City University of New York (CUNY) CUNY Academic Works

Dissertations, Theses, and Capstone Projects

Graduate Center

10-2014

The Politics of Transportation Megaprojects

Patrizia Christa Nobbe Graduate Center, City University of New York

How does access to this work benefit you? Let us know! Follow this and additional works at: https://academicworks.cuny.edu/gc_etds

Part of the <u>Economics Commons</u>, <u>Political Science Commons</u>, and the <u>Public Administration</u> <u>Commons</u>

Recommended Citation

Nobbe, Patrizia Christa, "The Politics of Transportation Megaprojects" (2014). *CUNY Academic Works*. https://academicworks.cuny.edu/gc_etds/370

This Dissertation is brought to you by CUNY Academic Works. It has been accepted for inclusion in All Dissertations, Theses, and Capstone Projects by an authorized administrator of CUNY Academic Works. For more information, please contact deposit@gc.cuny.edu.

THE POLITICS OF TRANSPORTATION MEGAPROJECTS

by

PATRIZIA NOBBE

A dissertation submitted to the Graduate Faculty in Political Science in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York

© 2014

PATRIZIA NOBBE

All Rights Reserved

This manuscript has been read and accepted for the Graduate Faculty in Political Science in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

Professor Christa Altenstetter

Date

Chair of Examining Committee

Professor Alyson Cole

Date

Executive Officer

Professor Christa Altenstetter

Professor Alyson Cole

Professor Joe Rollins

Professor Joseph Berechman

Supervisory Committee

Abstract

"The Politics of Transportation Megaprojects"

by

Patrizia Nobbe

Adviser: Professor Christa Altenstetter

Large infrastructure investment decisions, especially for mega-projects defined as costing more than one billion U.S. dollars, are largely based on complex, unclear and non-transparent decision criteria. The project's specific context and a variety of actors and interests add to the complexity of the decision processes. All projects deviate, to a certain degree from a "rational" decision-making process, are politically motivated and subject to multiple interests. Cost-benefit analyses are conducted in about half of the projects. In this work I hypothesize that the politics of project decision-making is comparable across countries, relative to their nature, form of involvement and impact on decision-making. This dissertation develops a theoretical framework to assess the politics of transportation megaprojects internationally, and then tests it by integrating quantitative and qualitative research methods. I apply the framework to a comparative database composed of transportation megaprojects worldwide as well as to two US based case studies. Using this framework the research yields the following main findings:

1. Any infrastructure investment project is a product of its time.

2. Transportation investment decisions most frequently are about funding.

- 3. The dwindling role of national governments across the globe in favor of local decision-making shifts project and funding decisions to the local level.
- 4. Creating broad pro-project coalitions is crucial. Each transportation megaproject is composed of different sets of support and opposition groups. Agency fragmentation and privatization trends further contribute to more complicated decision and funding schemes.
- 5. National governments disproportionately fund projects that have cost overruns and long implementation times.
- 6. The nature of transportation agencies matters. Depending on the type (line agencies, special purpose agencies, or single purpose agencies) transportation agencies either contain the inbuilt conflicts of their creators, or they already embody consent for a project. This yields strong impacts on project decision and implementation processes. On the other hand, transportation agencies may act as a potential shield from politics, with the ability to hold and maintain items on a long-term agenda.
- Generally, national level and grant-funded projects face weaker opposition.
 Further, opposition and cost overrun are associated.

Table	of	Contents
IUDIC	•••	Gomeenes

Introduction	1
Chapter 1: Transport Megaproject Decision Making: Literature Review	17
1.1. The Rational Decision-Making Model and Its Demise	17
1.2. Which Are the Political Factors Entering Decision-Making?	23
1.3. Contextual Factors	24
1.4. Rationales of Investment Decision-Making	29
1.5. Transport Agencies	35
1.6. Other Factors	39
Chapter 2: The Politics of Transport Investment Decision-Making - Theore	etical
Framework	
2.1. Scope	41
2.2. Transportation Infrastructure Investment Decision-Making: Making Sense	44
2.3. Transportation Agencies	48
2.4. Political Context and Project Decisions	52
2.5. Actors in the Political Process: Coalitions, Interests, Power and Money	55
2.6. Transport-Economic Considerations	58
In Summation	59
Chapter 3: Research Design: Quantitative Methods and Case Study Selection	on 62
3.1. Justification of the Research Design	63
3.2. Dataset, Quantitative Analysis, Statistical Results	65
Randomness	65
Data Representativeness	66
Statistical Tests	66
Application	67
3.3. Case Selection and Case Study Research	68
Case Synopsis	68
Selection Criteria	69
Case Study Methods	70
Application	71
Chapter 4: The Politics of Infrastructure Investment Decision-Making: A	
Ouantitative Analysis	72
4.1. About the Data and Data Analysis	72
4.2. Macro-Political Factors and their Influence on Project Decision-Making	73
4.2.1. Notes about the Data	74
4.2.2. Exploring Relationships between Variables	77
4.2.3. Regression Models	83
4.2.4. In Summation	88
4.3. Project Decision-Makers	89
4.3.1. Notes about the Data	89
4.3.2. Exploring Relationships between Variables	90

-	
4.3.4. In Summation	
4.4. Megaprojects and Transparency	100
4.4.1. Notes about the Data	
4.4.2. Exploring Relationships between the Variables	
4.4.3. Regression Models	
4.4.4. In Summation	111
4.5. The Nature of Funding: Funding Sources	112
4.5.1. Notes about the Data	112
4.5.2 Relationships between the Variables	114
4.5.3. Regression Models	120
4.5.4. In Summation	123
4.6. Nature of Funding: Funding Types	125
4.6.1. Notes about the Data	125
4.6.2. Relationships between Variables	125
4.6.3. Regression Models	129
4.6.4. In Summation	131
4.7. Conclusion	132
4.7.1. Macro-level Government Arrangements	132
4.7.2. Location, Opposition, Transparency	134
4.7.3. Project Funding	135
Chapter 5. The Politics of Large Infrastructure Investment Decision-	Making.
The Case of the Second Avenue Subway	
5.1. Project Summary	140
5.2. Project History and Context	143
5.2.1. A New Transportation Agency	
5.2.2. The First Second Avenue Subway Construction Attempt under the New A	gency 151
5.2.2. The First Second Avenue Subway Construction Attempt under the New A5.2.3. Construction Halted: Another Recession and Maintenance Priorities	gency151
 5.2.2. The First Second Avenue Subway Construction Attempt under the New A 5.2.3. Construction Halted: Another Recession and Maintenance Priorities 5.3. The Politics of Decision-Making 	gency151 153 154
 5.2.2. The First Second Avenue Subway Construction Attempt under the New A 5.2.3. Construction Halted: Another Recession and Maintenance Priorities 5.3. The Politics of Decision-Making	gency151 153 154 15 4
 5.2.2. The First Second Avenue Subway Construction Attempt under the New A 5.2.3. Construction Halted: Another Recession and Maintenance Priorities 5.3. The Politics of Decision-Making	gency 151 153 154 154 155
 5.2.2. The First Second Avenue Subway Construction Attempt under the New A 5.2.3. Construction Halted: Another Recession and Maintenance Priorities 5.3. The Politics of Decision-Making	gency151 153 154 154 155 161
 5.2.2. The First Second Avenue Subway Construction Attempt under the New A 5.2.3. Construction Halted: Another Recession and Maintenance Priorities 5.3. The Politics of Decision-Making	gency 151 153 154 154 155 161 165
 5.2.2. The First Second Avenue Subway Construction Attempt under the New A 5.2.3. Construction Halted: Another Recession and Maintenance Priorities 5.3. The Politics of Decision-Making	gency 151 153 154 154 155 161 165 166
 5.2.2. The First Second Avenue Subway Construction Attempt under the New A 5.2.3. Construction Halted: Another Recession and Maintenance Priorities 5.3. The Politics of Decision-Making	gency151
 5.2.2. The First Second Avenue Subway Construction Attempt under the New A 5.2.3. Construction Halted: Another Recession and Maintenance Priorities 5.3. The Politics of Decision-Making	gency 151 153 154 154 155 161 165 166 171 Making:
 5.2.2. The First Second Avenue Subway Construction Attempt under the New A 5.2.3. Construction Halted: Another Recession and Maintenance Priorities 5.3. The Politics of Decision-Making	gency 151 153 154 154 155 161 165 166 171 Making: 176
 5.2.2. The First Second Avenue Subway Construction Attempt under the New A 5.2.3. Construction Halted: Another Recession and Maintenance Priorities 5.3. The Politics of Decision-Making	gency151 153 154 154 155 161 165 166 171 Making: 176 179
 5.2.2. The First Second Avenue Subway Construction Attempt under the New A 5.2.3. Construction Halted: Another Recession and Maintenance Priorities 5.3. The Politics of Decision-Making	gency151 153 154 154 155 161 165 171 Making: 176 179 179 183
 5.2.2. The First Second Avenue Subway Construction Attempt under the New A 5.2.3. Construction Halted: Another Recession and Maintenance Priorities 5.3. The Politics of Decision-Making	gency151 153 154 154 155 161 165 166 171 Making: 176 179 183 185
 5.2.2. The First Second Avenue Subway Construction Attempt under the New A 5.2.3. Construction Halted: Another Recession and Maintenance Priorities 5.3. The Politics of Decision-Making	gency151
 5.2.2. The First Second Avenue Subway Construction Attempt under the New A 5.2.3. Construction Halted: Another Recession and Maintenance Priorities 5.3. The Politics of Decision-Making	gency151

6.3.3. The Corridor Cities	
6.3.4. Other Political Struggles: Putting Together the Funding	
6.3.5. Obtaining the Federal Loan	
6.4. Conclusion	202
Conclusions	
Implications for Infrastructure Investment	
Outlook for Future Research	215
Appendices	
APPENDIX A: List of Projects	217
APPENDIX B	
APPENDIX C	
APPENDIX D	
APPENDIX E	
APPENDIX F	
APPENDIX G	252
APPENDIX H	252
References	257

Figures and Images:

Figure 1: The Political Elements of Transport Megaproject Decision-Making	24
Figure 2: Project Decision-Making Elements	47
Figure 3: General Research Design	62
Figure 4: Purchasing Power Parity per capita 2010 (in \$U.S.)	
Figure 5: Cost-Overrun (inflation-adjusted)	75
Figure 6: Utilization Ratio	75
Figure 7: Planning, Implementation and Construction Time	
Figure 8: Average Project Funding by Funding Source (in %)	113
Figure 9: Funding Sources Second Avenue Subway	141
Figure 10: Second Avenue Subway Phasing	142
Figure 11: Decision-Making Model for a Single Purpose Agency	177
Figure 12: Alameda Corridor Plan: From the Ports to Downtown L.A	180
Figure 13: Alameda Corridor Funding Sources 2003 (in million \$)	181
Tables	
Table 1: Macro-Political Variables (Mann-Whitney U-Tests and Kruskal-Wallis Te	re (ste
Table 2: Macro-Political Variables (Mann-Whitney U-Tests and Kruskal-Wallis To	ests) 80
Table 2: Macro-Political Variables (Snearman Rank Order Test)	81
Table 4: The Impact of Macro-Political Influences on Project-Related Variables: F	Sond
Funding (Linear Regression)	84
Table 5: Effects on Ideological Opposition (Logistic Binary Regression)	
Table 6Parametric Tests (Spearman and Pearson's Correlations)	
Table 7: Non-Parametric Tests: Associations between Project Decision-Makers an	ld
Selected Variables (Mann-Whitney U-Test)	
Table 8: The Effects of National Decision Participation on Ideological Opposition	(Binarv
Logistic and Non-linear Regression)	
Table 9: Transparency, Cost-Benefit Analyses, and other Variables (Mann-Whitne	ey U
Tests)	102
Table 10: Transparency, Cost-Benefit Analyses, and other Variables (Pearson's an	d
Spearman's Correlations)	103
Table 11: Structural Effects on Project Transparency (Linear and Non-Linear	
Regressions)	106
Table 12: Impact of Transparency on Ideological Project Opposition (binary logist	ic
regressions)	109
Table 13: Funding Sources (Pearson's Correlations)	114
Table 14: Funding Sources (Mann-Whitney U Tests)	118
Table 15: Funding Sources and Project Type Predict Part of the Variation in Project	ct Years
to Completion (Binary Logistic Regressions)	122
Table 16: Funding Types (Parametric Tests – Pearson's Correlations)	125
Table 17: Non-Parametric Tests Funding Types (Mann-Whitney U Test)	127
Table 18: Impact of Funding Types on Types of Opposition (Binary Logistic Regre	ssion)
	129
Table 19: MTA Capital Program Funding Sources	150

Images:

Image 1: Demolition of the Third Avenue El	145
Image 2: Second Avenue Subway Groundbreaking Ceremony 1972	153
Image 3 & Image 4: Subway Construction	171
Image 5: Alameda Corridor: Consolidating Three Rail Lines Into One	191
Image 6: Alameda Corridor: From the Ports to Downtown L.A.	195
0	

Acronyms

ACFT	Alameda Corridor Task Force
ACTA	Alameda Corridor Transportation Authority
BOT	Board of Transportation
CBA	Cost-Benefit Analysis
CPRB	Capital Program Review Board
DB	Design-Build (procurement contract)
El	Elevated Line
EIS	Environmental Impact Statement
EIR	Environmental Impact Report
ESTA	Empire State Transportation Alliance
FTA	Federal Transit Administration
IND	Independent System
JPA	Joint Powers Authority
MESA	Manhattan East Side Transit Alternatives Study
MIS	Major Investment Study
MPO	Metropolitan Planning Organization
MTA	Metropolitan Transportation Authority
MTACC	Metropolitan Transportation Authority Capital Construction
NIMBY	Not In My Backyard
NYC	New York City
NYCT	New York City Transit
PAC	Ports Advisory Committee
RPA	Regional Planning Association
SCAG	Southern Californian Association of Governments
TA	Transit Authority (also: NYCT)

Introduction

Journalist Will Doig offers a candid assessment of the relationship between politics and transport decision-making: "If God himself, and Vishnu, Mohammed and Einstein said, 'Build this route this way with these stops!' politicians would still change it around for political reasons," Doig quotes land-use expert Roger Valdez. "It only takes one politician to gum up a world-class transit plan," he goes on to explain. "Voters want a subway stop on their block, so their elected officials fight for it, whether or not it really makes sense from an urban planning perspective. Or they *don't* want the subway coming near them. Or they want light rail but not a bus. Or they want an airport link, but they want it to go around their neighborhood rather than through it" (Doig, 2012).

This dissertation will analyze the politics that shape and direct decision-making for multi-billion dollar infrastructure investment projects (megaprojects). To keep pace with population growth, the need to invest in new or existing transportation systems has been increasing rapidly, especially in urban areas. For technical, economic and social reasons, selecting projects requires careful prioritization among available investment alternatives. But since large sums are at stake, projects are also politically contested, and a significant number of project decisions may be viewed as the spoils of political battles. As a result, from a transport-economic perspective, the "best" projects do not always win out.

In their study on proposed New York-area transportation investment projects, Berechman and Paaswell find that the numerous agencies¹ carry an equally large number of planning objectives and ideologies: "some were proposed to solve transportation problems, others are meant to mainly boost real-estate development and economic growth in specific locations." They summarize the problem as follows: "[T]he raison d'être of these projects did not emerge from a comprehensive analysis of regional needs; rather, they have been posed by various stakeholders putting forth agency-sponsored

¹ For example, in the New York metropolitan area, project decision-making involves coordinating a variety of different and competing transportation agencies and interests. The most important transportation agencies in the area are the Port Authority of New York and New Jersey, the Metropolitan Transportation Authority, New Jersey Transit, the New York State Department of Transportation, New York Metropolitan Transportation Council (the metropolitan planning agency), the development corporations, etc. Each has its own mission and agenda, but they share overlapping transportation responsibilities in the region and have different abilities to call on resources and capital.

projects some of which are over a decade old" (Berechman and Paaswell, 2005, p. 225). The authors ask the questions, who decides?, and on what basis?

Considering the financial and technological challenges megaprojects pose, one might expect that experts, politicians and stakeholders apply rational and economically informed criteria to the decision-making process. However, political considerations appear to have much greater influence in determining the fate of an infrastructure investment project than do economic and transportation considerations. As summarized by Berechman (2009), transportation investments, "despite their strong technological and economic dimensions, [seem to] represent partial political statements regarding objectives, funding priorities, and targeted service recipients." As a result, using strict transportation-economic criteria, a large number of implemented megaprojects are unworthy ex-ante or are clear failures ex-post. Thus, it may be said that actual megaproject decision-making is not necessarily or exclusively about economic or transportation efficiency, but something else – politics.

Furthermore, it seems perplexing how megaprojects get constructed at all, especially in considering the thicket of public and private transport agencies in metropolitan areas, multiple interests over urban space, and fierce funding competition. New York's \$1.9 billion AirTrain at John F. Kennedy International Airport, Paris' \$1.8 billion Meteor subway line, the bi-national \$4.1 billion Oresund link, all involved endless planning and political struggles. Some projects are endless construction sagas, like New York's Second Avenue Subway, the planning of which began about 80 years ago. Others might never be built, like the New York metropolitan area's \$8.7 billion "Access to the Region's Core" commuter rail project that got cancelled in 2010 after \$600 million had already been spent. Who decides when and whether these projects get realized or abandoned?

Understanding infrastructure investment decisions is crucial, because infrastructure access organizes social, economic and political opportunities and participation in society. As such, it would be insufficient to base project selection on transportation-economic rationales only. But project selection is undocumented, muddled and nontransparent to begin with. So the main questions, before normative questions may be asked, are: what drives infrastructure investment decisions; what are the politics behind each project? This dissertation explores whether these questions can be answered with any cogency.

The main argument of the dissertation is that investment choices are as much driven by politics (open and hidden) as by transport-economic rationales. The politics arise from institutional arrangements and political power struggles. Independent of place, infrastructure investment decisions are rooted in the larger societal context and in large-scale ideological dynamics. Megaprojects are executed by varying types of agencies that, corresponding to their degree of autonomy from these larger governance systems, have the power to channel politics, set agendas, and build shifting coalitions to compete for funding. Their institutional arrangements are crucial in the process, because they determine who holds power over what. In the end, the choices benefit certain groups over others, reflecting shifting political coalitions on the national and local levels. These dynamics are similar to all infrastructure investment decisions across the world.

That megaprojects should be political endeavors is not per se problematic. The politics "interfering" with the decision process can be good or bad. Infrastructure investment may carry socio-economical and political benefits beyond transport-economic considerations – for instance, when a project increases local or international economic competitiveness or addresses national security concerns. That still does not mean a project would stand a transport-economic test.

On the other hand, infrastructure investments have been criticized as vehicles for interest group politics, as expressions of the neoliberalization of public space. Here, too, the implication is that the politics influencing project planning are a distortion of what should be a more rational process. Whatever the angle of criticism about the role of politics in project planning and development, when these political influences combine with a lack of transparency in the decision-making process, there is no way to discern a reasonable standard for project choice. Political elements seem to be blended with technological, transportation-economic and social requirements, and one gets the sense that research on the politics of transport investment decision-making, in order to adequately reflect reality, must be interdisciplinary. I will explain the merits of an interdisciplinary research approach in more detail below. To better clarify and organize the issues, however, I first want to explain what the exact political parameters are.

This dissertation is not the first study to deal with this problem. Plato already understood the tension between expertise and rationality, on the one hand, and politics, on the other hand. While his advice – to form classes of experts in each generation that would handle all questions related to their expertise – might be one acceptable solution, this is not a likely outcome in the near future.

In recent decades, transportation megaproject investments (hereinafter also referred to as "megaprojects") are a subject that falls in and out of fashion periodically. It recently attracted renewed interest, also beyond academia, because of the prolific research conducted by Flyvbjerg and colleagues, most prominently with a book on implementation risks in 2003. The authors start by observing and establishing the problem of frequent cost overruns in infrastructure investment projects and ask why this happens. They assess several risk measures and argue that strategic misrepresentation –

by planners, promoters, and politicians – is at the core of many megaproject failures (in terms of cost overrun).

Priemus et al. edited a volume on megaproject decision-making (2008) where the contributors looked at management and planning issues, but not specifically at politics per se (Priemus et al., 2008). Berechman's book on the evaluation of transportation megaprojects establishes a framework for thorough project evaluation – something missing from typical project choice. His evaluation framework encompasses economic, transportation and policy-analysis theoretical principles; relevant evaluation issues; applicability to a wide range of transportation investment projects; and predictions about future developments and projective alternative analyses (Berechman, 2009).

Another large study on megaprojects was done by the OMEGA Centre in London, which directed a team of international researchers to conduct case studies in their countries. The project was centered on the themes of complexity, uncertainty and risk in megaproject management; politics was one among many issues feeding these themes (2010). A recent edited volume on urban megaprojects looks at megaprojects across the world as instruments of capitalist urban restructuring to fit the purposes of a globalizing economy. The chapter contributions encompass an impressive array of cities and their policies around the world (del Cerro Santamaria, ed., 2013). The contributors focus on megaprojects as an expression of another function without focusing specifically on the politics of megaproject decision-making.

The study most closely related to the subject of this dissertation is Altshuler's and Luberoff's analysis of the changing nature of urban transportation investment decisions. They conduct an in-depth analysis of the politics of large infrastructure investment in the United States. The authors situate infrastructure investment decisions within a historical

framework. They argue that the politics of urban investment have changed over time, influenced by changing federal funding structures and the massive opposition to innercity highway projects that arose in the 1960s and 1970s. The authors explain the politics of megaproject decision-making through several disjointed political theories, which will be summarized in more detail in Chapter 2 (Altshuler and Luberoff, 2003).

By contrast, my goal is to deliver a political framework of large infrastructure investment decisions. Though building on the literature, the dissertation goes beyond all of the literature above by first building a framework that integrates quantitative and qualitative methods to allow the documentation, assessment and analysis of project decision politics internationally. Second, the comprehensive account allows for focusing on the political aspects of project decisions independent of the decision environment, and hence analyzes the decision-process. Hence it provides a way to assess and evaluate the impacts of politics –broadly understood as interests— on decision-making, beyond sole transportation efficiency. In the following, I will outline my subject matter, concepts, research approach and contribution in more detail.

This analytical framework for large-scale infrastructure politics assumes the decisionmaking processes for infrastructure investment projects to be comparable internationally, and to a certain degree also across time. While this is a daring thesis, it will serve to identify the main elements of decision-making. A combination of quantitative and qualitative elements will balance the classic research problem of breadth vs. depth.

The most relevant concept of this study is the politics of decision-making on large infrastructure investment projects. *Politics* in this case refers to open and hidden purpose-driven negotiation, coalition and confrontation processes of actors embedded in

institutionalized settings that define their scope of power and influence – both over funding as well as in terms of ideas. While *decisions* are single acts of choice, *decisionmaking* refers to an interrelated series of decisions.

The *decision-making process* of a large infrastructure investment project entails everything (in theory) from project idea to ex-post evaluations. For analytic purposes, I abstract the process into the stages of problem definition, agenda setting, alternatives selection, project approval and funding and project conclusion – although they do not have to follow this order, or take place at all. This is particularly true for the complex infrastructure investment decision process.

Infrastructure investment refers to capital-intense expenditures on comprehensive, basic societal structures. The notion has been understood to include many different things, including public utilities, communications, health care and, of course, transportation. Here, infrastructure investment will refer to the decision-making process of large-scale transportation projects only. This dissertation will predominantly focus on decisions and decision-making prior to project construction start. Construction start, for the purposes of this dissertation, marks the conclusion of the infrastructure investment decision-making process.

Approach: To my knowledge, no systematic, integrative *political* study has been conducted that includes large-scale comparative elements as well as in-depth analysis and formulates a coherent theory of megaproject politics that is applicable independent of place. This dissertation attempts to do that.

To start, I identified the elements that are common to most infrastructure investment projects. My projects include railways, subways, airports, highways, bridges, and tunnel projects of over 1 billion \$US. They are comparable because they all organize or

reorganize transportation, are physical expressions in contested public spaces and are extraordinarily capital intensive. Hence, they all are subject to political and often modal competition. Ideally, all transportation megaprojects would be subject to transporteconomic scrutiny; in fact, most have the lack of such studies in common. Further, more often than not they do not perform well and are more expensive than projected.

Second, transportation agencies and authorities of various shapes implement infrastructure projects. Because transportation agencies operate within an institutional context, they are afforded a certain degree of either autonomy or dependence. In either case, decision-making involves multiple layers of government on local, regional (state), or national (federal) levels. Civic and business actors, organizations, neighborhood alliances and other interests play a role. The importance of understanding investment decisions is highlighted by fierce budget competitions and public controversies.

Third, all transportation megaprojects are impacted by larger political-contextual arrangements like regulatory policies, transportation cultures and policy frames. The contextual dynamics that may be compared –provided comparable data is availableacross countries are privatization, devolution and fragmentation (Giuliano, 2007). Privatization refers to the trend that public authority is being delegated into private or semi-private hands. Debates about private sector vs. public sector efficiency accompany these developments. The devolution of public services describes the re-allocation of decision authorities from the national (or federal) level to the local (or state) level. Both privatization and devolution trends increase the fragmentation of decision autonomy. This trend is particularly obvious in metropolitan areas.

I integrated these elements into one model designed to explain the politics of decisionmaking – the result of a literature review –, which will be described in detail in Chapter

3. To apply and test the model, I collected extensive information for 60 megaprojects all over the world, and conducted two in-depth case studies in the United States – one on the Alameda Corridor, a freight rail project in the Southern Californian area, and one on the Second Avenue Subway, a long-term on-again/off-again subway project in New York City.

The following research questions will clarify my approach to the politics of infrastructure

investment decisions:

1. What are the political decision-making steps for each project? In which order were they taken? What relevance do the individual elements have in the process?

2. Which contextual, macro-political factors and dynamics shape megaproject decisions?

3. What drives infrastructure decisions? Who decides and based on what? Which actors were involved, and what was their decision-making potential? What is the influence of competing project rationales and interests, and how can it be assessed?

4. How do transportation agencies channel larger contextual dynamics and the interests of the specific groups involved? How can their degree of independence from other institutions be assessed?

5. What is the role of funding in the decision process?

Hypotheses

The main hypotheses concern the elements of context, project types and range,

transportation authority, actor interests and funding issues. They are bound together by

the idealized decision-making process mentioned above. The identified elements of

political decision-making are visualized in a decision-making model in Chapter 4.

1. Macro-level government arrangements matter for transportation decision-making because they organize the political arenas and institutions. Infrastructure governance is dependent on these structures and permeated by the dynamics and values of fragmentation, devolution and privatization. The macro-political context matters, because it determines decision arenas and values. For instance, the type of electoral system determines the relative power constellations of social groups in society by favoring left or right-wing governments (Iversen and Soskice, 2006). They thus impact spending priorities and distributional values. The degree of centralization for federalism impacts the degree of devolution, fragmentation and privatization in any given polity. These dynamics determine the main decision arenas and the values that drive project decisions. These dynamics consistently re-organize the distribution of power. Where the dynamics of privatization, devolution and fragmentation have most progressed, infrastructure investment decisions have been more politicized because of the increased number of decision (veto) points (Giuliano, 2007). In that sense, project rationales shifted away from transport-economic considerations.

The privatization of public services refers to different regulatory instruments, as well as the delegation of decision authority into private hands. Depending on the degree of privatization, different actors with different rationales enter the decision arena: from public authorities to semi-public authorities to fully private actors. Regulatory frameworks on national or sub-national levels have the power to influence megaproject decisions by setting investment incentives or disincentives (Altshuler and Luberoff, 2003).

2. Physical attributes like project modes, types and location determine which actors are involved in project decisions.

Though transportation is organized differently across government systems, the decision arena is usually, at least in part, determined by modal type. In the U.S. transportation landscape, "picket fence" federalism prevails, which means that infrastructure investment decisions for highways can take place in the highway administrations on the federal, state or local level. However, the railroad administration, structurally mirroring

the organization of the highway department, shares no decision overlap. Instead, highway and railroad decisions take place nearly entirely independently. Besides having implications for comprehensive transportation planning, the effect for the purpose of this dissertation is that two different sets of decision-makers with their support networks or opposition structures are involved, depending on the project type.

Second, although it should be decision makers determining project types, pre-existing transportation situations will inform projects as well. The effect is either through technological path dependencies (most of the time it makes more sense to add to an existing network, rather than start a new one), or through power structures that are already in place: where there is a transportation network, there are transportation agencies and institutional structures that maintain it. Once in place, they have more power within the political landscape than less established ones would have.

Third, project type is associated with project reach: while subway projects and bridges, with exceptions, are restricted to an urban center or metropolitan area, rail and highway projects often have regional, national or international dimensions. Depending on the type of the project then, a variety of decision-makers, interests and opponents influence the decision process (Altshuler and Luberoff, 2003). It is their physical expression in space that shapes what is going to be involved in decision-making.

3. Transportation authorities serve as the hinge between the general political and societal context and the projects themselves, and thus channel national, regional or local politics. Depending on their degree of autonomy, they are often the driving force behind project decisions.

The term transportation authority refers to different types of agencies established by government to perform specific transportation functions. According to Will Doig, over the course of the 20th century, hundreds of semi-independent public authorities have been created in the U.S. and in other countries (Doig lists Israel, Australia and Thailand)

(Doig, w/o year). They are part of larger, regional governance systems where different responsibilities are assigned to different actors; as such they channel a variety of interests (see Hypothesis 4).

Transportation authorities are central to infrastructure investment decisions because, typically established by majority coalitions, they are institutionalized reflections of power distribution in a polity (Moe, 2005). No project decision may be understood without considering the coalition and the political-institutional culture that created the agencies, as well as the attributes of actors or decision-makers within the agencies and the resulting power relations. Over time, often they become powerful actors themselves.

4. A variety of political, economic and social interests drive transportation investment decisions, and their respective impact is dependent on institutional arrangements and financial means.

Given the large sums that are at stake and the significant influence of transportation systems on people and goods, investment decisions should ideally be guided by clear decision standards: the public documentation of decisions, cost-benefit studies, etc. However, at least half of all investment projects seem to proceed without meeting conducting such studies.² In the U.S. the documentation performance improves if federal funding is involved. So what guides transportation investment decisions?

The decisions may be driven by transportation concerns like re-organization, improvement or new access. They may be driven by concerns for improved economic competitiveness, for instance by local or national business associations. Groups that typically wield significant influence are "Big Oil" and construction companies. Among the groups with growing influence are those that focus on environmental concerns. Communities and their representatives have an interest in promoting or defeating

² The U.S. Federal Highway Administration, for example, provides many tools for how to conduct costbenefit studies, but there is no indication that they are required if applying for funding. (FHWA, **2013**)

certain transportation projects. Another significant rationale for transportation investment is accompanying unions and job creation programs, which have been emphasized (but later not continued) by the U.S. Recovery Act of 1933; but the tradition is there. Finally, national security considerations play a role for transportation investment. The National Highway System is the most prominent example, but as the Alameda Corridor case study shows, it remains a legitimate project rationale, especially given prominent U.S. involvement in world affairs. Each project has its own combination of project rationales, and coalitions supporting (and opposing) projects tend to be unique for each project, but the motivations are often hidden.

In Hypothesis 1, I hold that macro-institutional arrangements have the power to impact governing coalitions. This is true for all levels of government. Independent of two- or multi-party constellations, there is usually one center-right and one left-leaning party, with associated ideas on the relative prioritization of economic development and social spending. In the U.S., even transportation preferences are attributed to party affiliation (e.g. Republicans are assumed to prefer cars over public transport), although that depends on the region, too. The power distributions in government affect transportation decisions qua value judgment, the power to create lasting institutions and regulations, and spending power.

At the level of project planning and implementation, that means that open or hidden politics yield infrastructure investment choices that are not a function of transporteconomic considerations, but that must be also understood as political outcomes of arrangements that benefit certain groups over others.

5. The politics of infrastructure investment decisions is the art of directing funding streams.

Project funding and access to resources are a crucial aspect of project decisions. Decision-making politics on large infrastructure investment projects are characterized by power struggles first and foremost because a great deal of money is at stake. Hence project decisions are funding decisions, and those in a position to allocate funds, or effectively secure funding, have the ultimate decision power.

Besides contributions to the field, my motivation for the dissertation, plain and simple, was to understand how these huge projects get off the ground to begin with. Working on a case study on the comparatively tiny AirTrain JFK megaproject (an on-airport passenger train at New York's John F. Kennedy International Airport) and conducting more than 15 interviews with people involved in the decision process, I started to become intrigued with the question of how megaprojects in general overcome myriads of political and financial obstacles in difficult decision environments.

Fortunately, the literature relevant to the subject at hand recognizes the looming questions of politics, power and public organizations, as well (Moe, 2005, Callahan, 2007), but usually focuses on selected aspects of a project only, and so my project was born. While the political framework of transportation infrastructure investment decision-making will clarify infrastructure investment politics, it will also deliver a tool for the political analysis of power in public decision-making. It will contribute an organizing framework that integrates influences and findings from different disciplines – critical urban studies, economics, management, psychology, and public administration – into political science and policy studies.

Chapter 1 will provide an overview over the relevant literature to situate the subject and show the different dimensions of decision-making. The chapter will be divided into four main parts: an overview of the decision-making process and its critiques, what the

literature has to say about macro-structural policy impacts and effects, a summary of the literature on transportation authorities, and an overview of actor motivations in general and megaproject decision-makers in particular.

Chapter 2 will subsequently integrate the findings of the literature review into a coherent theoretical framework of the politics of decision-making. I will first situate the subject within the descriptive, non-normative realm. Then I will outline the point of departure: the ideal decision process. The steps in that process form the main body upon which I collect political "evidence": context, transportation agency as the vehicle of project implementation, and potential actors. The model will serve as the basic frame for the quantitative analyses.

Chapter 3 will provide an overview of the variety of different methods used to analyze the role of politics in transportation megaproject decision-making according to the model developed in the third chapter. I will restate the research questions and then show how they will be addressed in the multi-methods approach and provide rationales for using these methods as well as the case study selection.

The quantitative tool consisting of a database of 60 megaprojects will be presented in Chapter 4. Hypotheses from the literature and from my own understanding of the data and the research field guide the investigation. The chapter is divided into six sections: a brief introduction describes the data, its collection and the approaches taken. The second section explores macro-political, economic and cultural impacts on selected project characteristics. The third section scrutinizes the associations between national, state, local, transportation agency and international decision-makers and project attributes and outcomes. The fourth section investigates the influence of transparency issues and transport-economic studies that pertain to "ideal" decision-making. The fifth section

presents the results from the analysis of funding sources and types and their impact on project choice. Extensive appendices provide information about the data, its representativeness, and the statistical tests used.

Chapters 5 and 6 will present the two case studies of U.S. megaprojects. In both case studies, I first provide a case study synopsis, which will give an overview of the main project facts. I then summarize some of the project studies that served as the bases for decisions and provide the general context and historical overview of relevant project decision steps. The remainder will be reserved for the description and analysis of the decision politics. In the end, I will conclude by providing a summary of the main decision-making steps that are part of the model (Chapter 3), and summarize the finding in the light of the hypotheses presented above.

Following, I will conclude and summarize this study by synthesizing the findings from the statistical analysis and the case studies and discuss the hypotheses and the decisionmaking model. I will finish with a discussion of methodological problems.

Chapter 1: Transport Megaproject Decision Making: Literature Review

I reviewed the key megaproject-specific literature, as well as corollary political science policy literature with the intention of developing a model of the politics of megaproject investment decision-making that will allow me to compare projects cross-nationally. Though the majority of the studies deal with U.S.-based examples, this review covers not only U.S. American literature relevant for explaining the politics of investment decisions. The following questions organize the review:

1. How can the politics of decision-making in large infrastructure investment planning be operationalized? What are the political decision-making steps for each project? In which order were they taken? What relevance do the individual elements have in the process?

2. Which contextual, macro-political factors and dynamics (actually or potentially) shape megaproject decisions?

3. What drives infrastructure decisions? Who decides and on what basis? Which actors are involved, and what is their decision-making potential?

4. What is the role of transportation authorities in the decision-making process?

1.1. The Rational Decision-Making Model and Its Demise

1. How can the politics of decision-making in large infrastructure investment planning be operationalized? What are the political decision-making steps for each project? In which order were they taken? What relevance do the individual elements have in the process?

Implementing megaprojects is difficult and complex. Researchers emphasize how

multiple political jurisdictions and institutions, market forces, interest groups and

business actors are involved in project decisions, rendering planning and

implementation processes politically difficult (Flyvbjerg et al., 2010, 2003, Priemus et

al., 2008, Mackie and Preston, 1998, Morris and Hough, 1987, Hall, 1980). They show

how the problem of sunken costs yields irreversible decisions (Hall, 1980, Collingridge,

1992), and how all of this negatively impacts project selection and success measures (Berechman, 2009, Priemus, 2008, Flyvbjerg et al., 2003).

This state of affairs deviates from desirable, well-planned transportation-economic project selection rationales, which I'll refer to as the "rational decision model" (Stone, 2002). I will discuss this model here at length because it seems to underlie much of the literature that seeks to understand why the reality of megaproject implementation departs so far from expectations.

Rational models of decision-making, prevalent in economics and some strands of political science, are not directly concerned with the human factor. They assume that rational, self-interested actors take steps to maximize positive feedback and outcomes through efficient, incentive-guided action in a generally knowable environment. As summarized by Jones,

"those models [the 'comprehensively rational' economic and decision theory models of choice] assume that preferences are defined over outcomes, that those outcomes are known and fixed, and that decision-maker actors maximize their net benefits, or utilities, by choosing the alternative that yields the highest level of net benefits. The subjective expected-utility variant of rational choice integrates risk and uncertainty into the model by associating a probability distribution, estimated by the decision maker, with outcomes. Choices among competing goals are handled by indifference curves - generally postulated to be smooth (twice differentiable) - that specify substitutability among goals. A major implication of this approach is that the mix of incentives facing the decision-maker determines behavior. A second implication is that adjustment to these incentives is instantaneous; true maximizers have no learning curves." (Jones, 1999, p. 299)

For instance, when discussing infrastructure investment, the rational model would identify two types of decision-makers: potential users of the projects (e.g. trip-makers), who respond to transportation-economic incentives (e.g., travel-time reduction), and project decision makers on all levels that try to attain improved cost-benefit ratios. It is assumed that the maximization of the combined welfare of the first group is the main objective of megaproject decision-making of the second group. The rational decision-making process is based on a clear – and, in normative terms, 'ideal' – model of reasoning: "Identify objectives. Identify alternative courses of action for achieving objectives. Predict the possible consequences of each alternative. Evaluate the possible consequences of each alternative. Select the alternative that maximizes the attainment of objectives." A rational policy decision-making process may look like this: "problem identification/agenda setting, policy formulation and adoption, policy implementation, and policy evaluation and reformulation" (Stone, 2002, p. 8). It assumes that the actors and their roles are well defined, and that all steps are more or less consecutive (i.e. FHWA, w/o year, p. 16). With respect to the megaproject decisionmaking process (or any other, really), the rational simplified decision-making process might be organized in clean, distinct stages: Problem Definition, Alternatives Selection, Agenda Setting, Project Approval, Project Funding and Project Success.

After a rationalist phase in the 1940s and 1950s, policy theorists and political scientists started to criticize the stages concept by recognizing complicated webs of chance that might interfere with it (Lindblom, 1959), ambiguity (Zahariadis, 2003), or paradox (Stone, 2002). Lindblom was one of the first to suggest that decision-making is more like a "muddling through" rather than an organized process. The process unfolds in complicated, quasi-accidental, non-transparent, and disorganized ways (Lindblom, 1959). Subsequently, different policy making theories evolved: the Multiple Streams framework, Punctuated Disequilibrium, the Advocacy Coalition framework, and Bounded Rationality. They will be summarized in the following.

Kingdon's (1984) Multiple Streams framework analyzes policy decision-making in the United States.³ The theory, originally referring to agenda setting, has at this point

³ "Multiple Streams" builds up on the "garbage can model" of organizational choice. It holds that decisionmaking happens in uncertain environments, which are characterized by "problematic preferences," "unclear technologies," and "fluid participation." Problems, solutions, and decision-makers do not necessarily unite,

extended to include the entire policy formation process, and is thus applicable to a broader range of political systems (Zahariadis, 2003). The framework assumes that any policy environment is a challenging and chaotic one, and decisions happen during brief moments when three aspects (here envisioned as streams floating through the policy realm) fall in place: problems, policies, and politics.

Citizens or policy makers may bring in more or less concrete *problems*. Which problems to pay attention to, or get put on the agenda, depend upon attention spans and power relations (see also Rochefort and Cobb, 1994). *Policies* are the various ideas competing for acceptance and implementation. Their selection criteria include "technical feasibility and value acceptability" (Zahariadis, 2007, p. 72). The stream of *politics* captures the national mood, interest group influence, and administrative and legislative turnover. In order to get policies or projects on the agenda, these three streams, which are not typically connected or related, come together through particular "windows of opportunity" that may be engineered or opened by "policy entrepreneurs" or politicians (Kingdon, 1984).

Another framework explaining how policies come about is the Punctuated Equilibrium approach. Despite stagnation, incrementalism or the conservative nature of national political systems and institutions, major policy change does occur. While most theories try to explain either stasis *or* change in policy-making, Punctuated Disequilibrium tries to explain both, and thus holds some markers for megaproject implementation (Baumgartner and Jones, 1993; Krasner, 1993). Though it has been developed to fit the United States, subsequent empirical studies have shown that it is applicable in other democracies as well (True, Jones and Baumgartner, 1999).

but are often distinct. Similarly, solutions may even be defined sooner than the respective problems. Furthermore, in this model, agenda-setting and policy formation are processes informed by history, chance and specific constellations. The selection of solutions is rather unpredictable and affected by decisionmakers' degree of knowledge, biases, and temporary constellations (Cohen, March and Olsen, 1972).

The theory integrates different levels of analysis. Stagnation happens in policy subsystems, while those issues that reach the macro political level bring major changes (Baumgartner and Jones, 1993). The theory posits that small changes at the sub-policy level may lead to macro-economic changes, and the main underlying dynamic is the attention paid to an issue. The trick to inducing policy change is to create or attract attention to a problem, or what is perceived as a problem. With respect to megaprojects, this means that they may be manipulated by strategically-placed information (see also Flyvbjerg, 2003) or emotive appeals.

The strength of the theory is that it addresses the multiplicity of "separated institutions, overlapping institutions and relatively open access to mobilizations in the United States" (True, Jones and Baumgartner, 2007, p. 157). Many transportation megaproject environments are thus described – in the United States, and elsewhere as well. Because of their size and complexity, megaprojects often require interaction between policy subsystems and the politics between the executive and legislative branches of the national government.

Further, the projects are so expensive that the macro-political environment and its policies affect them. For example, megaproject decisions proliferated in the wake of German reunification. The combination of a new-found optimism and the symbolism of unifying projects created new and "decisive" actor coalitions and project implementation (Peters, 2010).

The Advocacy Coalition Framework (ACF) emphasizes the role of specific advocacy coalitions in policy decision-making. Advocacy coalitions, which are made up of proponents such as special interest groups or local business associations – or some combination thereof – act in concert or share resources in order to place items on the

agenda or implement policies (Sabatier and Weible, 2007, p. 196). The framework also accounts for psychological and ideological affinities driving political ambitions and decisions, like individual deep core beliefs and policy core beliefs (channeled through institutions and agencies). They may vary from polity to polity and by political level.

Individual deep core beliefs involve assumptions about human nature, assessments of relative values like liberty and equality, prioritizations of certain groups over others, the role of government vs. market, etc., and all of these may be summed up as ideological components. Policy core beliefs include the priority of different policy-related values. Examples are the relative authority of governments and markets; as well as the proper roles of the general public, of elected officials, of civil servants, of experts, and of the relative seriousness and causes of policy problems in the sub-system as a whole (Jenkins-Smith and Sabatier, 1994). For instance, individual core beliefs might explain public transit vs. car preferences, and policy core beliefs different social spending habits with respect to the former. This would explain why social spending has higher priority in Scandinavian countries than in others (Esping-Andersen, 1990), and why there is a more elaborate train system than in the United States.

Bounded rationality theories are concerned with the limits of human understanding (Jones, 1999, 2003). They, too, have been developed in response to the rational choice model, and often include two kinds of limitations: cognitive limitations (Simon, 1957) and institutional limitations (for the latter, see section on institutionalist theories). With respect to the cognitive limitations, Kahneman and Tversky argue that "people rely on a limited number of heuristic principles which reduce the complex tasks of assessing probabilities and predicting values to simple judgmental operations. In general, these heuristics are quite useful, but sometimes they lead to severe and systematic errors" (Kahneman and Tversky, 1979, as cited by Berechman, 2009, p. 15).

Another aspect of this is that people consciously and unconsciously make their decisions in response to their environments, which provide both incentives and structures for decision-making. Hence, decision contexts like electoral rules, resource distribution, or interpersonal relationships enter the decision process, removing it from its rational patterns. Collingridge, specifically with respect to megaprojects, puts it more bluntly: human cognitive abilities are too limited to make valuable and informed decisions about anything as complex as transportation megaprojects (Collingridge, 1992).

In political science, bounded rationality has its greatest applications in organizational studies. I could not summarize it better than Jones:

"Over and over again, students of the behavior of public organizations reported findings that did not comport with the demands of objective rationality (Simon, 1985, p. 294). [...] Decision makers did not need simply to choose among alternatives; they had to generate the alternatives in the first place (Simon, 1983, 1996b; Chisholm, 1995). Problems were not givens; they had to be defined (Rochefort & Cobb, 1994). Solutions did not automatically follow problems; sometimes actors had set solutions ready to apply to problems that could occur (Cohen et al., 1972; Kingdon, 1996; Jones and Bachelor, 1994). Choice was based on incommensurate goals, which were ill-integrated (March, 1978; Simon, 1983, 1995; Jones, 1994). Organizations seemed to have limited attention spans and, at least in major policy changes, serial processing capacity (Simon, 1983, Jones, 1994, Cobb and Elder, 1972, Kingdon, 1996). The three most important strands of research stemming from behavioral organizational theory in political science focused on incremental budgeting, on the impacts of organizational routine on policy outputs, and on policy agendas." (all authors as cited by Jones, 1999, p. 302f)

The different theories evoke different elements of policy formation. Their common background is curiosity about how things are getting done at all. In this context, the theories of the policy process are useful to establish a decision-making core that allows me to contrast across megaproject decision processes. In the remainder of the review, I will summarize some of the relevant political science literature outside the policy theories, including specific megaproject studies.

1.2. Which Are the Political Factors Entering Decision-Making?

When and where do politics enter project selection processes? I will provide an overview

over the literature from four different angles: 1) macro-political influences, 2)

institutions, agencies and policy frameworks, 3) actors, power and politics, and 4) other items impacting megaproject decisions. Figure 1 displays the structure of the literature review. The "Project Decision-Making" core would refer to the idealized and nonidealized stages of decision-making above.

Figure 1: The Political Elements of Transport Megaproject Decision-Making



1.3. Contextual Factors

Which contextual, macro-political factors and dynamics shape megaproject decisions? Macro-level arrangements are important to project decision-making, because they determine the decision-makers and decision-making institutions. They may directly impact project decisions, for instance those decided on the national level, or influence funding sources. Via federalist arrangements, infrastructure decisions are often delegated to lower level decision-makers (Altshuler and Luberoff, 2003, Giuliano, 2007). Two main bodies of literature are relevant. First, the literature concerned with the impact of electoral and representation systems; and, second, the literature on supranational processes like European integration, which is less applicable in the U.S. Some studies take national structures into account (e.g. Mercado et al., 2007, Altshuler and Luberoff, 2003, Persson, 2002, Pierre, 1999, Eisinger 1998). For instance, a comparative study on transport policies in aging societies identifies influential institutions on three levels: overall government structures and systems (e.g. monarchies, parliamentary systems, federal systems); national transport institutions (ministries and departments), which direct and determine transportation plans; and sub-national entities (regional planning agencies and authorities) (Mercado et al., 2007).

Others identify dynamics that organize and re-organize decision-making. Literature on the dynamics of devolution (the delegation of decision authority from higher to lower levels) investigates the impact on urban and regional decision-making (Eisinger, 1998, Pierre, 1999). "Fragmentation literature" researches decision-making constraints arising from the "proliferation of governmental units and the dispersion of public funds" (Giuliano, 2007, p. 6). In a nutshell, in a tradition that goes back to the Anti-Federalists, decentralization proponents argue that the proliferation of government units benefits competitiveness and thus efficiency, while at the same time government is put closer to the people. Opponents of fragmentation hold that it complicates decisions that go beyond local issues (Giuliano, 2007).

The privatization dynamic refers to the role of government in infrastructure investments and deregulation trends (Derthick, 1985), or the delegation of decision, funding or contractual responsibilities to the private sector. The private sector is assumed to be more creative and flexible, thus better capable of adapting to increasingly competitive national and international markets (Giuliano, 2007, Flyvbjerg, 2003). Privatization is motivated by the assumption that the private sector performs better, either by delivering more efficient services (Donahue, 2002), or, in this case, more efficient projects (Hall, 1980, p. 188).
A related concept is the deregulation of certain industries over time. In the United States, proponents of deregulation bemoan the regulatory excess of "big government" that distorts or impairs market efficiency. Regulatory regimes affect elements of the construction and delivery of megaprojects – for instance, by framing contractual and financing schemes (Flyvbjerg et al., 2003). In the U.S. – although their regulation had been deeply entrenched – the deregulation of transport structures started in the late 1970s and included airlines, railroads and trucking industries. Derthick and Quirk explain that this was not a result of interest group pressures, but of experts successfully garnering Congressional attention by predicting increased efficiency and reduced costs to consumers. This appealed to Democrats, because it promised increased consumer rights, and to Republicans, because it promised greater economic freedom (Derthick and Quirk, 1985).

Some internationally comparative studies examine the influence of electoral institutions on economic and policy questions (e.g. Persson, 2002, Grossman and Helpman, 2001). For instance, Persson (an economist) studies the "systematic effects of electoral rules and policy regimes on the size and composition of government spending" (Persson, 2002, p. 883). He analyzes electoral rules (district sizes and electoral formula) and regime types internationally and finds that electoral rules and political regimes exercise systematic influence on economic policy choices:

"Empirically, presidential regimes are associated with smaller governments than parliamentary regimes, a smaller and less persistent response of spending to income shocks, a stronger post-election cycle in aggregate spending and revenue, but a weaker cycle in social transfers. Majoritarian elections are associated with smaller broad spending programs than proportional elections and with less corruption; they also have smaller (and perhaps less persistent) spending responses to income shocks, and a weaker election cycle in social transfers." (Persson, 2002, pp. 902f). Looking further he argues it is difficult and time-consuming to measure political institutions. Other researchers find that far-right and far-left controlled governments will have different investment patterns (Hibbs, 1977, Schmidt, 1982).

Political researchers are divided on how to categorize electoral systems, and what exactly their effects are (Norris, 1997). But all theories concern the distribution of power qua institutional effects, and their (potential) influence; for instance, how electoral systems are related to parties (Lijphart, 1994; Morelli, 2004), to voters (Taagepera, 1989), or to interest groups and clientelism (LeDuc, Niemi and Norris, 1996). As an example, the prevalence of the majority system in the U.S. facilitates the two-party system and thus polarization, which might lead to heightened ideological conflict at all levels and affect public spending (e.g. Lindquist and Oestling, 2010). Relative to this literature, one of the most relevant sources for analyzing the politics of megaproject decision-making is literature on interest groups, outlined below.

Altshuler and Luberoff describe how cities adjust to economic pressures. First, federal funding dried up, after an era of unprecedented infusions of federal aid for local and state infrastructure investment projects. At the same time, there was growing popular opposition to large-scale investment. As a result, cities needed to find different ways to deal with their infrastructure needs. Instead of relying on public funding, cities began shifting their investment strategies from direct public investments toward monetary and regulatory inducements in an effort to attract investments. Newly-established public authorities and local and state development corporations began to coordinate incentive and regulatory systems for public and private investment. Popular protests led governments to adopt rules that greatly constrained disruptive public investment, meaning that certain forms of large-scale public investment became more difficult, more expensive, and time-consuming than others (Altshuler and Luberoff, 2003).

Specifically with respect to megaproject investments, Priemus argues "[...] the frequent changes that occur in the political composition of the respective government may complicate the decision-making process. As the entire process, from proposal to handover, takes decades rather than years, every megaproject will be confronted with government elections and – more often than not – shifts in the balance of political power at national, regional and local levels. Some megaprojects are so emotionally charged and so bound up with differences in political ideologies that they are used as part of the stakes during elections and the formation of coalitions (e.g. for the effects of infrastructure decisions on incumbents see MacManus, 2004). This happens not only at national level (parliament, cabinet), but also at regional and local level and – most crucially – around the political consensus or dispute between different tiers of governments (national and local)" (Priemus, 2010, p. 6).

The complexities increase because of the long-term nature and geographic extent of transportation investment projects: the longer the planning and implementation time of a project, and the more jurisdictions it touches, the more political hurdles there are to overcome. Priemus describes this as "political discontinuity"⁴ (Priemus, 2010). First, since most megaproject decision-making processes span many years, they are subject to changes in governing coalitions on various levels, budget cycles, a variety of political

⁴ Priemus also describes the effect of "market discontinuities:" "Megaprojects figure in different decisionmaking phases in some markets and affect many other markets in the process. In some markets empirical facts have only limited validity. Generally speaking, prognoses and estimates - implicit and explicit - are based on assumptions about trends in supply and demand, and hence the price developments in relevant markets. A whole host of factors comes into play, such as the availability of engineers and other experts for the preparation phase; the supply of tradesmen, building materials, installations and raw materials for the execution phase; developments in energy prices; the overall economic situation; the capital market (including trends in long-term interest rates); inflation and the land market (important in the programming phase and the preparation and execution phase). Sometimes these market conditions are taken as read, but it is no exception for a megaproject to create its own endogenous market dynamics. These uncertainties can be 'put into cold storage' until a later date, but there is no guarantee that crucial factors will follow the anticipated pattern. Moreover, deviations can have a profound impact on the final cost-benefit analysis. Mobility patterns can change within the course of a single decade as a result of, say, competition from other modes of transport than those envisioned in the project. Inland shipping, for example, is competing strongly with rail and road for the transport of goods to and from major ports like Rotterdam and Antwerp. And one can safely assume that the advent of budget airlines such as Easy Jet is undermining the demand for highspeed rail transport in Europe." (Priemus 2010, p. 25)

influences, and even system changes (e.g., German reunification or European integration). In those cases, large-scale political changes and market discontinuities (i.e. economic crises) potentially affect decision-making by promoting or inhibiting certain types of projects.

The process of European integration poses new challenges on cross-border and supranational levels. "In Europe megaprojects often cross national borders and thus involve international negotiations and treaties, and sometimes, international conflicts. In some cases the European Commission also participates in the decision-making, especially if subsidies are involved or specific EU themes such as the Trans European Networks. Lack of political continuity and public consensus [...] can exert an adverse influence on the decision-making. When this happens the parties are assailed by tensions, which have spilled over from other domains. Fortunately, this can also work in the other direction: if government units collaborate well in other spheres and if they share similar views, there may be more consensus" (Priemus, 2010, p. 6, see also: Sartori, 2008).

Examples are the French high-speed train networks reaching into Germany, or the Channel Tunnel between France and Great Britain. In these cases, as opposed to situations where megaproject complexity renders decision-making more difficult, sometimes there are advantages – like the pressure for consensus in transnational projects.

1.4. Rationales of Investment Decision-Making

What drives infrastructure decisions? Who decides and on what basis? Which actors are involved, and what is their decision-making potential?

Urban Studies tend to be concerned with the spatial matters in the public realm, how access to public goods and urban space are distributed, and who holds the power. Part of that literature addresses ideologies and values. Urban Studies literature has long theorized about the question of who governs a city (Brash 2010, Berg, 2007, Dahl, 1961).

American explanations include urban "political machines" (Scott, 1969), "regime coalitions" (Stone, 1989), with "pro-growth coalitions"⁵ (Altshuler and Luberoff, 2003; Mollenkopf, 1983) and "policy entrepreneurs" as active drivers of change (Kingdon, 1984, Altshuler and Luberoff, 2003, Flyvbjerg et al., 2003, Dye 2001). In the frame of this dissertation the important question is what motivates decision-makers.

Mollenkopf has maintained that long-term urban development and financial support has always been grounded in party coalitions (particularly Democrats) wanting to hold on to power. Parties will assure that housing/public works programs are implemented (and provide both jobs and services) in order to keep the rule of that party in place. Progrowth coalitions are of interest here because, in megaprojects, there is so much money at stake that profit (and non-profit) actors and coalitions may get behind projects and push them. These coalitions started out as the expression of national-level involvement in local politics through development efforts and became lodged on the local level. Policy entrepreneurs compose pro-growth coalitions of various disparate – and, at times, even oppositional – groups to rally behind certain issues and policies; in this case, for megaproject investment (Mollenkopf, 1983; also: Altshuler and Luberoff, 2003).

Most authors argue that transport investment decisions are not about the projects per se but serve other motives beyond that. In his study of Los Angeles, Erie situates metropolitan developments within a debate on the influence of technological and governance systems on policy and performance measures.

One side of that debate argues it is market and technological pressures that bring about modernizing infrastructure investment (Denning, 1985 – as summarized by Erie, 2004, p. 32). The other side of the debate argues that governance structures matter (Olson,

⁵ "Pro-growth coalitions" may include a variety of political actors and interests, even conflicting ones, to implement certain agendas, and may originate from both the public and private sectors. They were crucial for the development of urban agendas and metropolitan development patterns (Mollenkopf 1983).

1988). This perspective will be illuminated in the next section below. The debate with respect to megaprojects or public infrastructure investment usually concerns economic development (Kennedy et al. 2011, Samiolo, 2006, Altshuler and Luberoff, 2003, Pierre, 1999, or Mollenkopf, 1983), symbolic reasons (Haeussermann and Siebel, 1993), or equal access motives (Gregory, 1999). According to Erie, for instance, the Alameda Corridor freight-rail project (see Chapter 6), is to a certain degree the result of a particular political constellation rather than technological progress (Erie, 2004).

The critical urban and metropolitan perspective points out how megaprojects have been used by elites for the neoliberal restructuring of cities (Swyngedouw, Moulaert and Rodriguez, 2002, Harvey, 2007, Brash, 2010). As such, megaprojects would reflect global pressures and incorporate changing systems regulation and governance on all levels (Erie, 2004, Swyngedouw, Moulaert and Rodriguez, 2002). Because of privatization dynamics, the literature overlaps with critiques of public-private partnerships ("PPPs"). PPPs are seen as political vehicles of neo-liberal politics, poorly justified by assumptions of market efficiency and budget constraints, which would promote business and market interests rather than social interests.

The concerns raised are the commodification of public goods, the outsourcing of government responsibilities (and therefore democratic accountability), and the detrimental effects on social needs and the environment (Brenner, Marcuse and Mayer, 2009, Isin, 1998, Erie, Kogan and MacKenzie, 2010) at the expense of urban communities (i.e. Gregory, 1998). In this view, megaproject selection is the result of specific actor coalitions promoting profit-oriented interests: strong lobbies, interest groups, and the politicians who would serve them. Siemiatycki suggests that involving private capital in the investment has an impact on the types of projects chosen, and that PPPs might distort regional planning priorities (Siemiatycki, 2010).

A particular strand of German literature, where megaprojects were a hot topic in the 1990s, argues that megaprojects are part of a culture of a "festivalization of city politics" (Haeussermann and Siebel, 1993, Peters and Huning, 2003). The argument is that city politics increasingly relies on megaprojects and mega-events to promote urbaneconomic and reputational growth. Infrastructure investment projects here serve as large flagship and urban-renaissance projects, e.g. in Berlin (Peters and Huning, 2003) or Hong Kong (Lui, 2007), drawing lots of attention and creating controversy. New York, through Robert Moses' highway projects, provides another example. According to Caro, Moses' objective was the transformation of the city structure by building highways: the transformation from a "neighborhood city" to a metropolitan area. But underneath were at least two additional purposes. The first was to increase the living standard in certain areas by developing better transportation flows (at the expense of lots of other, mainly poor neighborhoods). The second was to improve the economic competitiveness of New York vis-à-vis other metropolitan areas (Caro, 1975).

Interest groups are another way to conceptualize incentives and rationales, although the relative influence of these groups is inconclusive and controversial. The defining range includes voters with specific incentives ("groups in society [that] gain favorable treatment from the government based only on their voting behavior"), and proactive, organized groups with the potential to influence decision outcomes for various reasons (Grossman and Helpman, 2001, p. 1). Business interest groups have the strongest influence, seeking economic benefits for their members. Often they have international influence as well. Small interest groups, representing minorities or special interests, are also active. Because there is a lot of secrecy involved, the actual degree of influence is hard to gauge and likely differs by local and issue. In federal systems there are additional levels of government, making it even more difficult to assess. In the United States, for

instance, interest groups are structurally different on a federal and urban level, and the research field is dominated by research on the national level (Berry, 1984).

On a national level, interest groups seek to influence politicians, either before or after elections. Authors argue that the fewer interest groups there are to weigh on a politician, the stronger their actual respective influence (Grossman and Helpman, 2001). Lobbying may facilitate the interaction and information flow between the legislature (Congress) and bureaucracies, and (moderate) interest groups affect bureaucracies in such a way that they present more moderate proposals (Epstein and O'Halloran, 1995). Sometimes, interest groups simply gain influence over politicians by providing one of the few sources of clear and concise information on a given issue to politicians. Strong private sector firms, e.g. the construction industry, bring their own motives into the political process, and deliver with profit-oriented behavior (Kenny, 2008). An example of this kind of interest group dominance is Washington's Silverline Extension to Dulles Airport, the "prototype of where politics come in" (Winston, 2012).⁶

On an urban level, the influence of interest groups is more immediate. Interest groups have a spatial focus that extends the impact of neighborhood associations. These groups gain disproportionate impact in the sensitive planning processes, and thus infrastructure investment. As opposed to national or state-wide elections, in which voters may influence the ideological direction of government and policy in general by voting for the respective candidates and parties, citizen participation on a local level is potentially more specific and influential. According to Berry, there is not much research on urban interest

⁶ According to Clifford Winston, federal funding, in combination with interest group power, seems to be the way to get things done. After the Silverline Extension was defeated in Congress, and declined by the then-Secretary of Transportation, interest group pressure continued. Eventually, the Transportation Secretary reversed her position, and they were successful in securing part of the money from the Department of Transportation. That started the construction process immediately. Winston doubts that a cost-benefit analysis would recommend the project (Winston, 2012).

groups, but it is easy to conceive of the NIMBY (Not-In-My-Backyard) problem when building large infrastructure investments through dense urban spaces (Berry, 2010).

Opposition: Altshuler and Luberoff identify local and neighborhood opposition to projects as an important factor for decision-making. No matter how broad the proproject coalition is, "proposals rarely proceeded to implementation if they imposed more than trivial costs on neighborhoods or the natural environment" (Altshuler and Luberoff, 2003, p. 258). They call this the "do-no-harm-paradigm". In other words, they detect a high potential for project opposition in cases where costs are imposed on local residents (NIMBYism). As a result, mitigation measures have become very popular for most projects and an important source of leverage for diverse groups (Altshuler and Luberoff, 2003).

A range of studies focuses on specific neighborhoods or cities where some groups are critically affected by projects (Peters, 2010, 2003, Gregory, 1998). In some cases, residents have succeeded in blocking an entire project or parts of it. One example is the AirTrain at John F. Kennedy International Airport (AirTrain JFK), an airport circulator that should have originally extended all the way to Manhattan. The train was reduced to its current size by NIMBY-neighborhood opposition along the way, especially in Manhattan, as well, of course, as by the enormous price tag (AirTrain JFK, see Brecher and Nobbe, 2009). Environmental groups are another potential source of project opposition and mitigation costs, and their condemnation of a project's environmental impacts extends beyond the specific location of the project. In many cases, expensive litigation drives up a project's costs (Panero and Botha, 2011, Flyvbjerg et al., 2003, Altshuler and Luberoff, 2003).

In the end, on every level, within all electoral systems, there are decision points which translate the electoral or representative will and determine whether a policy or project makes its way onto the agenda (Pressman and Wildavsky, 1984). Veto players are those actors who have the potential to veto a decision, wherever decision frames allow. Depending on the political context and the structure of the decision-making process, opponents of any given agenda item exercise disproportionate influence over project outcome along the line by voting against it, thus keeping it from further recognition (Tsebelis, 1992). Transportation megaprojects, for instance, might be derailed by not making it onto a relevant agenda, failing to secure the necessary funding, and failing to be approved on a local, neighborhood level, etc., simply because such complexities increase the number of veto players (Giuliano, 2007).

In sum, influence is unequally distributed. Stakeholder coalitions and special interest groups are influential in determining politics in general and megaproject decisions specifically. Their degree of influence varies according to the coalitions they are able to form.

1.5. Transport Agencies

What is the Role of Transportation Authorities in the Decision-Making Process? Many political science approaches to decision-making are indebted to institutionalism, an approach that holds that the (political) environment or context explains the range of possible decision outcomes (Scharpf 1997, Cobb and Elder, 1971, de Jong, 1999, Pierson 2000, 2004). It is a big field, and it is difficult to summarize basic similarities (Ostrom, 2003).⁷ The concept of "path dependency" seems particularly relevant for decisionmaking. It describes how former choices cumulatively restrict the range of choices that follow. "Once established, patterns of political mobilization, the institutional 'rules of the

⁷ There is no one agreed upon definition of "institutions." The most used definition is that of norms, rules and procedures. Here I use the term to describe existing political organizations, like Congress, transportation agencies – or like above – electoral rules.

game,' and even citizens' basic ways of thinking about the political world will often generate self-reinforcing dynamics. Once actors have ventured far down a particular path, they may find it very difficult or even impossible to reverse course. Political alternatives that were once quite plausible may become irretrievably lost" (Pierson, p. 31). Certain paths and actions increase the relative attractiveness of choosing a similar action another time, thus generating a powerful, positive feedback cycle.

In recent years, more and more theories combine institutions and actors.⁸ One of the major proponents of actor-centered institutionalism writes that actors are "characterized by specific capabilities, specific perceptions, and specific preferences. [...] What matters most in the context of policy research, however, are the action resources that are created by institutional rules defining competencies and granting or limiting rights of participation, of veto, or of autonomous decisions in certain aspects of given policy processes" (Scharpf, 1997, p. 43). An updated version of that is the field of governance studies. In this section I will summarize the literature on why governance matters, with a particular focus on (transportation) authorities.

Terry Moe offers a unique perspective on bureaucratic institutions, and allocates restricted, but more active, powers to them. His work, integral to this study, provides insight into institutions, cooperation and power. Moe holds that political institutions in the political process are not only vehicles to facilitate cooperative transaction, but also vehicles of power. Power relations, to a certain degree, are inscribed in the set-up of any institution or agency. Thus, there are certain limits to its range of decisions, its agendasetting powers, or the number and range of actors that must be consulted with respect to certain decisions. In the New York State transportation world, for instance, any big

⁸ Other examples are Burns et al., 1985: "actor-systems dynamics;" Ostrom et al., 1994: "institutional analysis and development framework;" Zuern, 1992: "situational-structural" (Scharpf, 1997).

capital decisions taken by the Metropolitan Transportation Authority need to be confirmed by specifically defined state actors with their own set of interests.

All institutions are subject to internal and external pressures that complicate their ability to implement effective policy. With respect to the design of public authorities, Moe distinguishes five distinct political features. First, public authority is "up for grabs": it is essentially coercive and competitive in nature. Second, politics are uncertain, and power is transitory; this uncertainty affects the contours of institutions as "winners" design them, according to both some programmatic ideas and a desire to maintain power.

Third, agencies involve compromise, particularly under majority rules that necessitate appealing to those who oppose their design, which results in undermining agency performance. Fourth, the exercise of public authority creates counter-structures of groups trying to lobby, influence elections, or otherwise gain control. Five, public authorities are by nature imperfect, and not truly designed for efficiency. They are vastly different from economic models of organization (Moe, 1991, pp. 123-126). Therefore, the influence of a legislative principal shapes the range of possible legislative decisions.

Another aspect of this is that the principal has vested the agency with certain rules and structures to "keep [it] from doing what it would otherwise want to do, such as pursuing policies more to its own liking" (p. 228). In sum, bureaucracies and institutions start developing and promoting their own agendas. These mechanisms might play out as agenda control or have budget implications (Moe, 2005).

Jameson Doig's work on the Port Authority, an important transportation agency of the New York metropolitan area, focuses on the role and power of the agency itself. He argues that, besides the specifics of the metropolitan polity, the agency's politics and power are shaped by the stability of leadership, its leading characters, and the tension

between agency autonomy and democratic accountability. Doig categorizes the Port Authority as a "special purpose" agency, a structure that results from the desire or need to construct infrastructure unaffected by the rhythms and motives of politics. He explores the changing patterns and character of the Port Authority over time, and explains how the increasing encapsulation of decision-making within the agency has resulted in impressive projects, but has also negatively impacted its public accountability (Doig, 2001).

Both Doig's and Moe's accounts provide the tools for analyzing one of the most important tensions of infrastructure decision-making in democratic countries: the tension between normative decision standards informed by democratic requirements, and the requirements of getting infrastructure projects done. Moe's work is helpful in understanding the external and internal decision-making dynamics of a government agency that is entwined within a dense network of metropolitan power struggles. Doig's work reminds of the importance of both decision-making mechanisms, and the need for transparency in that process.

Generally, critics argue that decisions made by public authorities and their appointed, not elected, officials lack democratic legitimacy. By channeling decisions through public agencies, the efficiency and output of decisions may be improved, while democratic control vanishes (Bourdeaux, 2008, Swyngedouw, Moulaert and Rodriguez, 2002, Siemiatycki, 2010, Flyvbjerg et al., 2003). No matter how many calls there are for community participation, decision-making processes on megaprojects are criticized for their exclusion of community actors, and those most affected by infrastructure projects have insufficient political power to influence the decisions (Swyngedouw, Moulaert and Rodriguez, 2002; Flyvbjerg, 2003).

1.6. Other Factors

Political scientists, psychologists and economists try to account for "human nature" or psychological factors in decision-making and politics. I mentioned "bounded rationality" factors above, including the cognitive limitations of humans when it comes to understanding complex problems like megaprojects (Collingridge, 1992), and an innate optimism bias when making project decisions (Kahneman and Lovallo, 1974, as quoted by Berechman, 2009).

Authors also identify a personal, strategic dimension as a motivation of politics, namely the use of political power to advance a personal agenda, including manipulation and deceit. This is also called "Machiavellianism" (Flyvbjerg, 2003, Zahariadis, 2003, Wachs, 1989). Martin Wachs argued that megaproject decisions would often be based on deliberately distorted projections, depending on what experts and consultants would stand to gain or lose (Wachs, 1989). Flyvbjerg argues that data is strategically misrepresented –by politicians or experts— in order to approve otherwise questionable projects (Flyvbjerg et al., 2003, 2010).

Reelection concerns are one of the motivations. Altshuler and Luberoff hold that the structure of Congress itself is influential for decision-making. Congressional action, they contend, is motivated by the pursuit of district benefits and thus the prospect of reelection. Large infrastructure investment in any given district would establish a record of action and potentially present a Congress member as job creator in his district. On the other hand, Congress is an ideal platform to avoid blame and local controversies around projects because large majorities are doing decisions (Altshuler and Luberoff, 2003, Chapter 8).

Knowledge transfer issues as conceptualized by Principal-Agent Theory further muddle decision-making rationales. Principal-agent theory deals with the problem of delegation,

and information transfer between individuals or agencies (i.e. Osland and Strand, 2010, Jenkins-Smith and Sabatier, 1994 on the relationship between the bureaucracy and Congress). Key problems include the asymmetrical information between the agent and the principal. Asymmetric information makes it possible for an agent to take strategic advantage in order to see their projects realized (Flyvbjerg, 2010, p. 15). Asymmetrical information is one of the key reasons for Flyvbjerg, as to why transportation projects that are not in the public interest are chosen (Flyvbjerg et al., 2003).

Now, all these considerations have the potential to undermine a rational decision process for transport-economic requirements of decision-making. In the next chapter (Chapter 2), I synthesize relevant literature into one model that will then guide through the remainder of the dissertation.

Chapter 2: The Politics of Transport Investment Decision-Making - Theoretical Framework

I will synthesize the literature on megaprojects, institutions and actors that shape project decisions into a main model that explains where and how politics enter transportation megaproject investment decisions. Each section will be guided by one of the hypotheses provided in the introduction. But first I will clarify the scope and general ontology of the research project.

2.1. Scope

In megaproject decision-making, political pressures and incentives compete for influence with transport-economic or efficiency criteria. Political pressure may not be the best selection criteria for a multi-billion dollar project. Indeed, much of the literature shares this concern when attributing implementation problems to politics (Cantarelli et al., 2010). I argue that in democracies transport-economic criteria alone do not and should not suffice, but that the politics involved in megaproject decisions are ambiguous.

Transport-economic considerations do not suffice to meet larger societal ends. The equal-opportunity aspirations promoted in the United States have the potential to clash with economic (in this case, transport-economic) decision-making criteria, as the support of disadvantaged groups (e.g. improved transit access) may be morally and politically desirable, but not always efficient. The same is true for newer environmental concerns, which might lead to investments that are less efficient by economic criteria but promote long-term environmental sustainability effects.

The problem is that the democratic influence over project decisions most of the time happens post-factum, and is muddled at best: politicians that supported unwanted projects might not get re-elected (and are not often electorally punished pre-facto for their *intention* to support a certain megaproject—it they declare one). However, sometimes projects get bumped up to higher-level decision platforms (e.g. Congress), precisely because local decision-makers do not want to get their hands dirty. So politicians are clearly not the best project decision-makers because they are under lobby and re-election pressure.

This suggests that transportation agencies with a certain degree of decision-making autonomy are desirable in order to assert transportation efficiency criteria in the face of the NIMBY ("Not-In-My-Backyard") concerns of constituents.

The question here is not which decision-making criteria should be employed; the questions are where politics and political interests actually do play a role in the process, what is the particular role of transport agencies in directing that process, and whether it is possible to gauge trade-offs with other decision-making criteria. I assume that the combination of contextual factors, transportation authority, and access to funding (=power) determine the perceptions of transportation problems and potential project agendas – and, hence, project decisions.

Decisions are made continuously. As indicated in the introduction, *decisions* are single acts of choice, while *decision-making* refers to interrelated series of decisions. The *decision-making process* of a large infrastructure investment project describes everything (in theory) from project idea to ex-post evaluations. I will draw it out in more detail below. In politics, which is concerned with the formulation and implementation of (public) resources, single decisions are rare. Because public decisions are concerned with something as complex as public welfare, the politics and decision-making processes are also complex. They might involve different layers of government, individual actors like planners and heads of authorities, and the political negotiations required to solve an

investment problem. Often, a variety of issues is decided-upon at once. Political parties integrate literally thousands of issues and decision options and present them as a few sets of ideological choice. Decision outputs are typically laws, regulations or policies. In this study, the decision output is a project, specifically a transportation megaproject.

According to the standard definitions, politics may refer to the art of influencing government, the creation of policies, the direction of funding streams and of governance. The political process then describes the rule-guided interplay of institutions and actors. Politics here refers to open and hidden purpose-driven negotiations, coalitions and confrontations between actors embedded in institutionalized settings that define their scope of power and influence – both with respect to funding as well as in terms of ideas.

I will use an approach similar to the actor-centered historical-institutionalist framework to evaluate how project decisions are made, because this allows for the integration of contextual and interest-driven elements. One of the major proponents of actor-centered institutionalism writes that actors are "characterized by specific capabilities, specific perceptions, and specific preferences. [...] What matters most in the context of policy research, however, are the action resources that are created by institutional rules are defining competencies and granting or limiting rights of participation, of veto, or of autonomous decisions in certain aspects of given policy processes" (Scharpf, 1997, p. 43). I added elements of historical institutionalism, which insists on path-dependent influences over time.

This dissertation will predominantly focus on decisions and decision-making preceding the start of construction of large-scale transportation projects. Construction start, for the purposes of this dissertation, thus marks the conclusion of the infrastructure investment decision-making process. During construction, I do not expect politics to have too much

influence, largely because of the issue of "sunk costs": once project planning – and, more importantly, construction – has begun, it becomes increasingly unfeasible to stop the project, because too much money and political credibility have already been spent (Hall, 1980). At this point, relevant changes only come in through mitigation measures.

In the following, I will outline the political process of transportation infrastructure investment decisions and provide the research questions. The next sections will discuss various elements of the political process. Finally, I will summarize the main points and introduces some hypotheses.

2.2. Transportation Infrastructure Investment Decision-Making: Making Sense

Infrastructure investment decisions, for better or worse, are politically charged – and very messy. Open and hidden project politics yield infrastructure investment choices that cannot be measured in transport-economic terms and must be understood as political outcomes that benefit certain groups over others.

The project decision-making process is politically contested (Hall, 1980, Flyvbjerg et al., 2003, 2010, Altshuler and Luberoff, 2003) and subject to political disruption (van Wee, 2008). More often than not, it is unstructured, uninformed, misleading or deceptive (Wachs, 1989), inflexible (Hall, 1980), or barely manageable – cognitively speaking (Collingridge, 1992). Because of the long planning and decision process, there is also significant uncertainty – for example, about the economy, the weather, or the complexity of the enormous management tasks. And each megaproject decision process is embedded in governance structures and regulatory frameworks that are unique (but almost always complicated) and involve different institutions and actor coalitions.

Despite all differences, there are sets of decisions common to all projects. I organized them to correspond to the main decision clusters in the policy literature: Problem definition Agenda-setting Alternatives selection Project approval Funding decisions Project Implementation/Project Success

Regardless of different project contexts and agency types, common to most megaproject decision processes is the characteristic that these decision clusters rarely occur in this particular order. Often, the decision stages are overlapping, reversed, or simultaneous; at times, some are skipped altogether. Nonetheless, I use them as approximations of "where" and "how" the politics enter the process. Additionally, they are impacted by the structure of the implementing agency and embedded in context. The entire megaproject decision model will be visualized in Figure 2 below.

Problem definition: Simply put, someone needs to feel there is a transportation problem or gap. The perception of what that gap is may vary drastically. Projects are built to enhance traffic flow (highway extensions), to replace older means of transportation with newer ones (bridges and tunnels instead of ferries; airports), or to offer transportation alternatives (subway systems). Sometimes the primary goal of a transportation investment project is not directly improved transportation services, but something else. The number "7" subway extension west leads into a future development area. But there are a number of subway gaps that might be closed in New York. Currently under construction is the Second Avenue Subway in Manhattan, rather than one out in the boroughs. Boston's "Big Dig" (a complex tunneling project that submerged a surface highway and created a new tunnel) is in large parts a beautification project, and less a project driven by strict transport-economic necessity. Also in that category are infrastructure investments in developing countries, as touched upon in the literature review. Consequently, different sources – from the public to the private sector, transportation agencies, or developers – stimulate and promote projects everywhere,

making projects difficult to compare. Yet this stage in the decision-making process is present in every project.

Agenda-setting: If someone perceives of a transportation gap, they must get a proposal on some relevant agenda. Depending on the regional infrastructure implementation landscape or funding availabilities, this might either be an influential transportation agency or a legislative sub-committee at the appropriate political levels. At least in the U.S., projects are more likely to get on agendas if they have powerful political or economic proponents, like favorable party platforms, lobby or business groups (Altshuler and Luberoff, 2003), or otherwise charismatic proponents (Caro, 1975).

Alternatives selection: If considered, there are a variety of routes or even transportation modes that might be chosen to address the transportation gap. Transportation authorities, planning agencies or independent consultants conduct studies based on a variety of criteria that are deemed relevant (transportation-economic, costs, projections). They then deliver the results to the platform responsible for the main project decision.

Project approval: Depending on the institution – for example, a transportation agency – problem definition might already constitute project approval. Or certain actors may also perceive a project as desirable *first*, and successfully put it on some agenda, and *then* go looking for a problem the project may be able to solve. However, a project is usually sponsored by some implementing agency that needs to then gain approval. In some cases approval is required from agencies at a higher level, and often from overseeing funding institutions, which may be legislative actors. Some political environments encourage the creation of single-purpose agencies to implement projects, the creation of which implies project approval.

Funding: The competition over project funding is where the politics play out: when project decisions are made on a parliamentary level, funding approval often means general project approval. Even when mainly channeled through independent transportation agencies, internal agency is often coupled to the approval of various outside funders.

Project Implementation and Success: This stage refers to whether the project is actually being implemented or not, and then later, whether actual user number correspond to projected ones.

Figure 2 presents the general model of the political decision-making process and hence also illustrates the main theoretical framework of the dissertation. The model includes additional elements, because it needs to be applicable across projects and countries, to allow for comparisons. Again, the order of decision steps may vary.





The model contains five main elements. The first element is the vertical block of decision clusters. These are the individual decisions or sets of decisions, described above, which are relevant to most projects. The second element, the smaller circle, represents the implementing agency. Depending on the type of agency, different political factors may potentially impact the decision-making process at various points, represented by the left box and respective arrows.

The fourth element is the large circle, representing how context may shape all political factors, as well as potentially determine the degree of agency autonomy. Decision contexts vary by country or region, as do political factors like electoral systems, planning and decision environments, transportation cultures, politicians, stakeholders (funding sources), and interest or opposition groups. Dependent on these factors are the three dynamics of fragmentation, devolution and privatization. They will be discussed below. The fifth element is transport-economic factors, represented by the box on the right. It symbolizes those impacts on decision-making that may come from project studies, prognoses, and environmental impact assessments.

The model renders infrastructure investment politics comparable across countries. Project or decision politics, embedded within historical and present context, cluster around problem definition, agenda setting, alternatives selection, funding decisions, and final choice. The context also informs the possible ranges of political institutions, actors and capacities, and hence the political activity (negotiations, compromises, votes, power relations, etc.). I will turn to each of the layers in the remainder of the chapter.

2.3. Transportation Agencies

Transportation authorities serve as the hinge between the general political and societal context and the projects themselves, and thus channel national, regional or local politics. Depending on their degree of autonomy, they are often the driving force behind project decisions.

Usually, project decisions are channeled through implementing transportation agencies. Transportation agencies are central to infrastructure investment decisions because they are the hinge between the general political and societal context and the projects themselves. No project decision may be understood without considering the politicalinstitutional culture that created its implementing agencies, and the attributes of actors or decision-makers within the agencies and the resulting power relations.

Agencies are not independent actors. Usually the institutions that created them also exercise varying degrees of control over them; their degree of autonomy varies across agencies and some agencies have more independent decision authority than others. However, that does not mean that they are not powerful actors in their own right. For example the Metropolitan Transportation Authority (MTA) that is responsible for transit in the New York region needs to get state approval for capital investment projects, whereas the Port Authority of New York and New Jersey (PANYNJ), as a bi-state agency, can only make large investment decisions when the governors of New York and New Jersey agree on a course of action. Yet both agencies successfully pursue own agendas. I will show more about the MTA in Chapter 5.

Transportation agencies are difficult to classify because each is created within a unique environment and for a particular purpose. They may have different degrees of power, budget levels, and scopes, and they may deal with either one or several modes of transportation. There are three main types of agencies. First, "line agencies" are government or public agencies with a hierarchical structure, like the U.S. Department of Transportation and its sub-departments at the state and local level. The second type is a semi-autonomous "public authority," created for a special purpose. Usually transportation authorities integrate a particular region. Examples are the PANYNJ and the MTA, both of which are responsible for different portions of transportation in the

New York area, which includes parts of the neighboring state of New Jersey, as well. The third type of agency is one that is specifically created to implement a particular investment project. These are founded in the absence of other eligible implementation agencies and either dissolve after project implementation, or settle and expand (for example, the Alameda Corridor transportation authority in Southern California).

'Line agencies' have a specific place within government hierarchies. In the United States, the federal Department of Transportation (DOT) ranges on the same level with other executive government agencies and has lower-ranking counterparts at the state and local levels. As such, the DOT's decisions are dependent on its allocated budget (which is administered by Congress) and the (mostly indirect) approval of the president. The president also appoints the head of the DOT. The state DOTs answer to the federal DOT concerning how they distribute their funds, which are mostly allocated by the federal DOT. The local DOTs are similarly dependent on their relevant state DOTs. Within their agencies, the DOTs possess relative decision-making autonomy. In politically centralized countries, which are often smaller in size, decision-making is more centralized, as well: large investment decisions typically take place on a national level. In these cases national parliaments tend to be more immediately involved in project choice, like in Sweden.

Semi-public authorities answer to the institutions that created them. The investment capital project decisions of the MTA, as I will discuss at length in Chapter 5, are subject to the budget approval of New York's governor and the state legislature. So, their decisions rely upon approval that is subject to political compromise, which may impede the sensibility of project selection.

On the other hand, authorities or public agencies – if they have their own long-term planning framework – may have grown so independent that they become powerful

conduits of project implementation, as evidenced by the history of the PANYNJ (Doig, 2001). They are also more independent of, or sheltered from, the prevalent political climate than line agencies. But, like line agencies, these types of authorities might become more inflexible over time, because of the general bureaucratic resistance to organizational innovation, and they may shelter project decision-making from useful political considerations.

Special purpose agencies have the lowest degree of dependency, because project proponents usually create them. So the agency and its creators are, in a sense, one. And once created, these agencies then may act as autonomous, goal-oriented actors. One of the side effects of this is that the special purpose agency shields the projects from outside concerns and democratic input. Private projects, or projects with a larger share of private funding, often use this type of single-purpose agency.

The degree of agency dependency impacts the project decision-making process in various ways. If they are in any way dependent on electoral politics, project choices and implementation are also subject – however indirectly – to election cycles. While megaproject decision-making processes may stretch over a number of decades, election cycles are usually between two and six years – whether for local, state or national legislators, mayors, or other party or executive appointees. Election cycles may disrupt or halt project planning or even the implementation and construction process, as power gets redistributed – or, in some cases, when agencies are reorganized (van Wee, 2008). The implementation of Boston's Big Dig, for instance, was repeatedly halted whenever the state governing coalition changed. On the other hand, shifting political constellations and coalitions create "windows of opportunity" (Kingdon, 1984), which may be used to introduce new project ideas. Projects already started might get changed, reversed or halted, until power constellations change again. So if agencies are less dependent on

outside factors – giving them greater ability to enact long-term planning, they may provide more stability.

However, independent agencies may also become less flexible, and the result is a trend toward "path dependency" of decision-making. The concept of path dependency proposes that prior decisions inform current ones because over time they manifest in institutions and rules that perpetuate status quo arrangements. Here, I use "path dependency" to mean that most decision-makers are influenced by built trajectories and existing institutions, e.g. the highway bias in the United States. That does not mean that prior decisions wholly determine future decision-making; instead, the term merely acknowledges the important influence of past legacies. A lack of political control may also facilitate socially insensitive transportation decisions, like the tendency to place megaprojects in poorer neighborhoods. Thus, transportation and planning agencies can provide stability for the decision-making process, but they also introduce inflexibility.

Returning to the decision model, that means that the type of agency involved in the decision-making process influences how political project decisions may get at any given decision cluster.

2.4. Political Context and Project Decisions

Macro-level government arrangements matter for transportation decision-making because they organize the political arenas and institutions. Infrastructure governance is dependent on these structures and is permeated by the dynamics and values of fragmentation, devolution and privatization.

Project decisions are informed by the political environment, context, or culture of a given polity. Besides historical, geographic, and economic factors, institutions, politics and ideologies shape infrastructure decisions (Kaur Brar, 2005, p. 736 – for the U.S.). In Figure 2 context is represented by the large circle and has three specifications. First, political context contains all political, structural and regulatory issues influencing a project. This includes macro-level factors such as the types of political systems, the structure of decision-making institutions (who gets to vote, and why), and the number of political levels a project is embedded in (e.g. federal systems have more political layers than centralized systems).

The political context informs project decisions in two main ways. First, political culture affects project selection by setting incentives or disincentives for certain types of projects (cars vs. public transit), or in favor of certain types of regions (urban vs. rural areas). Second, the concept of context assumes institutionalized histories and determines which problems will be perceived and addressed and into which institutional "track" they might be sorted (public vs. private concerns).

Transport history and the transport systems in place impact planning decisions for two reasons: First, existing transport options suggest the range of feasible transportation solutions: certain transportation decisions make more sense than others. For example, metropolitan areas with existing subway networks have a variety of intermodal options. They can add transport capacity by adding new subway lines, renovating old lines, or by investing in road and highway structures. In cities without a preexisting subway network, building one or multiple subway lines will come with a much lower short-term costbenefit ratio.

The second reason is that where there is an industry-specific history, there are also established power networks –in this case mode-specific power networks— that make changes or alternative choices difficult. One example is the extraordinarily politically powerful truck and automobile lobby in the United States with their highway bias. Since World War II, the federal government in the United States has distributed ten times

more money to highways than to the railway sector, which was subjected to a more pronounced deregulation starting in the 1970s (Kaur Brar, 2005). Compared to Europe, this is very low transit investment, highlighting how different European governmental structures are more fiscally supportive of mass transit investment.⁹ Put simply, context makes some choices more likely than others.

Second, the large "context circle" in the model also accounts for contextual dynamics that determine governance or regulatory regimes, which include privatization, devolution and fragmentation trends. Where these dynamics have most progressed, infrastructure investment decisions have become more politicized because of the increased number of decision (veto) points (Giuliano, 2007). In that sense, project rationales shifted away from transport-economic considerations.

As outlined in the literature review, the privatization of public services over the past decades affected infrastructure investment, traditionally a public service, through shifts in decision-making structures – e.g. outsourcing of transportation responsibilities to semi-public authorities or project management and delivery by entirely private contractors. The M6 Toll Road in Britain is an example of an entirely privatized road. Debates about private sector vs. public sector efficiency accompany these developments.

Along the dynamics of fragmentation, devolution and privatization, instruments like privatization rules, property regulations, rights-of-way, taxation, levels and types of public subsidy, or environmental requirements all affect the realm of respective project selection and governance (Aarhaug et al., 2011). European countries – particularly in Northern Europe – have long traditions of public ownership, as compared to the U.S.

⁹ The U.S. federal government was involved in highway construction through building and supervising the national highway system. Today, it allocates dedicated highway funds to the states. The states share major parts of the decision authority because they are responsible for local roads and other road projects not of national importance.

history of privatized services. Therefore, European transportation policies are expected to be different from other countries, like the United States. Within this realm, different countries set up particular institutionalized structures for investment decision-making.

The devolution of public services, more of an American trend, describes the re-allocation of decision authorities from the federal or national level to the local (or state) levels. Both privatization and devolution trends increase the fragmentation of decision autonomy. The effects are particularly strong in metropolitan areas and urban centers, where there is a synchronicity of old and new power structures, overlapping jurisdictions, cooperation and competition – and a myriad of veto points and opposition.

Transportation decisions are further a function of geographic reach and project type. One of the significant factors worth noting is *where* the projects are actually being implemented – whether in dense urban spaces or sparsely-populated rural areas: in the former case, there are more potentially affected people than in the latter case, and hence more potential opposition (Altshuler and Luberoff, 2003). Political protests over spending priorities and the use of urban space are a quite steady hurdle that megaproject decision-makers face, especially in dense urban and metropolitan areas.

Furthermore, the general lack of intermodal infrastructure coordination means that decision-makers, project proponents and opponents vary by transport mode. As between railway and highway projects, for example, different funding pots, promoters, and project oppositions come into play, and very different sets of political support coalitions need to be established. In the model, project context is symbolized by the outer ring, which encompasses all.

2.5. Actors in the Political Process: Coalitions, Interests, Power and Money A variety of political, economic and social interests drive transportation investment decisions, and their respective impacts are dependent on institutional arrangements and financial means.

The model also contains "political actors," which are also representative for different motivations. The actors involved vary by project, as described in the previous section.

First, most megaprojects originate somewhere in the public sector, in transportation departments or planning agencies. Some have been in drawers for decades; others start on restaurant napkins (Alameda Corridor), as new ideas. Political representatives might feel the need for infrastructure improvement in their districts, or respond to citizen concerns. Sometimes it takes insistent transportation visionaries. Either way, transport decision-making by nature has a heavy public component, because transportation, by and large, is a public good (Altshuler and Luberoff, 2003), the projects are necessary and hyper-visible.

Infrastructure investment projects have a wide range of potential proponents and opponents outside of the regular political process. Proponents may include business or real estate interests, environmentalists (for transit projects), planners, neighborhood groups, unions and lobby groups like construction, oil or manufacturing industries. Opposition groups may include neighborhood associations, environmental groups, or perhaps anti-transit lobbies. Some groups may combine their efforts into growth coalitions that push for certain projects. These actors have direct and indirect ways to influence decision-making and may be vaguely lumped together as interest groups.

The central idea of interest groups is to bend politics and policy-making in their favor by organizing like-minded individuals and providing information to elected representatives. Politically effective groups with a possible bearing on infrastructure investment decisions range from national to neighborhood level actors and coalitions. On national and regional levels, there are transportation investment, trucking, automobile, oil, and real estate lobbies that lobby to gain very specific benefits. The impact of project opposition

on project decision-making, as in the case of the lobby groups is often indirect, diffuse, and underreported. In general, the influence of special interests is controversial: the actual influence of lobbyists on politicians not measurable or even visible. The influence of interest groups in the European Union might be even more diffuse than in the United States because of the multiplicity and complexity of multi-level institutions.

Improving transportation networks is one of the strategies to further economic development. Hence pro-growth coalitions and businesses may have strong infrastructure investment interests. Proponents of large investment projects (in the U.S.) now routinely cite projected job numbers and training programs to establish project need. One example is the \$1.9 billion AirTrain JFK in New York: only after residents of Jamaica, Queens were promised economic benefits for their area did they support the rebuilding of Jamaica Station – a key component of the project. The Alameda Corridor Transportation Authority that sponsored the Alameda Corridor in Southern California also secured crucial local support through a jobs program.

Project opponents are another set of interest-driven actors. Project opposition might be directed at the proposed routes, the type of project, the project's social or environmental impacts – or at the project itself. The motivations to oppose a project range from private interests, like NIMBY concerns, to public interests, such as environmental concerns and "ideological conflicts" (e.g., opposition to projects that are perceived as unnecessary). "Ideological conflicts" suggest different ways to judge and prioritize the necessity of certain "prestige projects" – whether to select projects according to economic benefits or to help diminish social inequalities by providing transportation access to those with few transportation alternatives. One key example was the opposition to the construction of elevated trains in the wake of the Olympic games, such as Skytrain in Vancouver, Canada. Another example is the prioritization of the construction of high-speed rail

projects over the restoration of local train lines in Germany, which has been criticized by both local populations and train advocates. And then, not all opposition involves chaining oneself to train tracks or similar types of dramatic protest (e.g., Stuttgart 21 in Germany).

Because proper political-institutional access points (and, thus, power) may be lacking, proponents and opponents may convince their political representatives to vote a certain way, raise their concerns in response to environmental impact drafts, or hope that their ability to protest is taken into account by project planners, who may adjust the projects accordingly. And not every meeting between businesses and politicians means that influence has been exercised: most of the time, blocked proposals go unnoticed if they are not high-visibility projects (like high-speed rail plans in California, or public transit tunnels in New Jersey).

2.6. Transport-Economic Considerations

By transport-economic considerations I mean economic, cost-benefit analyses (CBA) and other investment studies that form the foundation of project decisions. Their value and public availability (or their absence) implies the degree of politics in the decisionprocess: if there are no publicly available project studies, it is probable the project may not be the most transportation-economically –or even socially— beneficial project, compared to available alternatives (including the no-build option).

However, critics usually point to the limited extent to which project characteristics and outcomes can be measured,¹⁰ and hence the accuracy and explanatory reach of the

¹⁰ For instance, they are being criticized for their limited reach (Beukers et al, 2012). CBAs aim to facilitate investment decisions by comparing various factors of investment alternatives. They do so by assigning numeric values to costs and benefits. Thus the project with best cost-benefit ratio may be determined through rigorous measurement. Among the most commonly measured items are construction, maintenance and fleet costs (where appropriate), and transportation benefits –possibly including network benefits, environmental impacts, etc.

CBAs are contested on content- and on process-related grounds. With respect to the first, Beukers et al. states a general uncertainty about what is actually being done during a CBA process, and how to apply it.

analyses. Numbers may be projected and ratios compared for technical, construction and cost aspects, but further transportation net effects, and social, societal or even environmental or security impacts to a limited degree only.

In democracies, political costs will be present in any event, but they cannot truly be measured either. Of course, CBAs are usually being conducted to provide decisionmakers with facts about the costs and impacts of potential project selection and to facilitate political decisions. But it is at best difficult to put a price tag on the value of negotiating a complex and uncertain decision environment.

To render CBAs more relevant, critics call for more stakeholder involvement. They also admit this is also difficult, because each stakeholder would come with their own set of criteria, which are sometimes clashing (Beukers, 2012, citing Macharis in: Haezendonck, 2007), and there are not only philosophical questions about the relative weigh of expertise vs. lay opinion. This makes it difficult to include everybody's values in one study.

In Summation

Returning to Model 1, project decisions may be impacted at every level – either by politicians or interest groups, from problem definition to agenda setting, from selection and stages to final approval. Politicians and interest groups alike may block ideas from getting on the agenda, replace them with alternative suggestions, or actually halt projects at the final approval or budget stages. Transportation agencies have some power to channel some of the impacts.

Further they list "disputable calculation methods," "missing information about winners and losers," the ignorance of equity issues, "missing information about expected synergy and agglomeration effects," "poorly constructed reference cases," and the poor incorporation of uncertainties" among the main contentions of the literature (Beukers, 2012, p. 69). The referenced authors proceed to address process-related issues with CBAs, among them for non-transparency, late application and its use as a final decision criteria – "the 'sword of Damocles' without the possibility of improving the underlying plan or vision" (ebd. p. 69).

Finally, three additional factors not shown in the model are important to keep in mind when analyzing project politics.

First, politicians or elected officials, because of the specific nature of representative politics, are influenced by their reelection motives. Their chances of reelection increase if they have something to show for their time in office: either by bringing big projects in, or keeping them out, no matter the transportation benefits accruing outside their narrow constituencies. The problem of strategic misrepresentation (providing false information to achieve a certain decision) is related to this (Wachs, 1989, Flyvbjerg, 2010).

Second, to the extent that politicians and decision-makers base their decisions on expert advice, delegation problems arise. In political-economic terminology, this is known as the "principal-agent" problem: politicians and other decision-makers make choices based on partial or incomplete information collected by others; in some cases, no information is available at all to make certain decisions. The delegation of decision authority – and the separation of decision-making and expertise – introduces the possibility of reporting error when relying upon others.

Additionally, administrators, experts and advisors might face pressures through their public or private employers and their related agendas. How do voters know that their elected representatives decide in accordance with their interests, and not that of some lobby groups? How do politicians and decision-makers know whether the information they have been given is trustworthy?

Third, human decision-making skills are limited in their processing capacities by optimism biases (the expectation or hope for better results when faced with uncertainty) and complex information (Collingridge, 1992). Resulting limitations of managerial oversight, varying policy expertise, and technical skills, coupled with the constraints of

politics in the broader sense – and all under conditions of complexity and uncertainty – render unbiased or even sufficiently informed decision-making difficult, at best.

In the next Chapter (3) I will outline the methodology I use to tackle this extensive framework.
Chapter 3: Research Design: Quantitative Methods and Case Study Selection

As described in the literature review, there are a few books and a number of case studies, but there is no all-encompassing model on the politics of infrastructure investments (except for Hall (1980), and Altshuler and Luberoff (2003) in the U.S.). Building on various elements of the literature, I developed a theoretical model that organizes and illustrates the decision-making process. It is both specific in its political dimensions and sufficiently abstract to allow for contextual and project-specific variation. The previous chapter presented the assumptions and the model. This chapter explains the methods I use to obtain the information to populate the model.

A two-part research design will allow me to address my research questions in two ways: quantitatively and through case studies. Figure 3 displays the general research design of the study.



Figure 3: General Research Design

The first part, the quantitative study that will be described in more detail below, tests hypotheses from the literature, and my own, with a particular focus on setting the descriptive and analytic frame for the two case studies. The quantitative study lends itself to comparative analyses of contextual factors (macro-political and economic ones, the participation of decision-makers, transparency indicators, the prevalence and interaction of funding sources and project location, funding types, and opposition).

Second, I selected two case studies and used the theoretical model to organize the understanding of investment politics. The case study research complements the statistical results by examining the impact of transportation agencies on project decisions, the impact of their degree of autonomy from context factors, how they channel politics, how this impacts the balance between transport-economic considerations and alternative decision rationales, and other possible political factors that come up during an in-depth case study. Further, the case study research has the potential to go deeper into the impact of funding decisions than the quantitative analysis is able to do.

This research design will allow me to verify some descriptive characteristics and statistical causations and complement the quantitative research by focusing on those political questions in the case-study research where statistical methods fall short. In sum, while the statistical part illustrates the internationally comparative what and who, the case study part complements the model with information about the how and why. The details of each part are described below.

3.1. Justification of the Research Design

1. Two research methods are advantageous compared to one method, because they allow for triangulation – the cross- and double-checking, and the mutual complementation of research findings. I will be able to complement and verify certain statistical findings with case-study findings and vice versa. The quantitative analysis aims at specific parts of the

model –the macro-aspects— and relies on data collection and theory-based quantification and categorization methods that will provide a clear picture of statistical associations relevant to the research questions.

At the same time, because the quantitative part is internationally comparative, the focus is directed at the megaproject as a species onto itself. It thus becomes possible to elicit the main characteristics and associations of megaprojects *per se*. The case study research is better suited to deal with more detail-oriented questions, involving historical analysis, path dependency, and project tracing. However, both methods are integral to the overall study. This approach has further been justified:

"Hence as elsewhere, the sharp separation often seen in the literature between qualitative and quantitative methods is a spurious one. The separation is an unfortunate artifact of power relations and time constraints in graduate training; it is not a logical consequence of what graduates and scholars need to know to do their studies and do them well. [...] Good social science is problem driven and not methodology driven in the sense that it employs those methods that for a given problematic, best help answer the research questions at hand. More often than not, a combination of qualitative and quantitative methods will do the task best." (Flvybjerg, 2006, p. 242)

2. The two methods rely on different methods of data collection: the statistical part draws information from public sources like books, online pages and newspaper articles; the case study research adds in-depth interviews with decision-makers. "The use of multiple sources addresses Yin's suggestion on the comparative advantage of using multiple sources of information to develop 'converging lines of inquiry." (Yin, 1994, 92)

3. No one has yet done a statistical analysis of the political elements of international infrastructure investment decisions (or written up a case study on the politics of the Second Avenue Subway).

I will lay out the details of both research steps.

3.2. Dataset, Quantitative Analysis, Statistical Results

To answer the research questions and test hypotheses contained in the model and the literature review, I created a database containing 60 projects (railways, highways and bridges, subways, etc.) in 22 countries, with about 60 variables, designed to illuminate the politics of project decision-making. The variables are both contextual and project-specific. A list of projects is attached as Appendix A, a list of variables as Appendix B. The distribution of projects and variables is described in Appendix C. In the following, I am going to describe data selection, randomness, representativeness, tests and applications in more detail.

Randomness

I selected projects to achieve proportionality along some major dimensions: 1) regional proportionality (I aimed to have at about five projects on each continent, at minimum); 2) at least five projects in each of the assigned project ranges (inner-city, metropolitan, regional, national, international); and 3) at least five observations for project types like highways, bridges, tunnels or other. Any projects were I could not find *any* data were discarded. One of the issues of the selection is that I do not (or cannot) know, in each case, what the project alternatives were. This affects the analysis because I only take into account projects that proceeded to completion (except in the five cases of canceled projects). The analysis thus has a "positive" bent, in the sense that it does not tell what would *not* work.

Data Representativeness

The projects make up a significant portion of the total investment volume of a given time period in their respective countries. I compiled a list of percentages of the aggregated investment volume of the projects per country, measured against the respective national transportation infrastructure investment volume (Appendix D). By average, the projects constitute anything between 1 and 44 percent of gross national transportation investment volumes, with an average of 13.5 percent. So the data is very representative.

Because there is so much money at stake, decision-making transparency is an issue and sufficient and reliable information in the public domain may be hard to come by. If not indicated otherwise, I systematically drew on three major sources of publicly available information: 1) The project websites, 2) the project reports available online from the OMEGA Centre at the Bartlett School of the University College London. OMEGA Centre researchers, between 2007 and 2010, have conducted thirty case studies of megaprojects across the world,¹¹ and 3) extensive newspaper search via the "LexisNexis" database. Whatever data I found I tried to verify by finding at least one other source reporting the same data point. However, data was not always available in comparable ways. In general, any lack of data indicates a lack of decision-making transparency, which is one of the research themes of this study.

Statistical Tests

I used binomial tests to assess data representativeness, different theory-led correlation tests and non-parametric (Mann-Whitney U Test) tests to display significant associations, model fit tests for multivariate linear, and binary and multinomial regressions for more complex models. Appendix F describes these tests in more detail.

¹¹ They are available online at http://www.omegacentre.bartlett.ucl.ac.uk/.

Significant results of all mentioned tests are discussed and displayed in tables throughout Chapter 5. The main findings will be summarized at the end.

Application

With the data I will test macro-level influences on various decision-making characteristics, and analyze relationships between actors, institutions and decision-tools, and some outcome measures. The macro-context variables, including continent and countries, GDP measures, a range of government types (e.g. federal or centralized systems, proportional or majority decision-making, or some basic distinctions of party systems), and the transportation range of the projects, deliver further information.

Measurable project-specific characteristics include project types, schedules, cost overrun and utilization ratios, whether there was public or private funding involved and where the funding came from, a rough measure of participating decision-making levels, and project opposition. The broad range of data allows analyzing and separating the decision contexts of projects and possible intervening factors that influence decision-making. It also allows testing specific hypotheses that deal with project costs, funding sources, decision-makers and opposition.

The data collection, quantification and categorization process of international transportation megaprojects showed that breadth comes at the expense of depth. In order to test a variety of hypotheses, the data had to be quantified into categories that do not always reflect the complexity of the real world, but the categories allow testing for broad patterns, and less for subtle tendencies. Through the case studies I will be able to use finer pointers to make further sense of the results from the statistical analysis.

The quantitative results provide statistical "feedback" of particular aspects of the model – particularly context-specific aspects. Since decisions always take place within rule-

bound spaces (macro), the provisions to resolve funding competition and democratic input differ. Hence the statistical results complement the case study research, which will deliver a more aggregate picture of the entire process.

3.3. Case Selection and Case Study Research

I selected two U.S. cases for closer study: the Second Avenue Subway in New York, and the Alameda Corridor freight rail project in Southern California, to zoom in on the history, institutions and actors as bases of infrastructure selection.

Case Synopsis

The Second Avenue Subway project is an 8.5-mile inner-city project of \$3.4 billion for the first segment and \$17 billion in total. The first section is scheduled to open in 2015. The Alameda Corridor is a \$2.4 billion project and also the first part of a larger network that has yet to be built. While the Second Avenue Subway has been selected on a longstanding transportation plan in New York City (since 1929), the idea for the Alameda Corridor arose in the 1980s and was speedily implemented. At the time of this writing, the Second Avenue Subway is under construction, while the Alameda Corridor has been completed.

The Second Avenue Subway is under local jurisdiction and sponsored by an independent (but state-controlled) public authority. Alameda Corridor's sponsor is a special-purpose agency created for the sole purpose of implementing the project (but it has subsequently been used to sponsor other projects). While one project had to establish consensus on a crucial decision-board, the other project was able to use the decision-board to keep politics away. Though the multiplicity of actors and of transportation needs makes it difficult to predict any decisions and funding streams at all, with these two case studies I will be able to understand megaproject decision dynamics in a complex political environment. Understanding the political dynamics of megaprojects as they play out in

the New York metropolitan area and the L.A. harbor region is a good start for the generalization of megaproject politics for both the contrast to the data distribution in the database, and the evaluation of the theoretical framework.

Selection Criteria

1. Both projects are transportation megaprojects of more than one billion dollars.

2. Similar context: Both projects are built within the same country and are thus subject to a similar historical institutional development, macro-political organization, and a cultural framework, with similar attitudes towards privatization and similar devolution dynamics. Both metropolitan areas score high on a fragmentation score devised by Hamilton (cited Giuliano, 2007). Seeing that I have an international database, an international comparison would have been appropriate, too. However, I believe that the differences between the states of California and New York are sufficient to contrast political landscapes, while controlling for the historical-institutional logic of a place. An international comparison of two projects would not have left a sufficient number of similarities to judge, whether differences in the decision-making process are rooted in the nature of megaprojects, or owed to national differences.

3. Different types of agencies: The project-sponsoring agencies were created for different reasons and play a different role within their polities and channel transportation politics differently. One is a special purpose agency with a broader transportation purpose (the MTA) and one is a single-purpose agency with the sole purpose (originally) of creating the Alameda Corridor.

4. Different project types: Subway and freight rail implementation is different because the different project types elicit and trigger different constituencies, interest groups, proponents and opponents, while being focused on transportation as a public good.

5. Lastly, in both cases I was familiar with some of the involved institutions and actors, making project information more easily accessible.¹²

Two case studies should be a sufficient number because:

1. The general research design includes both quantitative and case study research. The statistical results test for the larger contextual impacts as described in the model, and thus cover a significant part of it. Complementing it with two in-depth case studies will allow me to draw a sufficient number of conclusions and pointers from two projects to attain well-rounded results.

2. The context-dependent knowledge of two projects provides ample information to generalize about the broader category of transportation megaprojects. In that sense, already one case study suffices to both test and generate hypotheses (Flyvbjerg, 2006).

Case Study Methods

In the two case studies, I studied the literature, newspapers, and project-related documents, and I conducted interviews with decision-makers. Additionally, for Alameda Corridor I used the information and research material a non-published research study (Nobbe and Brecher, 2011). Process tracing is the main method to uncover the processes and variables through which causal or explanatory variables produce causal effects. The case study approach, and particularly the interviews with project stakeholders, will illuminate those parts of project decision-making that were previously. A sample of the IRB-approved interview questionnaire is provided in Attachment G.

¹² I considered, but did not select, a number of U.S. transportation megaprojects: AirTrain JFK was not selected because the political landscape would have been too similar, and the agency type as well. The same is true for the 7-Train extension in New York – which also is not yet finished, and I did not want to study two incomplete projects. Completed projects add the additional layer of post-facto evaluation. Also under consideration was the Central Artery Tunnel in Boston, but significant research has been done on this project already.

Application

Answering the case studies through the research questions will supply contextdependent knowledge for this study. The case studies serve as valuable examples out of a pool of 60 in this study and out of the entire megaproject population. In combination, the quantitative and qualitative methods will enable the verification or falsification of the hypotheses, while drawing conclusions about the model itself. The methodological issues that remain concern problems of breadth vs. depth, which will be attenuated by the combined methods. One particular concern is the inherent affirmation bias towards the projects that have been built (as opposed to project failures). I will discuss the implications in more detail in the Conclusion. I turn now to the statistical analysis.

Chapter 4: The Politics of Infrastructure Investment Decision-Making: A Quantitative Analysis

The objective of a statistical analysis of the politics of megaproject decision-making is to examine political and other project indicators and compare their impact on project decisions and performance. To my knowledge, no statistical analysis that establishes systematic political patterns across international, multi-type transportation megaprojects exists.¹³ Hence I developed an extensive database with relevant variables.

4.1. About the Data and Data Analysis

The database comprises 60 projects in 22 countries, including railways, highways and bridges, subways, tunnels and intermodal projects. The investment volume is typically at least \$1 billion (\$2010) per project. More than 60 variables for each project allow insights into the politics and economics of project decision-making. I included political contextual and project-specific variables, and will introduce relevant variables in each section below, as noted in Chapter 3 above. Appendix B provides a complete list of variables, including categories, coding and a few notes about the data. Appendix C describes the project and variable distribution and frequencies in detail.

Project selection criteria were described in Chapter 3 above as well. The selected projects constitute a significant portion of the total investment volume of a given time period in their respective countries. By average, the projects constitute between 1 and 44 percent of the national transportation investment volumes, with an average of 13.5 percent, which makes the data very representative. In Appendix D, I compiled a list of percentages of the aggregated investment volume of the database projects per country and the respective national transportation infrastructure investment volume. The list

¹³ Parts of this chapter are also being used as the final report for a University Transportation Research Center grant received in 2011. PI: Joseph Berechman.

establishes the proportions of the dataset vis-à-vis the real world, and thus the representativeness of the data.

The chapter will be organized by five themes: 1) macro-political indicators and their relationship to project decision-making, 2) project decision-makers, 3) transparency matters and the basis of the decisions, 4) the role of opportunity and crises situations for megaprojects, and 5) the nature of funding as political dependent and independent factors. In the end, I will offer a general conclusion about the nature of project decisionmaking according to the data.

Each of the five themes starts out by introducing and evaluating the core data. I then present various hypotheses and models and say a few words about the chosen tests. While I will explain each test that I use in a footnote the first time I use it, Appendix F provides an overview of all these tests. After presenting the significant results in tables, I will explain them and assess their explanatory power. The hypotheses that guide the tests are partly derived from the literature, and partly guided by my own data exploration. For a better overview, they are all listed in Appendix E. For space reasons I will generally only display significant associations. In the conclusion of each core section, I summarize the most important results, with notes of caution where appropriate.

4.2. Macro-Political Factors and their Influence on Project Decision-Making First I will look at possible effects of macro-level factors on transportation infrastructure investment characteristics and decisions. Macro-level factors include 1) the structure of the political system, 2) the type of the legislative system, 3) the type of party system, 4) the type of voting system, 5) cultural and 6) economic factors.

4.2.1. Notes about the Data

The political system variable (V9) records whether a country is federalist or centralized. Sixty-five percent (39 projects) are located in centralized states such as France. The "type of legislative system" variable (V10) captures whether the legislature is bi-or unicameral. Fifty-two percent (31) are in states with a unicameral legislature. The "party system" binary (V55) distinguishes between two- and multiparty systems on the national level. Seventy-three percent (44) are in multiparty systems. The variable "type of voting system" (V56) distinguishes between proportional, majority/plurality and mixed voting systems. Thirty-three percent (20) of the projects are in proportional systems, 40% (24) in the second category, and 20% (12) in the third. Four projects could not be clearly categorized, because they were hybrids. Further, 32% of the projects (19) are located in Anglo-Saxon countries (the U.S., Great Britain and Australia), the majority of them in the U.S. The data includes macro-economic variables like GDP Purchasing Power Parity (V5) and GDP measures over time (V6, V7, and V8). Figure 4 shows the distribution of purchasing power across countries.



Figure 4: Purchasing Power Parity per capita 2010 (in \$U.S.)

Because much of the megaproject literature is interested in project success factors (Flvybjerg et al., 2003), I examine associations between macro-political types and project success, which is defined in terms of project cost overrun ratios, project utilization and project construction or implementation times. Figure 5 shows the percentage distribution of actual vs. projected cost in the database: 9% of the projects have cost overrun ratios between 0 and 0.8%, which means they cost 80% or less of the projected cost. About 40% of the projects come in at a price roughly estimated, and more than 50% come in with at least 20% above the original price estimate. Similarly, Figure 6 shows that most projects are under-utilized (as compared to the projections): about 43% come in with fewer users than estimated (0-0.8= 0-80%), about 43% come in as projected (80%-120%), and less than 10% experience a better use than the projected one. In sum, consistent with the literature, more than half of the projects experience cost overrun. Over 40% of the projects vastly fail their projected users numbers, but at least 10 percent exceed their projected goals.



Figure 5: Cost-Overrun (inflation-adjusted) Figure 6: Utilization Ratio

Figure 7 shows the length of project phases – planning, implementation and construction times for those projects were all three values were available—sorted by length of implementation time.





Planning time is the time-span from the beginning of project planning to the year of its inception, when the project got a formal approval by decision-makers. The data in Figure 7 is based on is normally distributed but right skewed, as some megaprojects experience really long project phases. Construction time is the time span from beginning of construction to the end of construction. These two categories may overlap as some planning is completed after construction has begun. Implementation time is the time from the year of inception to the actual opening of a project (construction end). In some cases construction times may be longer than the implementation time, because construction began before official project approval.

The relationship between macro-political categories and particular megaproject investment decisions, statistically, is not well explored. Persson's work deals with the impact of macro-political electoral institutions on policy outcomes, and inspires the hypotheses in this section. Persson does not directly study megaprojects. Rather, his work emphasizes the importance of macro-structures on policy outputs, e.g. government spending or corruption indices (Persson, 2002). Others have analyzed macro-level impacts, too; for instance Grossman and Helpman, 2001, or Iversen and Soskice (2006),

who analyze the difference proportional vs. majority systems have on redistributive policies, and thus allow insights into the different rationales of government funding and which groups and projects they likely benefit. They argue that proportional representation systems do have predominantly center-left government coalitions. On the other hand, center-right governments occur more frequently in majoritarian voting systems. So the literature provides some pointers not specific to megaproject decisions, but to their context.

4.2.2. Exploring Relationships between Variables

I will start by exploring relationships between variables through the Mann-Whitney U Tests and Kruskal-Wallis for ordinal, dichotomous variables, and Spearman rank order tests for continuous ordinal, but not normally distributed data, and Pearson's correlations for normally distributed data.¹⁴ The relationships are guided by a list of hypotheses:

H2.1: Projects built in centralized governments are more successful.

H2.2: Macro-political factors such as the political system, the legislative structure, the party and the national voting system impact funding sources for projects.

H2.3: Bond-funded investment is more prevalent in federalist than in centralized countries.

H2.4: Project decision-making in federalist countries is more transparent than in centralized countries.

List of Predictors		Political System (Mann-Whitney)		Legislative Structure	Legislative Structure (Mann-Whitney)		
		Test statistic U (df)	Z (N)	Test statistic U (df)	Z (N)		
H2.2	Prov. Funding	244 (1)*	-2.209				
	Bond Funding	527 (1)**	2.900	538 (1)*	2.421 (56)		
H2.4	Transpa- rency	271 (1)*	-2.219				

Table 1: Macro-Political Variables (Mann-Whitney U-Tests and Kruskal-Wallis Tests)

Reported in the table are only significant results: *sig≤.05, **sig≤.01, U=test statistic, df=degrees of freedom, Z=standardized coefficient, N=number of projects included in the analysis

¹⁴ For a description of each test see Appendix F.

Summary: Table 1 displays the most important significant findings.¹⁵ I used the Mann-Whitney U-Tests¹⁶ because I compared project characteristics between two macro-political categories.

Most associations are weak, except for the bond type association. **Provincial funding sources play a larger role in federalist than in unitary political systems** (Mann-Whitney U=244, Z=-2.209, sig \leq .05). More literally, there is a probability of 1 in 25 for this distribution to occur normally under the null hypothesis – rare enough to suggest there is a statistically significant difference in ranked distributions between groups (given sig \leq .05, 2-tailed): the use of provincial funding sources varies between federalist and unitary countries in the real world.

Further, significant associations between the political system and bond funding show that **projects in centralized systems are more often bond-funded than in federalist systems** (U=527, Z=2.900, sig \leq .01), with only about a 1:100 chance for the distribution to occur by chance. The political system variable is also associated with project transparency (U=271, Z=-2.219, sig \leq .05): projects in federalist countries are more transparent than projects in centralized countries.

Project funding also differs by the type of legislative structure. In countries with bicameral legislatures project bond funding, compared to other funding types, is underrepresented (U=581, Z=2.421, sig \leq .05). Finally, the Kruskal-Wallis test¹⁷ (7.869, sig \leq .05) shows that cost overrun is highest in projects in

¹⁵ Important note: throughout the report I will only display those with significant outcomes. ¹⁶ The non-parametric or rank order Mann-Whitney U Test ranks two independent groups by ranking them or comparing their means against an assumed distribution (for instance whether one population features larger values of a specific outcome than another). As opposed to parametric alternatives, the Mann-Whitney U Test is less susceptible to abnormal distribution of the data and unequal sample sizes. The output is the Mann-Whitney U value, the interpretation of which depends on the sample size, and the p value, which indicates whether there is a statistically significant difference between both groups (if so, then p<.01). ¹⁷ The non-parametric Kruskal-Wallis test is an extension of the Mann-Whitney U Test, the data does not need

proportional voting systems, followed by mixed systems, and lastly by plurality/ majority systems. Now I will turn to discuss the findings in the light of the hypotheses.

H2.1: **Projects built in centralized governments are more successful.** The **hypothesis was rejected.** Macro-political characteristics and project success measures are not correlated, at least not directly. (Again, the results are not displayed in the table because I only display significant associations.)

H2.2: Macro-political factors such as the political system, the legislative structure, the party and the national voting system impact funding sources for projects. **The political system and legislative structure bear on the typical types and sources of funding employed in megaprojects: regional/provincial funding sources play a larger role in federalist countries (U=244, Z=-2.209, sig≤.05) and private sources play a larger role in centralized countries (U=485, Z=2.015, sig≤.05, 2-tailed).** The first association is not surprising: only projects under federally organized governments (21 out of 60) have sub-national (state or regional level) funding sources. The second association needs to be further investigated, which I will do in Section 5.

H2.3: Bond-funded infrastructure investment is more prevalent in federalist than in centralized countries. The hypothesis was rejected: bond-based funding is more prevalent in centralized (U=527, Z=2.900, sig≤.01) than in federalized states. Any causation between macro-political arrangement and funding types appear to be driven by other factors. These may include overall public finance practices in each individual

not be in equal interval scale, the population does not need to be normally distributed, and the samples need not have equal variances. It assumes that the dependent variable is measured at an ordinal level, and that the independent variable consists of more than two independent categories. The test provides a ranking for each group, and the statistical significance, which allows for conclusions about the effect of the independent variables on the groups.

country and larger political-economic policies of the type analyzed by Persson (2002) in general.

H2.4: Project decision-making in federalist countries is more transparent than in

centralized countries. The hypothesis was confirmed: decision-making is more

transparent in federalist countries (U=271, Z=-2.219, sig≤.05). It is possible

that the comparatively large number of U.S. projects in the database drives the

association, because projects receiving federal funds in the U.S. (without the federal

government being a decision-maker) face thorough documentation requirements.

The next set of hypotheses guides the exploration of voting systems and Anglo-Saxon

states (the U.S., Great Britain and Australia) with other variables.

H2.5: Infrastructure projects in two-party systems are underwritten by a greater variety of funding sources than projects in multiple party systems.

H2.6: Anglo-Saxon projects face more opposition than projects in centralized countries.

H2.7: The nature of the voting system affects project success measures like cost overrun.

List of Predictors		Voting System (Kruskal-Wallis)		Anglo-Saxon (Mann-Whitney)		
		Test Statistic	(N)	Test statistic U (df)	Z (N)	
H2.6	Opposition (ideol.)			490 (1)	2.460 (58)	
H2.7	Cost Overrun	7.869	(41)			

 Table 2: Macro-Political Variables (Mann-Whitney U-Tests and Kruskal-Wallis Tests)

 List of Decision
 Varian System (Mann-Whitney)

Reported in the table are only significant results: *sig≤.05, **sig≤.01, U=test statistic, df=degrees of freedom, Z=standardized coefficient, N=number of projects included in the analysis

Summary: Project opposition is stronger in Anglo-Saxon countries than in

others (490/ 2.460). Cost overrun is associated with proportional voting systems

(7.869). Referring back to the hypotheses:

H2.5: Infrastructure projects in two-party systems are underwritten by a greater variety

of funding sources than projects in multiple party systems. The hypothesis was rejected.

I am not surprised and conclude that lots of different factors other than macro-structural ones drive the funding composition of projects.

H2.6: **Anglo-Saxon projects face more opposition** than projects in centralized countries. The dataset contains four types of project opposition: political, ideological, issue-oriented or no opposition. **The hypothesis was confirmed for "ideological" opposition** (490/ 2.460*).¹⁸ I will analyze the association in a regression model in Section 2.3 below. There seems to be less opposition to projects in centralized than in federalist systems (Mann-Whitney U-Test 490/ 2.460* - not displayed in table).

H2.7: The nature of the voting system affects project success measures like cost overrun. The test statistic is not really telling, since the voting system variable has three categories (see Appendix B). The box plots associated with the Mann-Whitney U Test show that cost overrun is highest in proportional voting systems (like Denmark), followed by mixed voting systems (Germany). It is lowest in plurality voting systems like the United States.

Additionally, I examined associations with Spearman's rank order correlations¹⁹ for ordinal variables.

H2.8: Macro-political organization affects choices between project types like highway or rail.

H2.9: Local decision makers are more involved in project decisions in federalist countries than in centralized ones.

able 3: Macro-Pontical Variables (Spearman Kank Order Test)							
List of Predictors	Political System	Legislative Structure	Party System				
Decision-Makers: local			.273* (57)				
Decision-Makers:	682** (59)	428** (59)	.361** (57)				
Decision-Makers:	682** (59)	428** (59)	.361** (57)				
regional							

Table 🤉	e: Macro-Political	Variables	(Spearman	Rank Order	Test)
Table :). macio-i onucai	variabics	(Spcarman	Kalik Oluci	rusu

¹⁸ For distributions and categorizations, view Appendices B and C.

¹⁹ The Spearman Rank Order Test is a non-parametric measure testing an association between two variables, e.g. if the value of one variable increases or decreases depending on the value of another one. The test may be used with discrete or ordinal data. Similar to the Pearson's Correlation coefficient, ranges of outcomes are between -1 and 1, with -1 being a negative correlation, 1 being positively correlated, and a value of o

Decision-Makers:	.543** (59)	.423* (54)	341** (57)
national			
Decision-Makers:	.315* (59)	.323* (59)	
international			

Reported in the table are only significant results: $sig \le .05$ $sig \le .01$; values: Spearman coefficient (and number of projects)

Summary: The correlations between provincial and national decision-makers and the political system are highly significant. The association between political systems and regional decision-makers is strong (-.682). At a .01 probability level regional decision-makers are more involved in decision-making in federalist governments than in centralized ones (-.682, sig \leq .01). National decision-makers in centralized countries (.543, sig \leq .01) are more involved in project decision-making than their pendants in federalist governments. International infrastructure decision-makers play a larger role in centralized countries (.315, sig \leq .05).

The legislative structure impacts decision-makers as well. There are more regional/ provincial decision-makers in bicameral legislative systems (-.428, sig<.01) and more national (.423, sig<.05) and international decision-makers (.323, sig<.05) in unicameral legislative systems. In the macro-political categories only the type of party system has a systematic effect on the involvement of decision-makers on the local level: local decisionmakers are less involved in multiple-party systems than in two party systems (.273, sig<.05); the same is true for provincial/regional decision-makers (.361, sig<.01). There are more national decision-makers involved in project decision-making in two-party systems than in multiparty systems (-.341, sig<.01).

H2.8: Macro-political organization affects choices between project types like highway or rail. The hypothesis was not confirmed.

describing no correlation. Spearman correlations are less sensitive to outliers than the parametric Pearson's correlations.

H2.9: Macro-level political factors determine who plays a role in megaproject decisionmaking. The data validates associations between macro-level factors and decisionmakers, at least on some dimensions. As expected, national decision-makers are more strongly involved in centralized countries. However, even though the statistical probability is strong, the association is not (-.341, sig≤.01). **The participation of local decision-makers in project decisions is lower in centralized than in federalist countries, so one part of the hypothesis was confirmed (.273, sig≤.05).** But the correlation is weak also. Projects located within centralized countries (and those with one legislative house) have more international decision-makers than projects in federalist countries with two houses (.315, sig≤.05). This is not surprising, as many of the European Union member-states are smaller and centralized, and bordercrossing supra-national infrastructure in the European Union keeps expanding.

There are not many two-party dominated countries in the world, and 20 percent of the projects are located within one of them (the United States), so the significant results with respect to party systems should not be overstated. But the displayed tendency reinforces the other trends in the table, with the addition that local decision-makers are less involved in projects in multi-party systems (.273, $sig \le .05$). While pleased that the results show that the data is consistent, I will check for some additional intervening factors in the next section.

4.2.3. Regression Models

In this section I examine various effects of macro-structural variables on a range of dependent variables. The results in Table 1 already indicated that the more pronounced devolution of decision authority in federalist systems impacts funding choices available at the state and local levels.

H2.3: Bond-funded infrastructure investment is more prevalent in federalist than projects in centralized countries.

I hypothesize that the political system affects funding types. Specifically, I assume that the structure of federalist countries supports bond-funding schemes for infrastructure investment. I add project types and project location as independent variables in Model 1. Based on the structure of the dependent variable and model fit tests, I chose a linear model.20

Model 1: V36=a+Var9x+Var54x+Var11x

Y = Funding Type: Bonds (V36)

X = Political System (V9), Project Types (V54), Project Location (V11)

Table 4: The Impact of Macro-Political Influences on Project-Related Variables: Bond
Funding (Linear Regression)

List of Predictors	Model 1 (linear regression)
Political System	29.794**
Project Type	25.028* (highways)
Project Location	16.123* (inner city)
Constant	21.531*
Ν	57
Model Fit	.246

For linear regression: displayed: B values, *sig≤.05 **sig≤.01; Model fit: Adjusted R Squared; n.s. = not significant.

Summary: The results of the models, with about 25 percent explanatory range each, are

not insignificant for social science data. Overall, the models show that the political

system has some influence on project funding types.

Model 1 in Table 4 shows that bond funding is more typical in centralized than in

federalist countries (29.794, sig <.01). In Table 4 the parameter value of political system

²⁰ Regression analysis makes quantitative predictions about the effects of one or more variables on a "dependent" variable. The independent variable/s exercises a hypothesized influence on the dependent variable. Depending on the type of model, the relationships may be linear, quadratic or cubic. Linear Y=b0+(b1*t)

Quadratic Y=b0+(b1*t)+(b2*t**2)Cubic Y=b0+(b1*t)+(b2*t*2)+(b3*t*3)

In the given relationships Y is the dependent variable and b represents the slopes of the functions. In these types of regressions, the dependent variables are continuous. Associated tests of statistical significance evaluate how likely it is that the predicted relationships reflect the true relationships.

R Squared is the typical "model fit" test that assesses how well the hypothesized model fits the sample data. The closer the value is to 1, the better the model. For a more detailed overview over regression assumptions, see Appendix F.

of 29.79 suggests a stronger relationship. I added project type as a control variable, because in most countries funding sources and types differ by project type. **The results confirm a positive relationship between highway projects and bond funding** (25.028, sig≤.05) and with inner city projects (16.123, sig≤.05). Bond funding is prevalent in centralized systems, particularly for highway and inner city projects.

Quality of the Statistical Results: The models meet all necessary assumptions for linear regressions, although the Shapiro-Wilk test²¹ for the normality of error is low.

H2.4: Project decision-making is more transparent in federalist than in centralized countries. Here I hypothesize that the political system affects project transparency. Again, the devolution and fragmentation of the political landscape in many federalist countries might account for different cultures of decision-making or documentation. A binary regression model²² is employed to capture a transparency trend in either direction. To that purpose, the transparency data, usually a scale variable (described in more detail in Section 3 below), into a binary, was turned into a binary.²³ I included project types and project location in the model.

Model 1:

 $P(V50) = \frac{1}{1 + e - (a + bV9 + cV54 + dV11)}$

Y = Transparency (V50)

X = Political System (V9), Project Types (V54), Project Location (V11)

²¹ This test uses studentized residuals to determine whether the assumption of the "normality of error" is met. That means that residuals, or errors, should be random and normally distributed at the values of the dependent variable. Any value that is larger than p<.05 (if that it the set threshold, or "alpha value") is good to go, meaning that the errors are normally distributed. For a more detailed overview over regression assumptions and related tests that were conducted see Appendix F.

²² Binary logistic regressions are selected when the dependent variable is a binary variable, and the independent variables scale or ordinals. Non-parametric tests require for the data to meet fewer assumptions than parametric tests.

²³ I did test linear models, too, without a significant result.

The results reject the hypothesis - there were no significant results for the influence of the type of political or legislative structure on project transparency when holding constant project types or location. The model cannot explain the association indicated by the non-parametric tests above.

H2.6: There is more project opposition in Anglo-Saxon states than in others.

I hypothesize that Anglo-Saxon political culture affects project opposition. I assume opposition may vary by culture because decision frameworks, implementation requirements and actors differ in each country. Hypothetically, states may be grouped: Anglo-Saxon states are a "type" with a particular culture of public spending that differs from spending patterns in Scandinavian or European states (Esping-Andersen, 1990). **The different patterns of project opposition shown in Table 2 could be a result of less egalitarian approaches to public spending in Anglo-Saxon countries, which would in turn provoke stronger responses to large-scale investment decisions**.

Two different models to test the hypothesis are presented below, and the results in Table 5. Because the outcome variable is binary²⁴ I chose a binary logistic regression. Second order effects can be ruled out because all variables in the model are binaries.

Model 1: $P(V28) = \frac{1}{1 + e - (a + bV59 + cV12 + dV52)}$

Y = Ideological Opposition (V28)

X = Anglo-Saxon (V59), Project Types (V12), Decision Makers (V52)

²⁴ I categorized the opposition types by absence or presence of opposition; for the different types see Appendix B.

 $P(V28) = \frac{1}{1 + e - (a + bV9 + cV12)}$ Model 2:

Y = Ideological Opposition (V28)

X = Anglo-Saxon (V59), Project Types (V12), Project Location (V12)

Table 5: Effects on Ideological Opposition (Logistic Binary Regression)						
List of Predictors Model 1 Model 2						
Anglo-Saxon	1.743/ 5.715*	1.270/ 3.559*				
Project Type: rail	n.s.	n.s.				
Project Location: inner		1.606/ 4.984*				
city projects						
Local Decision-Makers n.s.						
Constant	-1.332/ .264**	-2.370/ .093**				
N	57	58				
Model Fit	.134/ .188	.177/ .249				

Displayed: Beta/ Exp(B); *sig<.05 **sig<.01; Model fit: Cox & Snell R Square/ Nagelkerke R Square; n.s. = not

significant.

Summary: The results for Model 1 show that ideological opposition is stronger in Anglo-Saxon countries (1.743/5.715, p>.01) than in other parts of the world. At the same time, project types and levels of decision-making do not impact opposition; the associations are insignificant.

Model 2 shows that ideological opposition is stronger in Anglo-Saxon countries

(1.270/3.559, p>.05), while the project type is not significant. Altshuler and Luberoff hold that inner-city transportation projects are particularly contested. Local decisionmakers were not significant in Model 1, so I tested for inner-city projects to explain opposition. As it turns out, ideological opposition is strongest for inner-city projects (1.606/4.984, p>.05), thus confirming Altshuler/Luberoff's thesis.

However, there are three caveats to the finding: first, Altshuler and Luberoff are only discussing U.S. cities; second, they focus primarily on opposition to highway projects; and third, they discuss soaring opposition in the 1960s and 1970s, after the highway boom that destroyed entire – especially poorer - neighborhoods. The majority of my

projects started in the 1980s. These caveats do not prevent a cautious conclusion, though, since the majority of the Anglo-Saxon projects are in the United States. So the hypothesis is supported.

Statistical Quality: Here, the quality of the results, in statistical terms, is fair, with ROC values in the range of 72% to 76%. Parametric tests like binary logistic regressions require the data to meet fewer assumptions than parametric tests. I tested the quality of the binary logistic regression results by looking at the ROC (Receiver Operations Graphs) curves of the results.²⁵ Specific results are displayed in Appendix I, an explanation of the statistical tests that have been conducted is in Appendix F.

4.2.4. In Summation

There are four areas where macro-political factors exercise limited influence.

1. Macro-level factors and different levels of decision-making are associated. As expected, national level decision-makers exercise more influence in centralized countries, where transportation investments and policies are also more centrally organized. Regional level decision-makers, on the other hand, play a larger role in federalist countries.

Further, projects located within centralized, smaller countries have more international decision-makers than projects in federalist countries. The explanation is that most European countries are centralized. In addition, European projects usually receive partial funding from the European Union, which are here counted as international. I will pick up on this in more detail in Section 3 (Table 2).

²⁵ For an explanation of ROC curves, see Appendix F. Individual ROC Curve graphs and more information are displayed in Appendix J.

2. There are some tentative indicators that macro-political characteristics impact funding types. For example, **bond funding plays a stronger role in centralized countries**. I will explore this concept further in Section 5 on project decisions and the nature of funding (Table 1 and Model 2.3).

3. Ideological opposition is stronger in Anglo-Saxon countries than in other countries. Possible caveats, however, are given in the discussion for Hypothesis 2.6.

4. The non-parametric tests held that the political system affects project

transparency. Since I was not able to confirm this in the regression analyses (which included various explanatory variables to the model), I assume the differences are driven by something else for which I cannot account. I will explore the issue of transparency further in Section 4 below.

4.3. Project Decision-Makers

4.3.1. Notes about the Data

The compositions of decision-makers per project vary by political system and project type. I distinguished five levels of decision-making: **local actors**, **regional or state actors** (mainly the subnational units in federalist systems), **transportation agencies**, **national** and **international decision-makers** involved in any major political decision points. Most projects involve national level decision-makers (70% of the projects), followed by regional (40%), Transport Agency decision-makers (23.3%), local (21.6%) and international ones (15%). Since I am looking at different countries with multiple decision-making frameworks, it is difficult to establish how representative these proportions are, or which thresholds apply (with the exception of national decision-makers, which I will discuss following the presentation of the results).

Binomial tests²⁶ (below) show that none of these ratios, except for the regional decisionmakers ratio, are likely to exist by chance at a 50 percent threshold. So they might be true representatives of the general population.

Local decision-makers:	prop. 0.5, test stat=46, Z=4.166, sig \leq .05, two-sided
Regional decision-makers:	prop. 0.5, test stat=35, Z=1.302, n.s., two-sided
TA decision-makers:	prop. 0.5, test stat=45, Z=3.906, sig≤.05, two-sided
National decision-makers:	prop. 0.5, test stat=42, Z=3.125, sig≤.05, two sided
International decision-makers:	prop. 0.5, test stat=50, Z=5.208, sig≤.05, two-sided

Since there is no internationally comparative literature on megaprojects that would assess these ratios, it is difficult to gauge which proportions are truly representative. The tests show that at a 0.5 threshold, the proportion of national-level decision makers (70%) is too large to likely happen by chance. However, the literature *does* acknowledge strong national-level involvement in megaproject decision-making (Altshuler/ Luberoff, 2003). Thus I raised the test threshold to 60 percent. The result was insignificant (prop. 0.6, Test Stat=42, Z=1.621, n.s. (one-sided)), which means that the sample would be a more or less accurate application of reality – provided national decision-makers are routinely involved in multi-billion dollar project investments. Altogether, this confirms that the national level, statistically speaking, assumes the largest role in project decision-making. I already know that the ratios of national level vs. others decision-makers vary by type of government system (see Table 2).

4.3.2. Exploring Relationships between Variables

The relationships are given by the following hypotheses:

²⁶ Binomial tests test the probability that a binary sample reflects a likely distribution in the general population. Statistical tests operate with the default threshold of .5 (50%). With this threshold, the sample distribution is evaluated against the probability that the data distribution corresponds to 50/50 in the real world. The test value reflects the deviation from that probability. The threshold may be changed to reflect hypothesized proportions of the given general population based on theory or observation.

H3.1: Anglo-Saxon projects involve more local and regional decision-makers in project decisions.

H3.2: The types or nature of the project stimuli influence the types of project decisionmakers.

H3.3: There is less project opposition when national decision-makers are involved than when decisions are made on sub-national levels.

H3.4: National level decision-makers conduct more cost-benefit analyses than project decision-makers on local or regional levels.

H3.5: Project-planning times are longer for national level projects than projects on other levels.

Table	Table 6Parametric Tests (Spearman and Pearson's ²⁷ Correlations)						
List of F	Predictors	Local Decision-	Regional Decision-	TA Decision-Makers	National Decision-		
		Makers	Makers		Makers		
H3.1	Anglo-Saxon		.561** (58)		680** (58)		
H3.2	Special situation			.338** (58)			
H3.3	Opposition: ideological		.458** (58)	394** (58)	277* (58)		
	Opposition: none	.306* (58)					
H3.5	Planning Years***		369* (46)		376** (58)		

Table 6 displays parametric test results.

Displayed: Pearson's R, *sig≤.05 **sig≤.01, ***Pearson Correlations, TA=Transportation Agency

Summary: The results indicate less project opposition when local decision-makers are involved (.306, sig \leq .05), although the relationship it not strong. Regional decision-makers are more involved in Anglo-Saxon countries (.561, sig \leq .01). They also face more ideological opposition (.458, sig \leq .01), while the number of planning years for projects decreases in their presence (-.369, sig \leq .05). More transportation agency decision-makers are involved in special-stimulus situations (.338, sig \leq .05) (for a more detailed explanation, see Appendix B), while projects tend to face less ideological opposition (-.394, sig \leq .05). Local level decision-making is associated with more opposition²⁸ (.306,

²⁷ Pearson's correlations are measures of linear statistical correlation or the dependence between two variables, e.g. if the value of one variable increases or decreases depending on the value of another one. The values of the outcome coefficient range between -1 and 1. The closer the coefficients are to the values 1 and -1, the stronger the correlation. With a coefficient of 0 the variables show no statistical association. The negative or positive value describes the direction of the curve. The Pearson's test, a parametric test, works best with scale data.

²⁸ The coding is counter-intuitive.

sig≤.05). Finally, national decision-makers are less involved in Anglo-Saxon countries (-.680, sig≤.05) and in the face of ideological opposition (-.277, sig≤.05). The number of planning years decreases when they are involved (-.376, sig≤.05).

*H*3.1: *Anglo-Saxon projects involve more local and regional decision-makers in project decisions*, than project decision processes in other regions. Pearson's R indicates a strong association (.561**). Thus, the hypothesis was confirmed for regional and national levels of decision-making. However, the results should not be overstated, as they rest on the fact that most Anglo-Saxon countries are also federally organized, and thus it is not surprising that regional authorities are the key decision-makers there. This was already discussed following Table 2.

H3.2: The types or nature of the project stimuli influence the types of project decisionmakers. Projects that were implemented in preparation for, or in the wake of, special scenarios like German reunification projects or special constructions for the Olympics, more often involve transportation agencies: often transport agencies are specifically being created for such special purposes – either because the historic-institutional legacy of decision-making was disrupted, or because established practices were not available.

H_{3.3}: *There is less project opposition when national decision-makers are involved than when decisions are made on sub-national levels*. In some cases project decisions are being moved up to the national level to avoid conflict, if there is a strong potential for opposition on the local level. Indeed, I found that (ideological) project opposition is stronger when regional level decision-makers are involved than any other level, and less on TA and national levels. So **H3.3 was confirmed**. In combination with the results of Table 7 it may be inferred that the national level is more willing to take on projects that are cost-intensive (experience more cost overrun) but that

are deemed necessary and do not inspire opposition. (The findings in Table 13 that projects with national funding sources meet their user projections better than projects with other funding sources, confirm this.)

H3.4: *National level decision-makers conduct more cost-benefit analyses than project decision-makers on local or regional levels*. Transport authority decision-makers do not appear to conduct more CBAs than other levels. The national level – as held by the hypothesis – does not influence the use of CBAs, either. So the hypothesis was rejected.

H3.5: Project-planning times are longer for national level projects than projects on other levels. The association between national and regional decision-makers and planning years is negative. So the number of planning years is shorter when these decision-making levels are involved. The hypothesis is not confirmed. A lot of factors may play a role. The involvement of national decision-makers suggests different possible planning practices. Long-range planning and budgeting is more probable for nationallevel projects, while the practice of one-year planning cycles is generally more prevalent at local levels and the planning process and related issues thus more dispersed – and likely longer.

Next, I compare how levels of GDP, costs and cost overruns and some timing variables are affected by the presence or absence of types of decision-makers by conducting Mann-Whitney U-Tests. These tests, because they compare groups, allow seeing whether and which decision-making levels affect the variables. I thus hope to gauge the possible effects of different decision levels.²⁹

H3.6: The higher the GDP PPP, the more project decisions are made at the national level.

²⁹ More details on the test may be found in Appendix F.

H3.7: If (special-purpose) transportation agencies are involved, cost overruns are smaller.

H3.8: National level decision-makers tend to take on more complex, long-term projects.

H3.9: National level decision-makers are involved with the more expensive projects (costs/km).

H3.10: Project decision-making levels changed over time, specifically from the 1980s onward. More projects are now decided on sub-national levels.

Table 7 shows associations from the non-parametric tests.

Table 7: Non-Parametric Tests: Associations between Project Decision-Makers and Selecte	ed
Variables (Mann-Whitney U-Test)	

		Local Decision- Makers		Regiona Decision Makers	Regional Decision- Makers		Transportation Agency Decision-Makers		National Decision- Makers	
		U (df)	Ζ	U (df)	Ζ	U (df)	Ζ	U (df)	Z	
H3.6	GDP PPP	372 (1)**	1.823 (58)							
	GDP 2010	412 (1)*	2.066 (59)	712 (1)**	4.525 (59)					
	GDP 2000	443 (1)**	2.636 (59)							
H3.7	COR					103 (1)*	-2.248 (43)	315 **	2.476 (43)	
H3.8	Decade Inceptio	390 (1)*	2.265 (58)				-	188 **	-2.837 (58)	
	Year of Inceptio n		1			-		178 **	-2.920 (58)	
H3.9	Constr. Time							452 **	3.322 (53)	
H3.1 0	Costs per km	328 (1)*	2.087 (51)							
Displa *sig≤.(yed: U=test s	statistic (df	=degrees of	freedom),	Z= standaı	rdized coeffic	cient, N=pr	roject cour	ıt,	

Summary: Local decision-makers are positively associated with a country's wealth: the richer a country, the more local decision-makers are involved in project decisions (372, 1.283 sig \leq .01, .412, 2.066 sig \leq .05, .443, 2.636 sig \leq .01). The same is true for regional decision-makers (712, 4.525, sig \leq .01). Also, local decision-makers have increased their relevance over the past few decades (.390, 2.265 sig \leq .05). The change over time has been established through a variable that assigns an increasing value to each passing decade during which the main project decision was made. Higher values are associated with newer projects. Additionally, local decision-makers are associated with larger project costs per kilometer (328, 2.087, sig \leq .05). Projects implemented by transportation

agency decision-makers experience fewer cost overruns (103, -2.248, sig \leq .05). National decision-makers are associated with larger cost overrun (.315, 2.476, sig \leq .01) and longer construction times (.452, 3.322, sig \leq .01). At the same time, their relevance has diminished over time – both measured by decade (188, -2.837, sig \leq .01), and by inception year (.178, -2.920, sig \leq .01).

H3.6: The higher the GDP (PPP), the more project decisions are made at the national level. The hypothesis was not confirmed. Non-parametric tests show that the richer a country, the more decision-makers participate on a local level (372, 1.283 sig \leq .01, .412, 2.066 sig \leq .05, .443, 2.636 sig \leq .01). The data shows no significant association between wealth and the national decision level. It is possible that the correlation is driven by the fact that a relatively large number of projects in the data set are located in very wealthy federalist countries (12 out of 60 projects in the U.S.), where the devolution of decision-making is stronger than in centralized countries (Table 2).

H3.7: If (special-purpose) transportation agencies are involved, cost overruns are smaller. The hypothesis was indirectly derived from the literature (e.g. Doig, 1983, Bordeaux, 2008) – and confirmed. Transportation-agency led projects have fewer cost overruns than projects decided by other levels of decisionmaking (103, -2.248, sig<.05). The hypothesis was based on the assumption that the specialized organization of established transportation agencies may improve implementation efficiency. TAs further hold the potential to shelter decisions from political impacts, thus making implementation more efficient. Additionally I found that cost overruns are higher for national projects

H3.8: National level decision-makers tend to take on more complex, longterm projects. Local-level decision-makers gained influence over time (.390, 2.265

sig \leq .05), while national-level decision-makers lost their influence (by inception decade: 188, -2.837, sig \leq .01; by inception year: .178, -2.920, sig \leq .01), which **confirms**

Altshuler and Luberoff's (2003) devolution thesis (even though they were only focusing on the U.S.). I did not find any significant results for international decision-makers.

H3.9: National level decision-makers are involved with the more expensive projects (costs/km). The data confirms the hypothesis in terms of cost overrun. Again, national decision-makers might take on complicated (and maybe less profitable) projects that are not pursued by lower decision-making levels. Related: longer construction times may drive up project costs, as well.

H3.10: Project decision-making levels changed over time, specifically from the 1980s onward. More projects are now decided on sub-national levels. Interestingly, projects with local decision-making participation have higher costs per kilometer.

4.3.3. Regression Models

The correlation results suggested that there is less "ideological opposition" when national decision-makers are involved (H.3.3.). This suggests that the national level takes on projects the public deems important, but that are expensive. I test this association in the models below. In Model 1, I added the number of years a project has been considered (project history) as an indicator for project opposition: projects that have been brought up repeatedly for a long time might be controversial and expensive. On the other hand they might also face less opposition, because the public has waited for them for a long time. The Second Avenue Subway in New York is an example. I included the decade of project approval, because I assume that the earlier projects are more likely to have encountered opposition (Altshuler and Luberoff, 2003). Special interests (as

project stimulus) might not sit well with the general population, either, when selecting a

large-scale construction project.

H3.3: There is less opposition to projects when national decision-makers are involved, than lower level decision-makina.

 $\frac{1}{1 + e - (a + bV52 + cV26 + dV58 + eV19)}$ 1 P(V28) = -Model 1:

Y = Ideological Opposition (V28)

X = National Decision Makers (V52), Years of History (V26), Decade of Inception (V58),Project Stimulus (V19)

In the model, y (ideological opposition) is a binary variable, impacted by national

decision-makers and the control variables. I selected a binary logistic model first,

because the outcome variable is binary, and because I don't expect strong attenuation

affects. In the second model I treated the binary as a scale variable to test a non-linear

model. Table 8 displays the results of the model. Model 2 will be described in more detail

below the table.

Funding Type Bonds squared

Project Type Rail Constant

Model Fit tests:

N

Model 1 (logistic) List of Predictors Model 2 (non-linear) National Decision-Makers -2.185/ .112* **-**∙337* Years of History -.021/ .979 (n.s.) Decade of Inception [grouped] -609/.544* Project Stimulus (special .1262/3.531 (n.s.) inter.) Funding Type Bonds .014*

.054 (n.s.) (squared)

·359**

55

Table 8: The Effects of National Decision Participation on Ideological Opposition (Binary		
Logistic and Non-linear	Regression)	
List of Duadistans	Model 1 (legistic)	Model a (non linear)

.190/ .273 .125 Displayed in Model 1: Beta/ Exp(B); Model fit tests: Cox & Snell R Square/ Nagelkerke R Square; Displayed in Model 2: Beta; Model Fit: Adjusted R Squared; *sig≤.05 **sig≤.01.

-2.397/ 10.989 *

50

Summary: National decision-makers affect ideological opposition negatively in both models. That is, the stronger the national level is involved, the weaker is ideological opposition to a project. Model 1 lists the log-odds and regression coefficients for further independent variables. While the history variable has no significant effect, the time a
project has been considered, however, does: the younger a project, the less likely it is that it faces project opposition. The time is categorized by projects before 1990, those until 1995, until 2000, and since. I may infer that projects are less contested now than they were in the past. Another variable, project stimulus (projects constructed because of special interests), is not significant.

Model 2 includes a quadratic interaction (bonds) to account for a potential attenuation of the curve.

Model 2: V28=a+b(V52)+c(V36)+d(V36)²+error

Y = Ideological Opposition (V28)

X = National Decision Makers (V52), Funding Type: Bonds (V36) + Funding Type: Bonds²

The model predicts that national decision-makers have a negative impact on project opposition. I included bond funding because (depending on country or state specific policies) bonds are usually outside the typical (and often contested) funding pots. Hence, I expect bond-type funding to have a negative impact on "political opposition," and a positive impact on "ideological opposition." While there was no indication that "political opposition" is affected (not displayed in the table), bond-funded projects more often face "ideological opposition" (.014*). The hypothesized exponential relationship was not confirmed.

Statistical Quality: The quality of the statistical results in Table 1, Model 1 is good (see the ROC data presented in Appendix J). Model 2: The Shapiro-Wilk test for testing the normality of error is problematic (.000). That means the sample population is not normally distributed, so the finding of Model 2 (displayed in Table 8) should be disregarded.

4.3.4. In Summation

The results reported in Section 3 suggest the following effects for decision-making levels and transportation megaprojects:

 National level decision-makers in Anglo-Saxon countries are not significantly involved in infrastructure investment decisions (Table 6). Anglo-Saxon countries are mostly federally organized, so decisions are more localized. In centralized countries infrastructure investment decisions are handled top down.

2. National level projects face a lesser "ideological opposition" than projects involving other decision levels (Table 4.3.4), a finding that is complemented by the fact that inner-city projects face more opposition than projects of metropolitan, regional or national relevance (Table 6). To connect to point 1, Anglo-Saxon countries are more *laissez-faire*, at least compared to continental Europe (Esping-Andersen, 1999). Laissez-faire decision-making might lead to stronger economic and other types of inequality (in this case, transportation access), which might inspire more opposition. On the other hand, a culture of opposition is also strongly developed in states like France, which are not within the laissez-faire group. For a conclusive statement, the association should be explored by case studies.

3. The importance of national decision-making diminished over time, while local level decisions proliferated (Table 7). The Mann-Whitney U-Tests show that local decision-makers are associated with younger projects and national level decisionmakers with older projects.

4. **National level projects experience more cost overruns**. Projects involving TA decision-makers experience fewer cost overruns (Table 7.). National level projects have longer construction times, which are positively associated with cost overruns (Pearson's

99

R .328*). The costs per km, interestingly, are higher for projects involving local decisionmakers. There are two likely explanations: first, the most expensive projects, which are tunnels (including subways) and multi-lane highways, are built in inner cities and often under (at least partial) local jurisdiction. Second, the projects going beyond local jurisdictions are not only less expensive because they are being built through less developed land. Railroads are overrepresented in the categories beyond city-limits, because they usually are projects of supra-regional significance with less local authority.

4.4. Megaprojects and Transparency

In this section I will focus on two variables: transparency and cost-benefit analyses (CBA), and their relationship with other variables. These two variables are presented together because for the purposes of this study they are related – CBAs are part of my transparency measure: if a CBA was not conducted, or conducted but not published, I assume the project does not meet transport-economic standards. There may be a variety of reasons for this, and political motivation is one of them.

4.4.1. Notes about the Data

Transparency is an important aspect in the megaproject literature and cost-benefit analyses are being "routinely carried out as part of megaproject preparation" (Flyvbjerg et al. 2003, p. 5). By project transparency, I mean the degree to which project decisions are documented, decision criteria are clear, and the information publicly available. The transparency variable is a composite variable containing information about cost-benefit studies, environmental analyses, risk analyses and economic studies: the more documents are publicly available, the higher is the assigned transparency score. On this scale, 26% of all projects (16 projects) are not transparent, 38% medium transparent (23), and 37% in the upper ranks of transparency (23). Cost-benefit studies are (ideally) an important investment decision criterion. The costbenefit analysis variable is dichotomous, indicating the absence or presence of such a study. I only counted studies as "done" if they were publicly reported, and I also counted less rigorous studies. I did not find published systematic numbers for the proportions of transparent megaprojects accompanied by CBAs. **The database provides a ratio of cost-benefit studies done or not done is at about 50 percent (N=60, studies done=27 (45%), not done=33 (55%)).** If 50% CBA would be normal (binomial test: Z=.645, n.s.), this would be within the normal range – however, a quota of 50% costbenefit analyses conducted is very low. Although there is no established threshold in the literature, the number appears to be low. If I take partial or incomplete costbenefit analyses into account (N=60, studies done=21 (35%), partial=11 (18%), not done=28 (47%)), the number of CBAs increases. I assume that the sample comes close to being an accurate representation of project decision-making in the real world.

The transparency variable is a composite variable, so I cannot conduct a similar test here. I will explore what potentially affects the variables "transparency" and "CBA" and also how they affect various other variables.

4.4.2. Exploring Relationships between the Variables

Transparency and cost-benefit analyses will serve both as explanatory variables and as dependent ones. I want to gauge what drives transparency, and how it impacts other variables, such as cost overrun. Only statistically significant results will be reported.

Based in parts on the literature and in part on the analyses, I built several models that explore the role of transparency in megaproject decision-making. I will first list a set of hypotheses that guide the statistical tests, then present the most significant findings in subsequent tables, and then summarize the results and discuss them in the light of the hypotheses. Again, I use both parametric and non-parametric tests to account for the different data characteristics. In Table 9, I use the non-parametric Mann-Whitney U Tests to compare rail projects with non-rail projects, different types of project stimuli and decision-makers, and project opposition.

H4.1: Rail projects are more transparent than highway projects.

H4.2: Projects that arise from special occasions are less transparent.

H4.3: P	Project trans	parency increase	s with the rank	c of the	e decision-maker.
10					

		Tran	sparency (V50)	Cost-Benefit Analyses (V41)		
	Variables	U(df)	Z	Ν	U(df)	Z	Ν
H4.1	Project Type Rail	543 (1)*	2.131	60		n.a.	
H4.2	Stimulus/ Addendum	137 1)*	2.047	59		n.s.	
H4.3	Decision-Makers: Provincial	584 1)*	2.610	50		n.s.	
	Decision-Makers: National	244 1)*	-1.965	59		n.s.	

 Table 9: Transparency, Cost-Benefit Analyses, and other Variables (Mann-Whitney U Tests)

 Transparency (V50)
 Cost-Benefit

Displayed: U=test statistic, df=degrees of freedom, Z= standardized coefficient, N=project count.; *sig≤.05 **sig≤.01.; *** for Stimulus 5 there are only 3 observations in one category; n.s.: not significant; n.a.: not applicable.

Summary of the Results: Rail projects (543, 2.131, sig \leq .05), and provincial/regional level (.584, 2.610, sig \leq .05) as well as national level projects (.244, -1.965, sig \leq .05) are more transparent. Transparency is also positively associated with ideological project opposition (573, 3.230, sig \leq .01), and with network expansion projects (137, 20.47, sig \leq .05) - although there are only few observations. Cost-benefit analyses play a larger role in "crisis and opportunity" projects (517, 2.112, sig \leq .05) and with provincial/regional decision-makers (564, 2.310, sig \leq .05).

H4.1: Rail projects are more transparent than highway projects. Rail projects are indeed more transparent than non-rail projects (543, 2.131, sig≤.05). They are the only project type with a significant association to transparency.

H4.2: Projects that arise from special occasions are less transparent. The hypothesis was not confirmed. Instead, when testing for other project stimuli it turns out that

projects that are additions to already existing networks have better transparency indicators than projects being built for other reasons.

H4.3: Project transparency increases with the rank of the decision-makers. The

hypothesis was not confirmed. Transparency is actually higher on regional/ provincial levels (.584, 2.610, sig \leq .05) and significantly lower when national decision-makers are involved (244, -1.965, sig \leq .05). Project documentation on regional decision levels might be more public because funding applications to higher levels of decision-makers often require such documentation.

Further tests are presented in Table 10, guided by the following hypotheses:

H4.4: The wealthier a country, the more transparent are its projects.

H4.5: Projects in centralized countries are more transparent than in federalist countries.

H4.6: Entirely new projects are more likely to have CBAs than network expansion projects.

H4.7: The less transparent a project, the more protest potential is there.

H4.8: Project transparency affects project success (here, cost overruns) negatively.

H4.9: Inner-city projects are more typically based on cost-benefit analyses.

Spearman's Correlations)					
	Transparen	Transparency (V50)		nalyses (V41)	
	Correlation	Ν	Correlation	Ν	
Variables	Coefficient		Coefficient		
H4.4 GDP PPP 2010	.431**	60	.261*	60	
H4.5 Political System	296*	60			
H4.6 Description	258*	60	n.s	.	
H4.7 Opp: political	.330*	59	.267*	59	
Opp: ideological	.424**	59	.338*	59	
II to Immon Otta			0.05*	60	

 Table 10: Transparency, Cost-Benefit Analyses, and other Variables (Pearson's and Spearman's Correlations)

Values: Pearson's R for H4.4, H4.5, and H4.9; Spearman's correlations for H4.6 and H4.7; *sig≤.05 **sig≤.01; n.s. = not significant.

Summary: Decision-making transparency is higher in wealthier countries (.431,

sig≤.01), and more cost-benefit analyses are being conducted there (.261, sig≤.05). The

decision process is more transparent in federalist countries (-.296, sig≤.05) than in

centralized ones. Transparency is lower (-.258, sig≤.05) in network expansion projects (-

.300, sig≤.05) than in newer projects. Interestingly, transparency and cost-benefit analyses are positively correlated with political opposition (.330, sig≤.05 and .267, sig≤.05 respectively) and with ideological opposition (.424, sig≤.01 and .338, sig≤.05). Finally, cost-benefit analyses are more likely in inner-city projects (.287, sig≤.05) than for projects with a larger range.

H4.4: The wealthier a country, the more transparent are its projects. The hypothesis was confirmed: **wealthy countries are associated with more transparent project implementation** (.431, sig \leq .01; more cost-benefit analyses: (.261, sig \leq .05)).

H4.5: Projects in centralized countries are more transparent than in federalist countries. The hypothesis was not confirmed. Projects in federalist countries are more transparent than projects in centralized countries (-.296, sig \leq .05). The comparatively large number of U.S. projects (a federalist country) in the database is one possible reason. The U.S. has strict environmental impact analyses requirements for projects with federal funding. This is also consistent with the finding above that sub-national decision-making is more transparent.

H4.6: Entirely new projects are more likely to have CBAs than extensions to existing networks. The hypothesis was confirmed. There is lower project transparency in add-on projects to already existing networks (transparency: -.258, sig≤.05; the relationship refers to the "description" variable that measures whether a project is a new or stand-alone project, or an addition to an existing one). New projects are under more justification pressure because they have not been tested (at least in the respective area). They might also have no supporters, yet. Third, network additions produce network benefits that ease the justification process. (Also see Section 5.)

H4.7: The less transparent a project, the more protest potential is there. Project transparency and opposition are clearly associated, but it is unclear what was first: (a lack of) project documentation, or opposition. I selected the hypothesis for further analysis below.

H4.8: Project transparency affects project success (here, cost overruns) negatively. Cost benefit analyses are more easily available (and conducted) for inner-city projects than for projects that reach beyond.

H4.9: Inner-city projects are more typically based on cost-benefit analyses. The data confirms the hypothesis.

4.4.3. Regression Models

To assess the influence of the contextual variable GDP on transparency (as observed in Table 7), a linear model is used. I hypothesize that a higher GDP correlates with increased transparency because more funding might be available to conduct project studies (at least in capitalist democracies), and more planning and implementation practice, too. Also, wealth correlates with a degree of democratization, and policy requirements in richer countries may be more publicly oriented and stricter.

The first model focuses on the effects of Gross Domestic Product/ Purchasing Power Parity (GDP PPP) and of funding sources on transparency. I assume a linear relationship because I do not expect a particular threshold of wealth to make a difference. The hypothesis is given as:

Hypothesis 4.2: The wealthier a country, the more transparency in project decisionmaking.

Model 1: Y(V50)=a+b(V5)+c(V12)+error

Y = Project Transparency (V50)

X = GDP PPP (V5), Project Type (V12)

The linear model (Model 1) includes a variety of independent variables based on the

literature and correlation results above. The results are presented in Table 11.

Table 11: Structu	Table 11: Structural Effects on Project Transparency (Linear and Non-Linear Regressions)							
List of	Model 1	Model 2	Model 3	Model 4				
Predictors			-	-				
GDP PPP	.012**	.011**	.001** (squared)	.011**				
Project Location		n.s.						
Project Type:	.256*	.284*		.255*				
highway								
Project Type: rail	.148*	.185*		n.s.				
Project				n.s.				
Description								
Decision-Makers:			-1.085**					
local			_					
Constant	026	086		.180				
Ν	60	59	59	59				
Model Fit	.255	.261	.261	.261				

Values: Beta; $*sig \le .05$ $**sig \le .01$, Model fit: Adjusted R Squared; n.s. = not significant.

All models show that GDP PPP indeed increases transparency, although the effect is not

strong. Model 1 explains variation in transparency best: GDP PPP (.012, sig≤.01),

highway (.329, sig≤.05) and rail projects (.207, sig≤.05) predict transparency.

Model 2 confirms the main causalities of Model 1.

Model 2: $Y(V_{50})=a+b(V_5)+c(V_{11})+d(V_{52})+error$

Y = Project Transparency (V50)

X = GDP PPP (V5), Project Description (V11), Project Type (V12)

I added project location (whether a project is an inner-city project or ranging beyond

that) to Model 2, but the added effect was not significant.

Model 3 holds that a country's wealth and the participation of local decision-makers

increases project transparency. I chose a quadratic model because it best fit the data.

Model 3: $Y(V_{50})=a+b(V_{5})^{2}+(V_{52})+error$

Y = Project Transparency (V50)

X = GDP PPP (V5) squared, Decision-Makers (V52)

The rationale behind the hypothesis is that decision-makers on the local level are better informed about local transportation needs and need to document them better to convince the immediate constituencies and potential funders. However, the established relationship is negative: when local decision-makers are involved in project implementation, project transparency declines (-.243, sig≤.05). The model fit is at 23.3 percent, which is strong for a social science association. In Table 10, I observed that project transparency is positively correlated with federalist countries, so transparency is larger there. However, the main input variables are correlated as well, rendering the results not very useful.

Model 4 adds project type and the description variable as an independent variable.

Model 4: Y(V50)=a+b(V5)+c(V12)+d(V11)+error

Y = Project Transparency (V50)

X = GDP PPP (V5), Project Type (V12), Project Description (V11)

Though GDP is still significant (.011, sig≤.01), and the highway variable as well (.294, sig≤.05), rail projects and the description variables – while impacting the model fit – are not significant.

Quality of the Statistical Results: All results are ok, except for the lack of fit test for Model 3, which is too low. Linear models describe the relationship better than squared ones.³⁰

H4.8: Project transparency affects project success (here, cost overruns) negatively. Though the bivariate tests did not show significant associations, the literature hypothesizes that transparency and cost overrun are related (most prominently:

³⁰ For more detail see Appendix J.

Flyvbjerg et al., 2003, Berechman, 2009). Hence I continue the analysis. Adding additional variables to the model, I expect project success to increase (or cost overruns to decrease) when CBAs are conducted. Originally, I chose a logistic regression model (Model 1), because I assume a binary outcome: cost overrun or not. Since private funding serves as an indicator for improved project outcomes, I added it as independent variable. Because some types of projects are more prone to cost overruns than others (tunnel projects), I control for project types, too. If the hypothesis were correct, I would expect that, in the presence of CBAs, decent transparency and private funding projects experience fewer cost overruns. But there were no significant results.³¹

Model 1a: $P(V33) = \frac{1}{1 + e - (a + bV41 + cV35 + dV12)}$

Y = Project Success Variables: Cost Overrun (V33)

X = Cost-Benefit Analysis (V41), Private Funding (V35), Project Type (V12)

Model 1b: $P(V33) = \frac{1}{1 + e - (a + bV50 + cV35 + dV12)}$

Y = Project Success Variables: Cost Overrun (V33)

X = Transparency (V50), Private Funding (V35), Project Type (V12)

There were no significant results, even when testing other model specifications. ³² The

data do not reveal that the presence or absence of cost-benefit analyses, and the degree

Y = Project Success Variables: Cost Overrun (V33)

³¹ I also tested for effects on the degree of cost overrun, but there were no significant associations.

³² I tested the following linear and quadratic specifications. None of them produced significant results:

Model 2a: $Y(V_{33})=a+b(V_{41})+c(V_{35})+d(V_{12})+error$

X = Cost Benefit Analysis (V41), Private Funding (V35), Project Type (V12)

Model 2b: Y(V33)=a+b(V50)+c(V35)+d(V12)+error

Y = Project Success Variables: Cost Overrun (V33)

X = Transparency (V50), Private Funding (V35), Project Type (V12)

Model 3a: Y(V33)=a+b(V41)+c(V35)+d(V35)²+(V12)+error

Y = Project Success Variables: Cost Overrun (V33)

X = Cost Benefit Analysis (V41), Private Funding (V35), Project Type (V12)

Model 3b: Y(V33)=a+b(V50)+c(V35)+d(V35)²+(V12)+error

of transparency, significantly impacted project cost overrun. I conclude that such an association cannot be captured with my data.

H4.7: Project transparency affects project opposition: the less transparent a project, the more protest potential there is.

Because the dependent variable is a binary, I chose a binary logistic model to evaluate

the effect of project transparency on project opposition.

 $P(V28) = \frac{1}{1 + e - (a + bV50 + cV11 + dV36)}$ Model 1:

Y = Project Opposition: Ideological Opposition (V28)

X = Transparency (V50), Project Location (V11), Funding Types (V36)

This produced the following results:

-.025/.975*

-.037/.964*

Funding Type:

Gov't Loans

grants Funding Type:

regressions)				
List of	Model 1	Model	Model	Model 4
Predictors	Model I	Model 2	Model 3	Model 4
Transparency	1.644/ 5.178**	5.519/ 245**	4.732/ 113.4**	3.919/ 50.354**
Inner City	2.023/ 7.565*	1.754/ 5.780*	1.562/ 4.768 *	1.764/ 5.833*
Project			n a	
Description			11.5.	
Project Type				n.s. (rail)

Table 12: Impact of Transparency on Ideological Project Opposition (binary logistic

Stakeholders: private		1.585/ 4.879*		
Constant	-4.267/ .014*	-5.340/ .005**	-4.152/.016*	-3.760/ .023*
Ν	53	59	59	59
Model Fit	.358/ .507	.295/ 412	.252/ .353	.248/ .347
Values Bota / Ex	m(B). Model fit. Cov	& Spell P Square / Nagelkerke	P Square: *sig< OF **sig	< 01: n s -not significant

Values: Beta/ Exp(B); Model fit: Cox & Snell R Square/ Nagelkerke R Square; *sig≤.05 **sig≤.01; n.s.=not significant.

Summary: All models confirm that transparency impacts project opposition, but not in the hypothesized direction. The results for Model 1 show that transparency significantly affects opposition (1.644 / 5.178, sig <.01) by increasing it. The positive impact of innercity projects on opposition (2.023/ 7.565, sig≤.05; meaning more opposition in innercities) strengthens the relationship. I added project location as a factor, because

Y = Project Success Variables: Cost Overrun (V33)

X = Transparency (V50), Private Funding (V35), Project Type (V12)

construction projects in dense urban areas affect more people than elsewhere and may thus provoke them to protest more easily, especially when some groups are disproportionately affected (Altshuler and Luberoff, 2003). Further, public grants (-.025/ .975, sig≤.05) and government loans (-.037/ .964, sig≤.05) reduce project opposition. The model fit is a bit over 35%. I may conclude that if projects are not transparent and are additionally located in urban areas, they are likely to encounter protests. Government's grant and loan-funded projects, on the other hand, diminish opposition risk.

Model 2:
$$P(V28) = \frac{1}{1 + e - (a + bV50 + cV11 + dV51)}$$

Y = Project Opposition: Ideological Opposition (V28)

X = Transparency (V50), Project Location (V11), Stakeholders (V51)

Model 2 hypothesizes that in addition to transparency (squared to test for an attenuating effect) and inner city location, the participation of private stakeholders increases the odds of ideological opposition further. With 30%, the model fit is good enough to conclude that private sector participation plays a role in creating "ideological" project opposition.

Model 3: $P(V28) = \frac{1}{1 + e - (a + bV50 + cV11 + dV18)}$

Y = Project Opposition: Ideological Opposition (V28)

Model 3 is a non-linear logistic model that includes transparency (squared), project location, and the status of a project within a network as independent variables.

Transparency and inner-city location are significant indicators again, while V18 is not. The model fit is 25%.

Model 4:
$$P(V28) = \frac{1}{1 + e - (a + bV50 + cV11 + dV12)}$$

Y = Project Opposition: Ideological Opposition (V28)

In Model 4, I replaced the "project description" variable with project type, but here, too, while the transparency and project location associations remain, the project type does not add an additional significant element to explain project opposition. The model fit slightly decreases.

The relationship between the transparency and the opposition variable is positive in all models, which rejects the hypothesis. I will discuss this finding in the summary of this section.

Statistical Quality: The quality of the statistical result ranges between fair and good. In terms of statistical quality, Model 1 is the best model.³³

4.4.4. In Summation

There are three main findings.

1. According to the first two sets of correlations and non-parametric tests, the transparency "landscape" is as follows: project decision-making is more transparent in wealthy than in poorer countries; rail projects are more transparent than highway, tunnel or other projects; and there are more cost-benefit analyses done for inner-city projects than for others. Further, I also found that greater project transparency is

³³ More details may be found in Appendix J.

associated with more project opposition (addressed in point 3, below); projects in centralized countries and with national decision-makers are less transparent; and entirely new projects (not extensions of existing networks) are also less transparent.

2a. **Transparency increases with a nation's wealth**. Based on the parametric tests in Table 12., the decision-making process of highway and railway projects is better documented in wealthier countries. Government grants and loans do not raise project transparency norms but appear to diminish them.

2b. Project transparency and cost-benefit analyses do not impact project performance.But the more transparent a project, the more project opposition exists.

3. That raises the question of directionality: since it is not unusual for megaproject planning and implementation processes to run more than ten years it is difficult to determine which variable is a cause, and which is effect: project opposition may occur either before or after a study was conducted. The data suggests allows speculating about opposition being the catalyst for project studies or the result of their absence. In this sense, the transparency results are inconclusive.

4.5. The Nature of Funding: Funding Sources

This section examines the nature of project funding and associations with project decision-making factors. The nature of funding for a project has political implications because funding sources determine the decision-makers. Funding sources are also indicative of the local or national significance of a project.

4.5.1. Notes about the Data

The funding sources variable distinguishes between local, and provincial funding sources, transportation authority funding, and national, international and private

112

funding sources by determining the respective percentage of the funding source of the total project cost.

Local funding sources: mean 5.25 (St.D. 12.9, Min .00, Max. 73), N=55 projects (of 60). Provincial funding sources: 9.09 (St.D. 19.55, Min .00, Max. 100), N=55 projects. Transportation Authority: 12.01 (St.D. 12.01, Min. 00, Max. 98), N=55 projects. National funding: 37.73 (St.D. 32.79, Min. 00, Max. 100), N=56 projects. International funding: 4.86 (St.D. 10.73, Min. .00, Max. 50), N=55 projects. Private funding: 29.7 (St.D. 35.45, Min. .00, Max. 100), N=57 projects.

The comparatively high values of the standard deviations reflect that funding sources for megaprojects are really diverse. For instance, there are fully privately funded projects in the database (like Australia's City Link), a project that is fully funded by national sources (the Frejus Road Tunnel in Italy), and one nearly completely by transportation agencies (AirTrain JFK). On the other hand there are projects were multiple funding sources are evenly spread. The missing projects are results of non-transparent decision-making. The frequency distribution in Figure 8 provides more detail:



Figure 8: Average Project Funding by Funding Source (in %)

It may be seen that the darkest columns, national funding sources, dominate all but the first 0-20% cluster. That means that national funding sources provide most funding in

the 20-40% range, in the 60-80% range, and nearly most of the fully nationally funded projects, competing only with privately funded ones.

4.5.2 Relationships between the Variables

I tested a range of associations that contain project funding. The hypotheses below guide

them.

H5.1: The wealthier a country, the more resources of funding are available at the national level.

H5.2: Local funding sources became more important over time.

H5.2.1: The mix of funding sources (or funding complexity) increases over time.

H5.3: Projects underwritten with national funding will take longer to implement.

H5.4: Projects underwritten with national funding will experience more cost overruns.

H5.5: The more national funding, the better the projects meet utilization goals.

H5.6: Projects underwritten with private funding will experience fewer cost overruns or better utilization ratios.

H5.7: When special interests are involved in project decision-making, the funding sources become more complex.

List of	Predictors	Local	Provincial	National	Inter- national	Private	Number of Sources
H5.1	GDP		.287* (54)		283* (54)		
H5.2	Decade	.245* (53)					
&	Inception						
H5.2.1	Year of						.313* (54)
	Inception						
H5.3	Years to			.225* (47)			
	Completion						
H5.3.1	Constr.			.402* (49)		216* (50)	
	Time						
H5.4	COR		249* (41)	.232* (42)	.382* (41)		
H5.5	Utilization			.275* (34)			
	Ratio						
H5.7	Special						.300* (54)
	Interests						
	(Stimulus)						

Table 13: Funding Sources (Pearson's Correlations)

Values: Pearson's R (number of projects); *sig≤.05 **sig≤.01.

Summary: The table shows that a country's wealth correlates positively with regional funding sources (.287, sig≤.05) and negatively with international funding sources (-.283, sig≤.05). This indicates that the wealthier a country the more funding sources come from

the regional level, and also that wealthy countries use fewer international funding sources. The number of locally funded projects (like local decision-makers above) increased over time (.245, sig≤.05), and so did the number of funding sources in general (.313, sig≤.05). The latter indicates the diminishing importance of national governments for infrastructure investment.

Projects underwritten with national funding have longer completion (.225, sig \leq .05) and in construction times (.402, sig \leq .05). (Project construction time decreases, however, when private funding is involved (-.216, sig \leq .05).) Nationally funded projects experience larger cost overruns (.232, sig \leq .05), but their utilization ratio is better than for projects without national funding (.275, sig \leq .05). Cost overrun is negatively associated with regional funders (-.249, sig \leq .05) and positively with international funders (.382, sig \leq .05) – meaning that projects with international funding more often run over budget. Finally, "special interests" as project stimuli are correlated with increased funding complexity (number of funding sources) (.300, sig \leq .05).

H5.1: The wealthier a country, the more funding sources are available nationally. There is no significant association between national funding sources and wealth, so the hypothesis was not confirmed. Instead, a country's wealth correlates positively with regional funding sources (.287, sig \leq .05) and negatively with international funding sources (-.283, sig \leq .05). That the wealthiest country in the dataset, the U.S., is also a federalist country and with 12 out of 60 cases disproportionately represented, might explain the first association. The large number of wealthy European countries that build supranational infrastructure (European funding pots are counted as international here) possibly drive the association between "wealth" and "international funding sources."

115

H5.2: Local funding sources became more important over time. I determined a change over time by capturing in which decade the main implementation work took place and then using the year of inception as indicator.³⁴ Then I correlated these two time indicators with the share of local funding sources. **The hypothesis was confirmed**: I find that local funding sources (like local decision-makers above) increased over time (.245, sig≤.05). This corresponds with Altshuler/Luberoff's hypothesis of the devolution of infrastructure responsibilities (in the U.S.) (Altshuler and Luberoff, 2003).

H5.2.1: The number of funding sources (or funding complexity) increases over time. The hypothesis was confirmed (.313, sig≤.05), further illustrating the diminishing importance of national funding for infrastructure investment.

H5.3: Projects underwritten with national funding will take longer to implement. Projects underwritten with national funding take longer to construct (.402, sig≤.05) and complete (.225, sig≤.05). The hypothesis is confirmed.

H5.4: Projects underwritten with national funding will experience more cost overruns. The data confirms the hypothesis (.232, sig \leq .05).

H5.5: The more national funding, the better the projects meet utilization goals. The utilization ratio of nationally funded projects is better than the ratio for projects without national funding (.275, sig \leq .05). The hypothesis was confirmed. I will discuss this below.

H5.6: Projects underwritten with private funding will experience fewer cost overruns or better utilization ratios. The hypothesis was not confirmed. But construction times decrease when private funding is involved (-.216, sig≤.05). That could either reflect private sector efficiency or the tendency of the private sector to select lower-risk projects.

³⁴ See Appendix B for more detail.

H5.7: When special interests are involved in project decision-making, the funding sources become more complex. The data confirms the hypothesis. When "special interests" appear to be among the project stimulus sources, funding complexity (number of funding sources) increases (.300, sig \leq .05). This may indicate that the projects are not the most transport-economically beneficial or seek socio-politically equal access to transportation.

In the following, I conducted non-parametric tests.

H5.9: Project funding varies by region (like continent, or culture).

H5.10: Inner-city projects, because of their limited reach, are less likely to receive international funding.

H5.11: Funding sources impact project opposition types.

H5.12: The type of funding and the availability of a cost-benefit analysis for a given project determine the general degree of project support (measured by the absence of opposition).

H5.13: Rail projects are less likely to be privately funded than any other project type.

The results of the hypotheses are displayed in Table 14, and discussed below.

Lis Pro	t of edictors	Provin	icial	Transj n Ager	portatio Icy	Nationa	ıl	Interna	tional	Privat	e	Number Sources	r of
		U (df)	Z (N)	U (df)	Z (N)	U (df)	Z (N)	U (df)	Z (N)	U (df)	Z (N)	U (df)	Z (N)
	Continent: Europe	265 (1)*	-2.082 (54)			512 (1)*	2.298 (55)	538 (1)*	3.658 (54)				
6.9	Asia							2135 (1)*	-2.298 (54)				
Η	Australia					22 (1)**	-2.621 (55)					23 (1)**	-2.657 (55)
	North- America			366 (1)**	2.688 (54)			150 (1)*	-2.577				
	Inner-city							301 (1)*	980 (54)				
H5.10													
-	Opposition : political	301 (1)*	642 (53)										
H5.1	Opposition : ideological							213 (1)*	-2.182 (53)				
H5.13	Project Type: Rail			472 (1)**	2.692 (54)					226 (1)*	-2.332 (56)	462 (1)*	2.012 (55)

Table 14: Funding Sources (Mann-Whitney U Tests)

Values: U=test statistic, df=degrees of freedom, Z= standardized coefficient, N=project count;*sig≤.05 **sig≤.01.

Summary: European infrastructure projects are more nationally (.512, 2.298, sig \leq .05) and internationally (.538, 3.658, sig \leq .05) funded. There are fewer sub-national/ regional level investments (.265, -2082, sig \leq .05). Further, the role of international funding is particularly low in Asia (2135, -2.298, sig \leq .05). In Australian projects, national funding does not play a large role (22, -2.621, sig \leq .01), and the number of funding sources is low (23, -2.657, sig \leq .01). In North America, transportation agencies tend to be more involved (366, 2.688, sig \leq .01) and international funding is low (150, -2.577, sig \leq .05).

As expected, international funding sources only play a small role in inner city project funding (301, -.980, sig \leq .05). Further, there is more (political) opposition to projects that involve regional funding than to projects involving other funding sources (301, -.642, sig \leq .05). There is less (ideological) opposition where international funding is involved (213, -2.182, sig \leq .05). (For the different types of opposition, see Appendix B.) Finally, I found that rail projects positively correlate with transportation agency funding resources (472, 2.692, sig \leq .01) but negatively with private ones (226, -2.332, sig \leq .05). Interestingly, rail projects also have a larger number of funding sources than projects of other types (462, 2.012, sig \leq .05).

H5.9: Project funding varies by region (like continent, or culture). Unsurprisingly, provincial funding sources are not as common in Europe (where states are often centralized and transportation often organized on a national level) (.265, -2082, $sig \le .05$). National funding sources are particularly strong in Europe (.512, 2.298, $sig \le .05$) and rare in Australia (22, -2.621, $sig \le .01$). Transportation agency funding is strong in North America (366, 2.688, $sig \le .01$). International funds are least used in Asia (2135, -2.298, $sig \le .05$) and North America (150, -2.577, $sig \le .05$) and most often in Europe (.538, 3.658, $sig \le .05$) (due to European Union funds). There are no particular

119

findings with respect to private sources. Insofar as there are significant associations, all have to do with macro-political organization factors.

H5.10: Inner-city projects, because of their limited reach, are less likely to receive international funding. International funding sources indeed do not play much of a role for inner-city projects (301, -.980, sig≤.05). One likely explanation is that inner-city projects are usually embedded in different layers of funding options, such as city, regional, or national funding pots, and a city is barely divided among two countries that would provide funding. Further, inner city project decision makers are less likely to be in international funding opportunity networks.

H5.11: Funding sources impact project opposition types. The hypothesis was confirmed. There is more (political) opposition to projects that receive regional funding than to projects involving other funding sources (301, -.642, sig \leq .05) and less (ideological) opposition where international funding is involved (213, -2.182, sig \leq .05).

H5.12: The type of funding and the availability of a cost-benefit analysis for a given project determine the general degree of project support (measured by the absence of opposition). The hypothesis was not confirmed.

H5.13: Rail projects are less likely to be privately funded than any other project type. The hypothesis was confirmed. Unlike other project types, rail projects are often funded by respective transportation agencies (472, 2.692, sig \leq .01) and much less by private sources (226, -2.332, sig \leq .05). Also, rail projects appear to have, on average, a larger variety of funding sources than other project types (462, 2.012, sig \leq .05).

4.5.3. Regression Models

Since there is a lot of discussion about the impact of private vs. public sources, particularly with respect to efficiency, I examined possible associations in more detail (Donahue and Nye, 2002). I hypothesize that funding sources impact the degree of cost overrun:

H5.4: Projects underwritten with national or private funding will experience cost overruns.

In Models 1a and 1b I used a simple linear regression model to see whether the amount

of national or private funding impacts project performance.

Model 1a: V33=a+b(V35)+c(V12)+error

Y = Cost Overrun (V33)

X = National Funding (V35), Project Type (V12)

Model 1b: V33=a+b(V35)+c(V12)+error

Y = Cost Overrun (V33)

X = Private Funding (V35), Project Type (V12)

Although correlated (Table 13), the results from the regression models show no association between private funding/national funding sources and cost overruns, when adding project type as control variable. Again, I tried several model specifications, because a quadratic function is possible, none of which produced any significant results.³⁵ Thus a relationship between funding sources and cost overrun could not be conclusively established.

H5.3 Projects are completed faster when private funding sources are involved than with national funding sources.

As indicated in Table 13, private and national funding sources are important indicators for project completion time. Hence, I ran the models with both private funding sources (Models 1a and 2a) and national funding (Models 1b and 2b). I selected a binary logistic

³⁵ Model 2 is a quadratic function, to account for possible attenuated curves, followed by binary regressions. None of them produced any significant results.

model³⁶ because I was interested in the general trend. Using a scale instead of a binary

variable would not have made a difference.

Model 1:
$$P(V24) = \frac{1}{1 + e - (a + bV35 + cV12)}$$

Y = Years to Completion (V24)

X = Private funding (V35), Project Type (V12)

Table 15. displays the results of different variations of the Logit model.

 Table 15: Funding Sources and Project Type Predict Part of the Variation in Project Years to Completion (Binary Logistic Regressions)

List of Predictors	Model 1a	Model 2a	Model 1b	Model 2b		
	Р	rivate	National			
Source of Funding	026/ .974*	303/ .971*	.021/ 1.021*	.021/ 1.022*		
Project Type: Rail	-1.626/ .197*		n.s.			
Project Type:		1.717/ 5.566*		n.s.		
Tunnel						
Location: Regional		n.s.				
DM: Local						
Constant	1.570/ 4.808*	.034/ 1.035	531/ .588	-1.098/ .043		
Ν	48	48	47	47		
Model Fit	.124/ .166	.170/ .226	.106/ .141	.129/ .172		
Values: Beta/ Exp(B)	; Model fit: Cox & S	nell R Square/ Nagelker	ke R Square; *sig≤.0	5 **sig≤.01,		
DM=decision-makers	5.					

Summary: In Table 15 the results for Models 1a and 2a clearly show that the source of

funding impacts project completion years. If private funding sources are involved,

completion times goes down (-.026/ .974, sig≤.05). National funding sources are

associated with longer completion times (.021/ 1.021, sig≤.05). The project type is only

significant in Model 2a (-1.626/ .107, sig \leq .05).

Model 1b:
$$P(V24) = \frac{1}{1 + e - (a + b(V35) + cV12))}$$

Y = Years to Completion (V24)

Model 2b: $P(V24) = \frac{1}{1 + e - (a + b(V35) + cV12))}$

³⁶ It is equally possible to assume linear relationships; the results are similar.

Y = Years to Completion (V24)

X = Private funding (V35), Project Type (V12): tunnel

The results for Model 1b vary by project type. The results from Model 2a show that the project completion time decreases with private funding (-.303/.971, sig \leq .05) and – not surprisingly – increases for tunnel projects. Model 2b shows that project completion time goes up for nationally funded projects (.021/1.022, sig \leq .05), but whether these are tunnel projects or not is insignificant.

Additionally, I was interested in location effects on project completion time (because I assume the more jurisdictions are involved or people are affected, the more potential for complicated project implementation). The results, in all cases, were insignificant. One of the models (Model 2a) is displayed below, though, because including the regional location variable positively affected the model fit. In this case, the model explains 17 percent of the affect on project completion (Cox & Snell R² of .170).

Quality of Statistical Results: The quality of the statistical results ranges between poor (Models 1a and 1b) and fair (Models 2a and 2b). Details may be viewed in Appendix J.

4.5.4. In Summation

With respect to funding sources, the following patterns emerge:

1. The data reconfirms the results of Section 2: **national level and international funding sources play a larger role in European infrastructure decisions**. The finding also echoes the results from Section 3, which concerned the heightened role of national decision-makers in Europe, where the close proximity of European countries promotes border-crossing infrastructure projects and hence international funding. 2. Provincial funding sources play less of a role in Europe. International funders do not contribute much in Australia and North America, probably because of wealth and geographical reasons in both cases. The South American projects all have international funders (but the association should not be overstated: I have only three South American projects). North American projects receive much funding from transportation agencies, which confirms the particular political patterns in the U.S. Projects in wealthier countries and inner-city projects have fewer international funding sources. Rail projects are negatively associated with private funding.

3. Funding complexity and the importance of local funding sources increase over time and across countries.

4. Project success measures: project correlations show that cost overruns increase with national and international funding (not confirmed in the regression analyses), and decrease when underwritten with provincial funding sources. But then, nationally funded projects also take longer to construct and to complete (confirmed by the regression models), but also better meet funding projections. Different explanations are possible:

(i) National governments are more likely to take on complex and expensive projects. However, different projects could fall into this category: huge prestige projects like the Channel Tunnel Rail Link, or Øresund Bridge. Who would fund them if not national governments? Both projects are also utilized reasonably well.

(ii) National governments take on disproportionately cost-inefficient projects. Nationally funded projects perform worse than projects funded by other sources in all measures except project utilization.

124

5. I was not able to conclusively confirm whether private vs. national sector funding makes a difference for project efficiency.

4.6. Nature of Funding: Funding Types

4.6.1. Notes about the Data

There are five funding type categories: grants, bonds, equity, government loans, and other. As with funding sources, they are given as percentages of total funding:

Grants: mean: 39.28 (St.D. 35.98, Min. .00, Max. 100), N=57 projects (of 60). Bonds: 36.49 (St.D. 31.69, Min. .00, Max. 100), N=56 projects. Equity: 8.99 (St.D. 14.46, Min. .00, Max. 67.5), N=55 projects. Government loans: 5.79 (St.D. 14.3, Min. .00, Max. 77), N=57 projects. Other: 11.17 (St.D. 21.98, Min. .00, Max. 75), N=54 projects.

Non-transparent project documentation caused the missing projects. A more detailed frequency distribution was displayed in Figure 8 above. Figure 8 showed that equity, government loans and other funding types are providing the smaller portions of project funding (0-20%), while grants and bonds are those funding types that may fully fund projects (80-100%).

4.6.2. Relationships between Variables

The hypotheses are given as follows.

H5.13 GDP impacts funding types.

H5.14 The nature of project funding impacts project-related factors like construction time.

H5.15 The nature of project funding impacts project utilization ratios.

H5.16 Projects with equity funding are more often canceled than projects with other types of funding.

Table 16: Funding Types (Parametric Tests – Pearson's Correlations)

		Grants	Equity
H5.1	GDP 2010		443** (55)
3			
	GDP 2000		359** (55)
	GDP 1990		439** (55)
H5.1	Construction	.407** (51)	362** (51)
4	Time		

H5.1	Utilization	357* (36)
5	Ratio	
H5.1	Cancelled	.279* (55)
6	Projects	

Values: Pearson's R (and number of projects); *sig≤.05 **sig≤.01.

Summary of the correlation results: The higher the GDP, the fewer projects are funded through equity funding, the data suggests $(-.443/ -.359/ -.439, sig \le .01)$. Equity funding is also (negatively) correlated with construction time $(-.362, sig \le .01)$ and project utilization $(-.357, sig \le .05)$. In the first case, that means that equity-funded projects have shorter construction times, but their actual use falls systematically behind the projections. Equity funding is also associated with project cancellations $(.279, sig \le .05)$. Also, grant funding and construction time are positively associated $(.407, sig \le .01)$: grant funded projects have longer construction times.

H5.13 GDP impacts funding types. Equity funding is strongly associated with GDP: the richer a country, the fewer equity financed projects (-.443/ -.359/ -.439, sig≤.01). This is an interesting finding, and I will explore it in a regression analysis below.

H5.14&3.15&3.16: The nature of project funding impacts project-related factors like construction time and project utilization ratios. Equity funding is associated with more successful projects – i.e., projects with short construction times (-.362, sig \leq .01), and also with projects that do not meet their projected user numbers (-.357, sig \leq .05). It is also associated with project cancellations (.279, sig \leq .05). Further, construction times increase for projects that receive government grants (.407, sig \leq .01).

H5.17 Funding types differ across the world – e.g., government grants are most common in Europe.

H5.18 Funding types differ across projects – e.g., it is atypical for rail projects to be financed by bonds.

H5.19 Funding types affect project opposition – i.e., private funding is more associated with project opposition than grant funding.

127

		Grants		Bonds		Equity		Government Loans		Other	
		U (df)	Z (N)	U (df)	Z (N)	U (df)	Z (N)	U (df)	Z (N)	U (df)	Z (N)
H5.17	Europe					231 (1)**	-2.723 (55)				
	Australia	26 (1)**	-2.540 (57)					169 (1)**	3.239 (54)		
	Asia		(0))			356 (1)**	2.659				
	North America			151 (1)*	-2.021 (56)					325 (1)*	2.308 (54)
H5.18	Rail					202 (1)*	-2.494 (56)			407 (1)*	2.151 (54)
H5.19	Issue-oriented Opp.			532 (1)*	2.635 (55)						
	No Opposition	391 (1)*	2.196 (56)							178 (1)*	-2.046 (53)

 Table 17: Non-Parametric Tests Funding Types (Mann-Whitney U Test)

Values: U=test statistic, df=degrees of freedom, Z= standardized coefficient, N=project count;*sig≤.05 **sig≤.01.

Summary of non-parametric tests in Table 17: Equity funding is a less common funding instrument in Europe (231, -2.723, sig \leq .01) than on other continents. In Australia, government loans dominate over other funding types (169, 3.239, sig \leq .01), while grant funding is less prevalent (26, -2.540, sig \leq .01). Asian projects have a larger share of equity funding (356, 2.659, sig \leq .05). North American projects use less bond funding (151, -2.021, sig \leq .05) but "other" funding types (325, 2.308, sig \leq .05). Rail projects are rarely funded through equity-type funding (202, -2.494, sig \leq .05) and more through "other" types (407, 2.151, sig \leq .05). Bond funding is more associated with issue-oriented opposition (532/ 2.653, sig \leq .05). Grant-funded projects (391/ 2.196, sig \leq .05) experience less project opposition, while "other" funding types are associated with more (178/ -2.046, sig \leq .05).

H5.17 Government grants are most common in Europe. The non-parametric tests fail to confirm the specific hypothesis. But they do confirm regional differences: Australian projects are less likely to be funded by government grants (26, -2.540, sig \leq .01) and more by government loans (169, 3.239, sig \leq .01) than projects in other countries. North America has comparatively little bond funding (151, -2.021, sig \leq .05). Equity funding is more typical in Asian countries (356, 2.659, sig \leq .05), while the opposite is the case in Europe (231, -2.723, sig \leq .01). While this is interesting, there are probably a lot of factors weighing on funding type decisions.

H5.18 Funding types differ across projects – *e.g., it is atypical for rail projects to be financed by bonds*. Compared to other projects, rail projects are not typically funded by equity funding (202, -2.494, sig≤.05) and more by "other" funding types (407, 2.151, sig≤.05). Therefore the hypothesis was confirmed. One possible reason is that railroads

128

usually need a lot of government support (e.g., in Germany) because their economic competitiveness is contested.

4.6.3. Regression Models

H5.19 Funding types affect project opposition – i.e., private funding is more associated with project opposition than grant funding. The hypothesis was confirmed, and the data show that issue-oriented opposition hits bond-backed projects disproportionately (532, 2.635, >.05). Grant-funded projects, on the other hand, are comparatively opposition-free (391, 2.196, >.05). I will analyze the correlation in more detail in the following binary regression models.

H5.19 Privately funded projects face more project opposition (V28) than grant funded ones.

Model 1: $P(V28) = \frac{1}{1 + e - (a + b(V36) + cV50))}$

Y = Project Opposition (V28)

X = Type of Funding (V36), Transparency (V50)

Model 1 is the main model for the hypothesis. I do not mean to suggest that the funding type (private or public) causes opposition, but that it might be indicative of decision tensions. The project opposition variable has four categories, and I tested the impact of funding types on each category, with varying additional control variables. Similarly, as with the dependent variable, I also tested all the categories of funding types. In Table 18, I show the best models in terms of significant associations and model fits.

Table 18: Impact of Funding Types on Types of Opposition (Binary Logistic Regression)				
List of	Model 1a: Issue-	Model 1b:	Model 1c:	Model 1d: No
Predictors	Oriented	Ideological	Ideological	Opposition
	Opposition	Opposition	Opposition	
Type of	.025/ 1.025*	n.s Bonds	.041/ 1.042* "other	.024/ 1.205*
Funding	Bonds		types"	Grants
Transparency		4.715/ 111.638**	6.897/ 989.2**	
Location:			2.170/ 8.761*	
Inner-City				
Location:				n.s.
National				
Project		n.s.		-1.591/ .204*
Description				
Constant	903/ .406	-3.524/ .029	-6.102/ .002	-1.635/ .195* 120
Ν	55	55	53	56 129

Model 1a: $P(V28) = \frac{1}{1 + e - (a + bV36)}$

Y = Project Opposition (V28): issue oriented

X = Type of Funding (V36)

The results show that funding types, particularly bond funding, correlate with "issue-oriented" opposition. The model fit of .118 is the best. To fully explain the association, however, in-depth case studies are necessary.

Model 1b:
$$P(V28) = \frac{1}{1 + e - (a + bV36 + cV50 + dV18)}$$

Y = Project Opposition (V28): ideological opposition

X = Type of Funding (V36), Transparency (V50), Project Description (V18)

In Model 1b, "ideological opposition" is the dependent variable. I added project transparency because non-transparent projects may "trigger" project opposition, as found in Table 10 above. I hypothesize that transparency (and funding types) affect opposition, and not vice versa, although the causal direction might, in theory, be ambiguous. The results show that transparency does affect opposition (4.175/ 111.638, $sig \le .01$). The funding types (bonds) and whether a project is and old or a new one ("project description") were not significant. The model fit was a little more than 20 percent (Cox & Snell R Squared, .211).

Model 1c:
$$P(V28) = \frac{1}{1 + e - (a + bV36) + cV50 + dV11)}$$

Y = Project Opposition (V28)

X = Type of Funding (V36), Transparency (V50), Project Location (V11)

Model 1c assumes that there are causal effects of funding type, transparency and project location on (ideological) opposition. Funding type "other" (those that did not fit any of the other categories) affects opposition (.041/ 1.042, sig \leq .05). Transparency is still significant (6.897/ 989.2, sig \leq .01), as are inner-city projects (2.170/ 8.761, sig \leq .05).

Model 1: $P(V28) = \frac{1}{1 + e - (a + bV36 + cV11 + dV18)}$

Y = Project Opposition (V28)

X = Type of Funding (V36), Project Location (V11), Project Description (V18)

The fourth successful model includes the "no-opposition" category of the opposition variable. Projects are counted as "free" from opposition if I found no trace of it after intense research. As it turns out, projects financed with public grants tend to be without opposition (.024/1.205, sig<.05) (the variable is counter-intuitively coded). While the location variable had no significant effects, the description variable had: newer projects face more opposition than projects that are additions to already existing networks (-.1591/.204, sig<.05).

Quality of Statistical Results: The quality of the results varies between good (Model 1c) and fair (all others). The details and ROC curves are displayed in Appendix J.

4.6.4. In Summation

1. **Equity**: With increasing wealth of a country, the use of equity funding decreases. Wealthier countries still provide more moneys for public infrastructure. Poorer countries need to find other sources for their infrastructure projects. The distribution of funding types varies by region: equity funding is less important for European than for Asian projects. Australian projects use more government loans than grants. Different funding types are associated with different impact measures: projects with equity funding have shorter construction times— but they also barely meet their projected user goals. Also, equity funding seems to be associated with project cancellations, although this finding is tentative due to the relatively small sample of cancelled projects.

2. **Bond funding**, mainly used in North America, raises the likelihood of (issueoriented) opposition.

3. **Public grants** are statistically associated with the absence of opposition and with extended construction times – both in correlations and the regression analyses. Model 4 in Table 18 shows the odds of opposition going down with grant funding, particularly when the projects are additions to already existing networks and not entirely new ones.

4.7. Conclusion

The following results stand out in the light of the general hypotheses of the dissertation.

4.7.1. Macro-level Government Arrangements

Project decisions differ in federalist and centralized countries, but most decisions still involve national decision-makers and national level funding across the world.³⁷ The data shows no significant association between wealth and the national decision level, or associations between voting and party systems and the other variables.

³⁷ There are different motivations for investment decisions made on the national level. First, it makes more sense for a national government to invest in transportation infrastructure, because of scale and network effects, as well as the advantages of experience. Second, infrastructure may contribute to international competitiveness by providing improved infrastructure to their businesses and industry; so most governments (on all levels, actually) have an interest in advancing it. An example is the Alameda Corridor (Chapter 7), which successfully demonstrated to members of Congress the national economic effects of the project for their districts. Third, national governments are, at times, more interested in providing equal access to transportation for socio-political reasons rather than for transport-economic efficiency. Extensive train networks in European countries or China, into the most rural areas, attest to that. Fourth, national governments may build large prestige projects that do not necessarily meet strict transport-economic criteria. Examples include the large European integration projects like Øresund, or German post-re-unification projects intended to reunite the country (although they did conduct cost-benefit analyses for these projects). The second and the fourth motivations, in particular, may be susceptible to the ideological opposition indicated in the data.

Generally, national decision-makers are more involved in European countries, while project decisions in federalist and Anglo-Saxon states – generally more laissez-faire – take place on sub-national levels. This suggests that fragmentation and devolution are a predominantly American phenomenon. As a result of the European integration process, most border-crossing projects are in Europe as well. European integration is also the reason for several European countries to decentralize, as the European Concept of the Regions³⁸ provides cultural and infrastructure funding to further cross-national European cooperation.

National level decision-making relates to project success – here measured as construction time, utilization ratios, and cost overrun: One of the most interesting findings is that the data indicates that national governments are more willing to take on risky projects.

Projects involving national decision-makers experience both longer construction times and larger cost overruns. At the same time, the number of cost-benefit studies does not increase when national decision-makers are involved as compared to projects directed on sub-national levels. Compared to projects involving other levels of decision-making, however, national projects fare better in terms of utilization rates.

Also projects decided on the national level, or with national funding, are associated with less "ideological" opposition. I discussed possible reasons for this in the conclusion to Section 3, above. The other side of the coin is that ideological opposition is stronger in Anglo-Saxon counties, which are less centralized.

³⁸ The Concept of the Regions stipulates cooperation and integration of European countries through cultural, economic and funding frameworks benefitting border-crossing regional projects.
4.7.2. Location, Opposition, Transparency

Inner-City Projects: Altshuler and Luberoff argue that inner-city projects draw project opposition – at least since the 1970s in the U.S. Hence I would expect decision-making to vary between inner-city projects and outside-city projects. There are three insights.

The data systematically confirmed stronger opposition for inner-city projects – a variable to be taken into account when making urban decisions.

More cost-benefit analyses are being conducted for inner-city projects.

The data indicates that the presence of local decision-makers diminishes project transparency. This is not contradictory: inner-city projects are often very costly– primarily because urban space is highly contested (and requires underground infrastructure like water pipes and electricity cables). Because of the lack of space, they either need to be built underground, require expensive permits or the purchase of expensive property. Moreover, local residents must be recruited for support. On the other hand, local decision-makers may not guarantee more extensive public documentation because of political and business-related interests that potentially operate behind the scenes.

Diminished transparency and increased risk of opposition suggest that project decisionmaking is much more complicated for inner-city projects than for larger-scale ones.

Opposition: There are five main findings.

1) Projects with national level decision-makers and government grant funding face weaker opposition than other projects. 2) Project opposition and cost-overrun are associated. 3) As noted above, opposition increases in dense inner cities. 4) Opposition decreases with respect to projects that are being built as additions to existing networks. 5) Project opposition, bond funding, and transparency associations were repeatedly significant. Bond funding is associated with certain types of project opposition.

Transparency:

1) Project transparency (or the availability of cost benefit analyses) is not related to project success measures, which challenges some of the theoretical explanations about reasons for project efficiency (e.g. Flyvbjerg et al., 2003). 2) Although the degree of transparency of a project is only indirectly related to macro-political structures, the wealthier the countries, the more transparent the decision-making. 3) Transparency (as an independent variable) causes project opposition. Of course it does not directly, but there are issues with the directionality of the association, as discussed in the concluding part of Section 4. I held that it is problematic to determine whether transparency is a cause or an effect. For instance, project opposition may occur either before or after the study has been done.

With respect to cost-benefit studies the main finding is that barely half of the project decisions were based on a cost-benefit study. Moreover, the data suggests that the availability of cost-benefit studies impacts the degree of project opposition. That suggests that opposition, in fact, could be either the *catalyst* for project studies or the result of their absence. In this sense, the transparency results are inconclusive.

4.7.3. Project Funding

The data show that the importance of local funding sources increases over time and across countries, as does funding complexity (measured by the number of funding sources for each project). Bond funding plays a stronger role in centralized countries.

As will become obvious in Chapters 6 and 7, most political struggles evolve around funding sources. I will take up a sustained discussion of the distribution of funding

sources and funding types in the conclusion chapter, because some of the findings are best explained when adding information from the case studies.

Other than that, project funding seems easier in Europe: European projects are grantfunded to a larger degree than projects anywhere else, so some of the political struggles may be dodged. In any event, European infrastructure investment proliferated in the past 30 years, because the European Union, to further the ongoing European integration process, provided billions of Euros for integrative infrastructure development.

With respect to the efficiency debate in the literature, the results are inconclusive. Privately funded projects (or projects involving private funding) are not associated with fewer cost overruns or more efficiency in general. However, as a funding type, equity funding is associated with shorter construction times – but also with cancelled projects.

I will be able to test the hypotheses in the case studies that follow in Chapters 6 and 7, which will also look at the effect of devolution, fragmentation and privatization trends.

Chapter 5: The Politics of Large Infrastructure Investment Decision-Making: The Case of the Second Avenue Subway

This chapter³⁹ presents the first case study, an analysis of the Second Avenue Subway in New York. The Second Avenue Subway is a "typical" megaproject in terms of its enormous costs (the current construction budget is \$4.5 billion), its politically complex decision environment, and its expected major impact on New York's transportation network. Consequently, some of the political experiences of the decision process may also be generalized. The Second Avenue Subway (occasionally herein, the "SAS") is an excellent example of the challenges of infrastructure politics: from the project idea in 1920 to construction start in 2007, it took 87 years – although the NYC subway system had barely kept pace with changing economic and population patterns of the metropolis.

Despite having accompanied New Yorkers in spirit for decades and decades, there is barely any literature on the subject. An article by Lawrence Stelter discusses the justifications for tearing down most of New York's historic Elevated Transit Lines (the "els"), through the 1940s, 1950s and 1960s. He cites business and real estate interests as the main justification for replacing the els with the underground service of a Second Avenue Subway (Stelter, 1990). In 1980, Grava provocatively argued that the Second Avenue Subway project has, from the beginning, been both over-hyped and underjustified, lacking clear decision rationales and established evaluation procedures (Grava, 1980). Berechman and Paaswell focus on the decision-making criteria that have informed various infrastructure projects in the New York region, using the Second Avenue Subway as one of their case studies. They find that there are – in cost-benefit terms – more relevant projects to be built in the New York area.

³⁹ Parts of this chapter have been submitted as a Final Report for UTRC Minigrant Award 2011; by Patrizia Nobbe and Joseph Berechman

Besides maybe Grava, the only recent sustained discussion about the project is a 26-page chapter in Joseph B. Raskin's *The Routes Not Taken: A Trip Through New York City's Unbuilt Subway System* (Fordham University Press, Nov. 2013). Chapter 9 is titled "Building the Line that Almost Never Was." Raskin also mentions the SAS in Chapters 10 and 11. Raskin's account is a good short narrative of the SAS up to 1980, based almost exclusively on articles in *The New York Times*. In Chapter 9, there are only two pages covering the period from 1980 to the present, and none of his chapters provides much detail about how the current construction of the SAS came about. He cites few government documents, has done no interviews, cites only a few secondary sources, and gives no theoretical explanation as to why it has taken so long to build the SAS.

In this chapter I will examine the politics of decision-making of the Second Avenue Subway as an infrastructure investment "megaproject." As a reminder, I will address the research questions laid out in Chapter 3, some directly, some indirectly. The questions concern the decision-making steps for the project, contextual factors and dynamics, the influence and relative weight of actors with competing project rationales and interests, the role of the MTA, and the role of funding. All elements are shown in Figure 2, Chapter 2.

Because of its long history, there were many instances where one may find politics at work. While there never appeared to be any questioning of project *selection*, cultural, governance and funding issues had a major impact on project *choice* (timing). In more detail, I argue that during the 1940s and 1950s the project was not built because there was a major cultural focus on the automobile. After the automobile boom, there was a reorganization of the transportation landscape, specifically the formation of the MTA, which, with its own fiscal and political aspirations, skillfully maneuvered the project onto a relevant agenda. Third, over the course of the project history (back to 1920), the project

was repeatedly halted for lack of funding, but the lack of funding often reflected political choices. However, some of the funding arrangements removed competitive aspects from the project. Related to the funding agreement, the project was to be built in phases, reflecting a transport-economic compromise. Fourth, powerful project champions took a personal interest in advancing the project's success. And fifth, positive federal ranking and 9/11 served as a "window of opportunity" that made federal funding more available than it had been previously. Conspicuously absent were transport-economic studies, which were not at the center of the decision.

Though the Second Avenue Subway was not a very controversial project, the political competition of other projects was fierce. Nevertheless, the MTA appears to have implemented the project successfully: the ground was first broken in the 1970s, but it was halted then because of city bankruptcy and more pressing system maintenance issues; the second groundbreaking took place in 2007. Agency politics is an important part of how the project happened. How did the MTA, against all the odds and after heavy debates and political wrangling, decide to build the project, approve it internally, and then achieve project approval on the state board that is responsible for the oversight and approval of MTA capital projects – the Capital Project Review Board (CPRB)?

I begin to build the explanation by providing a historical outline of the Second Avenue Subway and describe available studies that recommended project selection. This will help outline the logic of the project and situate it within ongoing debates, problems, and actors in the different agenda-setting stages of the project. A debate-centered analysis of the main decision platforms that affected the current construction of the project will illuminate the project politics and deeply entwined funding struggles. All information used comes from extensive historical newspaper and legal resources research and from in depth interviews with various decision-makers and transport experts in the area, and

from secondary sources. For reasons of confidentiality I will cite my interviewees anonymously.

The chapter is presented in four parts: I will briefly summarize the project's main features to make the case study easier to follow. In the main parts of the case study, I will review the long history of the project and then summarize the main politics surrounding the final implementation and funding debates and end with a brief conclusion.

5.1. Project Summary

The Second Avenue Subway was first mentioned in 1920, and more specifically proposed by the New York City Board of Transportation in 1929 as part of the second stage of the IND system (short for the "independent" system) that would replace the Second and Third Avenue els. In October 1929, before any construction could begin, the stock market crashed and the project was put on hold. In the 1940s, 1950s and 1970s, both els were torn down anyway, yet subway construction was not begun. Its continuing delay was due to a lack of funding⁴⁰ and a generally deteriorating subway system, as well as a widespread "highway boom" and a federal lack of interest in mass transit. The first pieces of the Second Avenue Subway were built in the early 1970s, a few years after the founding of the MTA in 1968, but construction was halted when New York City nearly went bankrupt in a recession, and a "rebuilding" of the existing subway system became more urgent than capital expansion.

At the beginning of the 1990s, the Second Avenue Subway efforts restarted for a twotrack line. The final design for the first phase, as authorized by the Federal Transit Administration, started in April 2006. A map of the proposed line is shown in Image 5.1 below. The first phase contains the segment between 96th and 63rd Streets on

⁴⁰ The lack of funding is contrasted by the fact that in 1951 New York City voters approved a bond issue that provided money for the project; however, the money raised in the bond issue was never used for building the subway.

Manhattan's east side. It includes stations at 63rd Street, 72nd Street, 86th Street, and 96th Street. Service on the Second Avenue line (initially an extension of Q-service) will proceed across 63rd street for a connection to the Seventh Avenue subway and then proceed south through Times Square to Lower Manhattan.

The first construction contract was awarded in March 2007, and groundbreaking for Phase 1 began on April 12, 2007. The projected ridership for the first phase was projected to be 213,000 riders daily. The proposed costs were \$4.5 billion for the first phase, and \$13.3 billion⁴¹ for its entire length (or \$16.8 billion in year-of-expenditure dollars) (MTA, 2004). At this point, the first phase of the line is fully funded through allocations from the three capital programs and the Federal New Starts program (FTA website). So far, the project has braved the 2008 recession and is expected to open in December 2016.

The funding sources for the capital plans are as follows: \$1.3 billion from the Federal New Starts program, \$3 billion from state and local sources, and \$450 million from a 2005 State Transportation Bond Act. (Figure 9)



Figure 9: Funding Sources Second Avenue Subway

⁴¹ The source does not state whether this projection was linked to inflation.

Figure 10: Second Avenue Subway Phasing



Source: MTA Second Avenue Subway website

Several decisions lie ahead – first and foremost, whether there will actually be a next phase implemented (Interviewee 2); and second, if so, where the next phase of construction will occur. It could either go north to 125th Street, and over to Lexington Avenue with a transfer station, or it could extend south to Whitehall Street. In the southerly direction, there would be two segments: the first from midtown to Houston Street in lower Manhattan, and a subsequent piece continuing from Houston Street to Whitehall Street.

5.2. Project History and Context

The political complexity and plethora of transportation agencies in New York's metropolitan area renders any completed transportation megaproject something just short of a miracle. The Second Avenue Subway, especially, was a semi-miraculous achievement, judging by the number of times the project was aborted over the past several decades. Since the idea's inception, the project never entirely disappeared from the public radar, nor from political agendas or debate. The enormous anticipated cost actually did little to shatter the project's perceived need. As Grava argues, the project was always more of an unquestioned political promise and lacked more specific justification, so changes in the city or metropolis did not shake the idea (Grava, 1980, pp. 34-35). Over the decades, the project branded itself into the history of New Yorkers, as New York's "most famous thing that's never been built" (Russianoff, 2005), while Manhattan's 4/5/6 subway lines on the East Side –because the East Side els had never been replaced – were consistently overcrowded.

For a historical presentation, the long and complex evolution of the project is organized into four major phases, roughly sorted by the major reasons for project delay: recessions, the highway boom, and a deteriorating subway system. This will prepare for analysis in the second major part of the chapter.

The First Halt: Recession

The project was first mentioned in 1920. At this time, the subway was publicly owned and operated, under contract by two private operators as two separate transit systems; at that time, the municipal government sought to add a third, the publicly owned and operated IND system, to replace the els and generally improve service (Hood, 2004). The NYC Board of Transportation (BOT) planned the IND system in two stages, the first in 1924, and the second in 1929. The Second Avenue Subway was included in the 1929 plan. In 1940, the City acquired the operating rights to the private systems, and integrated them with the independent system into one municipally run subway network.

Part of the plan was to run a line along Second Avenue from Houston Street in Lower Manhattan to the Harlem River, with an expected opening by 1941 at a cost of \$86 million. However, by 1940, the first stage 1924 IND plan was completed with local funding and a small amount of federal funds (Hood, 2004). However, the second stage never was completed because of the stock market crash and dwindling municipal revenue. In 1931, the planned Second Avenue Subway opening was re-scheduled to 1948. By 1939, the cost estimates soared to \$249 million, but construction was suspended for the duration of World War II (Second Avenue Sagas, 2013).

Civic, business and real estate pressure led the Transit Authority to replace the els, which were being torn down beginning in 1939. In his case study of the Third Avenue el, Stelter shows how ridership decline and increasingly costly maintenance were used to justify its demolition – before the Second Avenue Subway, its replacement, was in place. But Stelter argues that it was the drastic service cuts that, in fact, led to declining ridership numbers and the increased use of alternative means of transportation, as opposed to a lack of demand. Since the transportation agencies were strongly fragmented, the els were

well used, and their replacement with a subway expensive. The demolition plans were met by strong skepticism by elected officials, civic and union leaders, and businessmen, particularly since no reliable alternative was in place. But their demolition became more feasible in 1940, under the municipally run transport system (Stelter, 1990).

Both the Second and the Third Avenue els were torn down *before* the first groundbreaking for the Second Avenue Subway. The Second Avenue el closed in 1942, and the Manhattan portion of the Third Avenue el closed in 1955. The last section of the Third Avenue el, part of which is shown in Image 1, was closed in 1973. So, although the els were equally overcrowded during their use (NYT, Duffus, Sep. 22, 1929), in effect the amount of service on Manhattan's East side was cut in half without replacement (Derrick, 2001, pp. 236-238).

Image 1: Demolition of the Third Avenue El



Source: Image provided by Peter Derrick (photo taken around 1974, Third Avenue at Fordham Road, Bronx)

Competing Priorities: Highway Boom

From the 1940s to the 1960s, New York City stabilized in population and the metropolitan area changed. The automobile was seen as the means of transportation of the future, and the city and the surrounding suburbs experienced an unprecedented automobile and highway boom. During that time, in 1953, the authority over subways, until then operated by the New York City Board of Transportation, was transferred to the State-chartered Transit Authority. The general political climate became less favorable towards transit, and most money went to the highways system, until, in 1964 the federal government began its focus on transit with the Urban Mass Transit Act.

During the highway boom, a good part of New York's policy power had been concentrated in the hands of Robert Moses (in office 1924-1968), whose preference for building highways over investing in mass transit helped shape New York's suburbs. Moses, who became transportation commissioner in 1933 (and, as such, was responsible for the capital budget) had no use for public transit. He went out of his way to block any public transit spending: for instance, even when asked to build provisions for potential later public transit along the Long Island Expressway route – a new highway project in planning – he refused to do so (Caro, 1975). At the same time, the federal government did not give any money to transit, either, so there was not much of a chance for new transit expansion.

The idea of a Second Avenue Subway remained popular because of continuing political promises and their repetition in the press. This "continued official sanction over several decades" fixed the subway in the public mind (Grava, p. 34). According to Grava, every NYC Mayor – from John Francis Hylan in the 1920's, to Abraham Beame, under whose reign the first construction took place – was supportive of the project and made it a political promise (with the possible exception of Fiorello LaGuardia (1934-1945), as Grava notes). Politicians, planners and the media still continued to search for ways to get

started, and somehow everyone was confident that construction would begin soon. As soon as the idea came up to tear down the Second and Third Avenue els, the Second Avenue Subway was specifically promoted as a replacement project: in 1940, Mayor William O'Dwyer promised that work on the design of the Second Avenue Subway would start within four years (Grava, 1980, p. 34), so that the els could be demolished.

In sum, New Yorkers were very optimistic about the project, particularly as a replacement for the els. Grava captures the optimism well: "In 1951, a \$500 million city bond issue was passed that promised major expansion of the transportation system, particularly along Second Avenue (although it was vocally opposed by Queens politicians and residents). *The Third Avenue El was demolished in the mid-1950s because construction of the new subway was just about to begin*" (sic) (Grava, 1980, p. 34 – emphasis added). The bond proceeds, however, were now being spent on the replacement of subway cars, as the state of the subway system had deteriorated badly in the meantime, with pressing signs of decay, operational deficits and dropping passenger numbers.

Despite the odds, various plans, White Papers (e.g. Mayor John Lindsay's White Paper of 1965 that proposed a Second Avenue Subway including an extension into the Bronx), and technical studies were commissioned. A state bond issue act was passed in 1967, providing yet another \$500 million for design and construction of the Second Avenue Subway (Grava, 1980, p. 35), but then the TA ran out of money. Grava notes that after all the different developments and changes in New York, the subway project was never thoroughly examined and re-evaluated, at least according to the standards of our time.

Though after the Moses era subway optimism picked up again, it had become increasingly obvious that New York's subway system now required investments in

maintenance rather than new construction. It was not until the MTA was created and the city and the Federal government provided larger sums, that the Second Avenue Subway became a plausible reality.

5.2.1. A New Transportation Agency

In 1968, William Ronan, the "Empire Builder" (Derrick, 2012), reorganized the regional transportation system by integrating all formerly independent agencies like the Long Island Rail Road, New York City Transit and the Triborough Bridge and Tunnel Authority into one state agency: the MTA. This involved a huge transfer of power from the city into state hands, helping to disempower Robert Moses. The new special purpose authority was created to develop and organize a unified regional mass transportation policy, including parts of New York State, as well as two Connecticut counties. Within the MTA, the Transit Authority is responsible for subways.

New York State established an internal and external decision-making platform: first the MTA Board and then later, in 1981,⁴² the CPRB. The chairman of the MTA Board, nominated by the New York State Governor and approved by the State Senate, serves for six years and provides the face of the agency.⁴³ As of 2013, the board has seventeen members, also appointed by the Governor, who serve for six years as well. (The MTA board was smaller in 1968.) The mayor of New York City recommends four officials, and each of the counties of Nassau, Suffolk, Westchester, Dutchess, Orange, Rockland and Putnam recommends one. Commuter councils for Metro-North or the Long Island Rail Road, as well as Metro-North Rail Road unions, have been listed as recommenders, as well. Each representative has one vote, with the exception of the latter four counties,

⁴² The State Legislature created the Review Board in the same Transportation System Assistance and Financing Act that confirmed the 5-year plans to confront the public transit crisis of the 1970s.
⁴³ List of Chairmen: William Ronan, 1968-1974; David Yunich, 1974-1977; Harold Fisher, 1977-1979; Richard Ravitch, 1979-1983; Robert Kiley, 1983-1991; Peter Stangl, 1991-1995; Virgil Conway, 1995-2001; Peter Kalikow, 2001-2007; Dale Hemmerdinger, 2007-2009; Jay Walder, 2009-2011; Joseph Lhota, 6 months in 2012 (MTA website).

which hold one collective vote (MTA website). Once the MTA Board approves the capital plans, they submit them to the CPRB.

The CPRB approves or disapproves the five-year capital funding programs proposed by the MTA board. The CPRB has four members, representing the State Governor, the State Senate, the State Assembly, and the New York City Mayor. Each of these members has veto power over the capital plan. The Senate President appoints the Senate member on the Board. The elected assembly member represents the State Assembly Majority. Usually, the State Department of Transportation Commissioner is the representative for the Governor. The appointee for the New York City Mayor has no vote on Metro North or Long Island Railroad capital plans. Another non-voting member represents the State Assembly minority (Higashide, 2010). There are two official capital plans, one for the TA, and one for the commuter railroads.

Both boards were relevant decision points for the subway: the MTA Board decided to put the project on the agenda and set aside (partial) funding for it, and the CPRB later approved it. The politics of decision-making play out on both boards.

Before the MTA's founding, the subway and bus system were technically run by state agencies, although publicly perceived as local, city matters (Interviewee 3). The creation of the CPRB solidified New York State power over New York City transport projects by holding three independent vetoes from the Governor and the State legislature over potential NYC projects, while the NYC mayor holds veto power only over NYC projects.

From the start, money has been an issue for the MTA with its deteriorating subway system. Money was needed to fix the system. Richard Ravitch, board chairman from 1979-1983, successfully introduced long-term capital plans through the Transportation System Assistance and Financing Act of 1981, to enable the sub-agencies to plan their

budgets and crucial repairs (Lardner, 1984). While prior allocation decisions had been conducted on an annual basis (although small agencies had their own, long-term range plans), Ravitch's plan provided the MTA with the authority to issue bonds and introduced the five-year capital programs (PCAC, 2012).

Table 19 provides an overview over these capital programs from 1982 - 2014. Since the first capital plan (1982), the agency has received funding from federal, state and local sources, with each contributing an average of 31.4%, 27% and 7.2% to the capital program, respectively. Debt financing has funded the remainder. In 2012, the agency had \$32 billion in long-term debt, with an annual debt service of \$2.3 billion. Additionally the agency took out loans from the Federal Railroad Administration (all information:

PCAC, 2012, p. ii).

Fable 19: MTA Capita Capital Programs	I Program Funding Sources Funding Sources	Use
1982-1986 1987-1992	Federal 33%, MTA Bonds 29%, State Capital Grants 15%, Other 13%, NYC 10%	 \$14.399 billion Total Core Program State-of-good-repair works and service improvements \$0: MTA Capital Construction (MTACC)*
1992-1999	Federal 33%, MTA Bonds 26%, Other 20%, State 12% (11% DTF bonds), NYC 9%	\$16.7133 billion: Total Core Program State-of-good-repair works and service improvements \$157.7 million: MTACC
2000-2004	Federal 27%, MTA Bonds 26%, MTA Debt Restructuring 21%, State Bonds 18%, Other 5%, NYC 3%	\$17.5 billion for Second Avenue Subway:* \$1,050 billion (\$744 million local, \$306 million federal)
2005-2009	Federal 39%,	\$22.56 billion
2005 Transportation Bond Act	State 27% (State Bonds 18%), MTA Revenue Bonds 18%, Other 5%, NYC 11%	for Second Avenue Subway:* \$1,914 billion (\$846 million local, \$1,068 million federal, (or \$758 federal, as recorded 7/2013))
2010-2014	MTA Revenue Bonds and State DTF Bonds 66%, Federal 25%, Other 6%, NYC 3%	\$26.3 billion for Second Avenue Subway:* \$1,487 billion (\$1,487 million local)

Source: Permanent Citizens Advisory Committee (PCAC) Report, 2012, MTA Capital Construction; *Specific numbers for Second Avenue Subway: Mark Nachbar/ provided by Peter Derrick From 1982-2011, the budget totals \$84 billion, or \$116.7 billion in 2011 dollars (PCAC Report, 2012, p. i). Table 19 shows that the first funding of the current project was allocated in the 2000-2004 Capital Program, and another installation in the 2005-2009 program, related to the Bond Act. I will analyze the actors in the capital program debates in more detail in the analysis part below.

5.2.2. The First Second Avenue Subway Construction Attempt under the New Agency

Led by its first chairman William Ronan, the MTA decided to develop a profile and massively expand by introducing an ambitious plan called *Metropolitan Transportation: A Program for Action*, which included the Second Avenue Subway. The plan was a collection of progressive ideas that had long been discussed, though it failed to support them with any relevant hard data – like cost-effectiveness, impact analyses, alternatives evaluations, and so forth (Grava, 1980, p. 35). Ronan was confident the new agency would be better equipped to implement a Second Avenue Subway than prior administrative arrangements, and in the beginning, it looked like it would be successful. However, as the plan began to expand, ever increasing anticipated costs became a significant problem.

It started with a bang: Governor Nelson A. Rockefeller (1959-1973) presented the plan – the "grand design" that would expand the subway system, and overhaul other mass transit facilities in the metropolitan area. Some of its key elements included a subway line into the Bronx, extensive new service in Queens, and the Long Island Railroad spur to John F. Kennedy Airport. The Second Avenue Subway was still to replace the Second and Third Avenue els, in order to provide more subway service on the East side of Manhattan (NYT, Witkin, Feb. 29, 1968).

Ronan, who had strong support from Rockefeller, began advocating for the project extending from Whitehall Street – at Manhattan's southern end – to 138th Street in the Bronx, at a price of \$335 million (NYT, Neuman, Apr. 9, 2007). Ronan had powerful backing besides Rockefeller, as well: the media, many local politicians, and influential interest groups all wanted the project. Chief among them were Wall Street-area interest groups, focused on the planned development of 120,000 new workers to fit expanding transportation needs – a plan that got the necessary support and approval within the MTA. Furthermore, the residents of the poor Lower East side successfully demanded access to the new subway, as well, although their piece would have been completed later in the construction process. The residents of other neighborhoods (Upper East side, Yorkville, and Harlem) also had a costly influence on the proposed plan, augmenting the station alignment scheme by forcing the MTA to plan for more frequent stations (Grava, 1980).

In September 1968 the New York City Board of Estimate (a government agency that was responsible for budget and land use questions) cleared the way for the entire "grand design" scheme: it was expected to add \$500 million to the city's budget (the total cost was estimated at \$1.26 billion). The State would provide \$600 million from bond issue funds, and the Federal government was expected to provide the remainder. Of that portion, the Board approved the Second Avenue line from 34th to 126th street, and a later extension south to Battery Park, but as a two-track instead of a four-track line (NYT, King, Sep. 21, 1968). Within a few years, the project started construction, and, in a highly publicized ceremony (with Governor Rockefeller and New York City Mayor John Lindsay in attendance), ground was broken in 1972. Three pieces were then completed: the tunnels between 99th and 105th Streets, 110 and 120th Streets, and another one near the

Manhattan Bridge at Canal Street (New York Magazine, w/o year). (The tunnel pieces were abandoned until the current construction.)



Image 2: Second Avenue Subway Groundbreaking Ceremony 1972

Source: New York Times "Mayor John V. Lindsay swung his pickax at a subway groundbreaking in 1972. Looking on, from left, were Percy E. Sutton, the Manhattan borough president; Senator Jacob K. Javits; John A. Volpe, United States secretary of transportation; and Gov. Nelson A. Rockefeller." (NYT, Neuman, April 9, 2007).

5.2.3. Construction Halted: Another Recession and Maintenance Priorities

As noted above, at the time of the fiscal and economic crisis of the 1970s, the MTA found itself in a financial crisis, too. In 1972, the projected price for the subway had risen from \$335 million to \$1 billion, and to \$1.3 billion the year after. One year after the groundbreaking, Mayor John Lindsay publicly stated that subway construction would probably have to stop if more Federal funding did not arrive (NYT, Neuman, Apr. 9, 2007). While the costs escalated, no new funding was made available. Though voters approved the 1967 bond issue, the money not used for the subway. Two bond issues (1971 and 1974) were defeated because highway and transit proponents were not able to agree on the proposed budget allocations (Interviewee 3). At the same time, economic recession sent the City's income base spiraling down, so that it did not have the 20 2). So the MTA ran out of money for the project and construction was halted in 1975.

By 1979, New York City's existing subway system was in such bad shape that the newly incoming MTA chair, Richard Ravitch, prioritized bringing the city's subway system back into a "state of good repair" and introduced five-year capital programs to regain control. Subsequently, over the next few capital programs, money was allocated predominantly for repairs and maintenance, while capital project expansion plans were put on hold until the 1990s.

5.3. The Politics of Decision-Making

Second Avenue Subway construction was re-started with the ceremonial groundbreaking on April 12, 2007. The first phase of the Second Avenue Subway is currently under construction and scheduled to open in December 2016. This section will focus on the politics of decision-making that led to its resurrection. Effectively, the MTA and the CPRB were where the politics played out.

5.3.1. MTA Decisions

Given the bad state of repair of the subway system, Ravitch had not been able to expand the subways in the 1980s but had to stop the existing system from falling apart by redirecting all funds towards repair. But Transit Authority staff made sure the project got back on the schedule when the time was right. In 1989, leading planners within the TA proposed to include money for project studies for a Second Avenue Subway in the next capital program. David Gunn, head of the Transit Authority from 1984-1990, supported this agenda, and, after some more or less effective lobbying of MTA chairmen and the Board, the MTA allocated \$700 million for project studies in the Third Capital Program (Interviewee #3). Two MTA Chairmen spoke on behalf of the project during the budget negotiations of 2000 and 2004. MTA Chairs Virgil Conway (1995–2001) and Peter Kalikow (2001-2007) both helped advance the project against headwinds. While Conway did not unequivocally support the project, he did not oppose it, either. Kalikow has been described as a "project enthusiast" (Interviewee #1) who did not need much convincing. With the MTA in support, all that remained was to convince the CPRB to approve the project. Here I will describe some of the studies project selection was based on before turning to the politics.

5.3.2. Project Studies and Selection Criteria

There is no question that the project had a lot of supporters. Every one of the interviewees – most from New York transportation agencies, including the MTA – emphasized that project selection was not difficult, and that the project was a "nobrainer" (Interviewees #1). As one of the interviewees from the TA who was involved in the planning process stated: "I often felt that, unlike similar studies I was involved in or observed, I had the unique problem that people, both inside and outside the agency, presumed that a Second Avenue line was justified and should be built if only the money could be found" (Interviewee #4). The question now is how, under continuing budget pressures, the MTA selected the project: what were the transport-economic considerations and study process. To this end, I will summarize some of the project selection.

Project critics were not too numerous. They questioned the rationale of project selection (Grava, 1980), and the absence of transport-economic studies (Berechman, 2009). In 1980, Grava, then Vice President and Technical Director for Planning at Parsons Brinckerhoff, and Professor of Urban Planning at Columbia University, criticized the

project for its lack of realistic application. Despite the political and media support, financial crises and anti-transit resentments were hindering any real capacity for such a project. He questioned why, even in periods of dropping passenger volumes and interest in transit (like the post-war periods), the Second Avenue Subway stayed on the agenda – without serious transport-economic evaluations: "construction was started in 1972 without a fundamental evaluation of feasibility or need at that time, although the basic conditions had changed dramatically over several decades and unrecognized forces were strongly present" (Grava, 1980, p. 33).

There is criticism of the current project, as well. Berechman and Paaswell conducted a comparative cost-benefit study of several large infrastructure investment projects underway in the New York metropolitan area. They found that the Second Avenue Subway did not rank among the first three projects to be recommended, mainly because of its massive capital needs and long construction time (Berechman and Paaswell, 2005). It has been suggested not to expand the construction beyond the first phase, as the money would be better spent on continuing to bring and keep the subway system in a state of good repair (Berechman, 2009).

Other criticisms, on the other hand, are directed at the "truncated" project outline. This mainly refers to the political (and funding) compromises involved in implementing the project in stages – and without a connection into the neighboring boroughs. Diana Fortuna, head of the Citizen's Budget Commission, argued that this project is not needed: "Capital improvements planned by the Metropolitan Transportation Authority should accomplish two things: reduce crowding on the subways during rush hour and support economic expansion by accommodating more workers bound for midtown Manhattan. By these criteria, the agency's plan for the Second Avenue Subway is either too much or too little." In the dimensions of the first phase, \$3.4 billion [the estimate in

1999] would be an extraordinarily expensive way to reduce crowding on Manhattan's East Side; and, if the intended goal is to move workers more efficiently around the city, the Second Avenue Subway should extend into other boroughs (NYT, Fortuna, 1999).

As these critiques indicate, there was skepticism around the transport-economic sensitivity of the project. In the following, I describe some of the studies that have been conducted.

Within the Transit Authority, in the mid-1990s the MTA/TA initiated the Manhattan East Side Transit Alternatives (MESA) study (final draft published in 2001). MESA contained a Major Investment Study (MIS) part and a draft Environmental Impact Statement (EIS). An EIS would be required to apply for federal funding. MESA looked into "transportation problems and needs" on Manhattan's overcrowded East Side and compared several approaches on how to improve transportation conditions there. The Second Avenue Subway was found to be the best solution to the problem of insufficient East Side transportation services.

The MIS established project need based on five problems: the limited capacity of the current system, limited transit accessibility, travel time problems, decreased system flexibility (unpredictable bus and subway service in the area due to overcrowding), and environmental and socio-economic concerns. The study then evaluated and compared different alternatives along Manhattan's East Side, like Second Avenue Subway segments, Lexington Avenue Subway segments, bus alternatives, Metro North Stations, light rail options, elevated trains, private and ferry services, and no-construction alternatives, based on the characteristics below.

Within the scope of the MESA study, the Second Avenue Subway made it through various screening stages. In 1999, a draft report was published that considered the no-

build alternative, bus lines along First and Second Avenue, and the Second Avenue Subway segment as it is being built right now – with an alternative (and dismissed) option of building a light rail line down to Lower Manhattan. After an initial, "coarse" screening, the remaining projects were examined for the following characteristics: total cost, average speed, transfer options, impacts on existing transit systems, engineering complications, use of existing tunnels, unresolved issues, potential for community/public support, expanded rapid transit area, ridership (comparison of ridership levels among same-mode options), street and operations impacts, legal issues, construction impacts, the possibility of phased construction, and implementation schedule.

During the final screen, partial cost-benefit analyses eliminated some of the full-length options: "The final screen involved an analysis of specific quantitative and qualitative data for each of the remaining alternatives. Preliminary model output (including ridership and travel time information) and capital cost estimates were used to perform a partial cost-benefit analysis. This screen also used qualitative screening criteria, including a definition of accessibility; potential for displacement; service to low-income, minority, and transit-dependent populations, community character effects (such as impacts on land use/public policy, visual character, open space, and historic and archaeological resources); hazardous materials issues; traffic impacts; impact on parking and goods delivery; air quality impacts; compatibility with existing transit system; and a general analysis of construction impacts" (MESA, 2001, p. 13). For instance, some projects were excluded from consideration because the "cost [would be] prohibitive to expected benefits"; others for not being physically feasible, disruptive to the existing transportation system or the neighborhood, not providing sufficient transport-economic benefits, or unable to comply with government or agency policies.

Certain aspects of the full-length project of the Second Avenue Subway, including an eastward alignment and/or an east-west connection, were eliminated during the second screening because of "cost-effectiveness and impact factors. "The full-length subway without those options and the north subway with Lower East Side subway shuttle (which had been developed in Screen 2) were eliminated in Screen 3 because of high capital and operating cost and high cost factors (cost per hour saved and cost per hour spent in less crowded subway)" (MESA, 2001, p. 14). In the end, the MESA study concluded that the full-length subway would be best, but suggests in the face of high project costs to build the project in stages:

"The evaluation conducted for Screen 3 concluded that the full-length Second Avenue Subway would provide the greatest benefit in solving transportation problems on the east side of Manhattan. The full-length Second Avenue Subway was also found to have the highest capital and operating costs. To address the most critical problems in the study area first, a lower cost alternative that could serve commuters in East Harlem and the Upper East Side who were traveling to Midtown and Lower Manhattan was selected as preferable to the full-length subway at that time. This lower cost subway alternative, which involved construction of a new tunnel segment between 125th and 63rd Streets and continuation on existing routes from 63rd Street south to Lower Manhattan, did not preclude future extensions of the subway route farther south to provide a fulllength subway. To allow for the future pursuit of a full-length subway option, conceptual engineering of the subway alternatives that were advanced past this point were designed to allow continuation of a full-length subway at a later time" (MESA study, p. 14).

The MESA study cemented the already growing subway support outside the agency, among others, the Regional Plan Association (more about the agency below), which called for a Second Avenue Subway in a well-noted study of 1999 (RPA, 1999). In combination, the MESA study and the EIS (described in the following) formed the basis for the MTA decision to go forward with the Second Avenue Subway.

The 2000-2004 capital program funds also provided funding for the Environmental Impact Statement (EIS) as part of the planned application for Federal New Starts funds at the Federal Transit Administration (FTA). (Federal law in the U.S. holds that an EIS must be delivered for projects that receive federal funding.) Because of some project critique, and in synch with the MIS study, the MTA and the Transit Authority completed all environmental and planning work for a "full length" subway, even if it would be implemented in phases (Interviewee #4). As required, the EIS described the proposed project in detail, considered reasonable project alternatives, some benefits and costs, and allowed for citizens to comment on the drafted version, providing opportunities for public participation.

An EIS does not typically discuss transport-economic feasibility, and is not a project selection document *per se.* The study named improving mobility on Manhattan's East Side, achieving economic feasibility and cost-effectiveness, and the maintenance or improvement of environmental conditions to be the main project goals. It compared a Second Avenue Subway and different alignments to a no-build alternative, and lists the following "enormous" project benefits: bolstering the economy of the city and the region, reduction of subway crowding and the improvement of reliability, subway access improvement, and the reduction of vehicle use and air quality improvement. It also described the phasing of construction, as a way to address the most urgent needs immediately, as well as an elaborate public outreach process (MTA, 2004).

Federal funding was approved in 2007, based on the ranking of a Federal study and MTA willingness to proceed in phases. In the Transportation Equity Act: A Legacy for Users (TEA-LU) Federal Act⁴⁴ of 2005, the FTA ranked the project (Phase 1) as a "highly recommended" transit investment project.⁴⁵ The project was one of only two nationwide to receive this tag and designated funding in TEA-LU (Maloney, 2005).

⁴⁴ Every six years the Federal government provides funding through the Federal transportation bill, which is mostly funded by a gasoline tax. Gasoline tax revenue is mostly spent on highways and, to a minor degree, also funds mass transit projects, depending on State regulation. Within the transportation bills, capital project grants may be capped at 80 percent under the Federal matching grants New Starts program. ⁴⁵ Decision criteria: "Under 49 USC 5309(d), major capital investment grants for the construction of a new fixed guideway system or the extension of an existing system seeking \$75 million or greater in Federal New Starts funds may be made only if the Secretary determines that the proposed project is: (A) based on the results of an alternatives analysis and preliminary engineering; (B) justified based on a comprehensive

The report ranked the project as "high" for each component of the "land use evaluation" (projects rank highly that address significant transportation problems or opportunities and provide significant mobility and economic development benefits in a cost-effective manner, e.g. uses existing structures, facilitates transit-supportive plans and policies, high-performance expectations in a strongly used corridor); "high" on the "environmental benefits" rating, as well as the "transit-supportive lane use" rating (which evaluates the degree to which transit use is integrated and promoted); "medium-high" in terms of its cost-effectiveness, its mobility-improvement ratings, and local financial commitment (capital finance plan and operating finance plan ratings); and "medium" on operations efficiency criteria. The total project justification rating was "high" (FTA, 2007).

In summation, the MTA conducted project alternatives studies, including partial costbenefit analyses, and an environmental impact study. Project selection criteria remain somewhat unclear at this point, if measured in terms of a cost-benefit ratio, and outside criticism is still significant. The MTA exercised its decision-making autonomy to get started on the project it wanted. In this sense, the project was not strictly based on criteria of transport-economic feasibility. In the following section, I will address how the MTA succeeded in keeping the project moving through the politically challenging territory of Manhattan.

5.3.3. The Issue of Funding

The issue of funding is a driving force throughout the political debates I will outline below. There has never been enough money to fund the project: "In 1953 the money

review of its mobility improvements, environmental benefits, cost effectiveness, and operating efficiencies, economic development effects and public transportation supportive land use policies and future patterns; and (C) supported by an acceptable degree of local financial commitment (including evidence of stable and dependable funding sources) to construct, maintain, and operate the system or extension, and maintain and operate the entire public transportation system without requiring a reduction in existing public transportation services or level of service to operate the proposed project." (http://www.greenlineextension.org/documents/FTA_NewStarts/FY08_Entire_NS_Report.pdf)

wasn't there because you needed money to fix up the existing system, in 1980 the money is not there, or if he [Ravitch] is going to get money, it is going to fight get money to fix up the existing system, because there is never enough to fix the existing system and to build new lines" (Interviewee #3). Compared to the 1970's, the general state of repair of the subway network had improved, but the MTA was not back in a healthy financial state. Nonetheless, as Interviewee #4 put it, the goal was to move the project idea from "this is something that should be built if we ever had the money" to "we should get the money to build this."

Funding options were limited for four main reasons. First, as described in the historical outline, for much of the time the political priorities were on highways, and explicitly not on transit, and federal funding scarce. Second, in the 1980s the priorities were necessarily on system maintenance rather than expansion. Third, the regional competition between rural and urban areas, both with their own transportation needs, spread state financial resources for transportation thin. Fourth, since Governor Pataki cut the MTA funds, the agency had to borrow more money, the repayment of which cuts into the available resources by now.

Besides regular budget sources, two additional sources of funding helped enable the project. First, a significant portion of funding was provided through a successful 2005 State Transportation Bond Act. The bond issue act was the result of a long-term effort by the Empire State Transportation Alliance (ESTA) that has accompanied the subway decision-process to accumulate sufficient public support. By its own description, the coalition includes "business, civic, labor and environmental organizations that seek to build consensus for expanded resources for New York State transportation" (RPA, 2013).

⁴⁶ Robert Yaro, President of the Regional Plan Association (RPA), a New York based association that has done research on "land use, transportation, environmental issues, economic development and security" (RPA, 2013) and Elliot Sander, who has served most city and state transportation agencies, spearheaded it. They significantly contributed to the success of the 2005 Transportation Bond Act.

Transportation Bond Acts were very important to Second Avenue Subway decisions, because they partly removed the project from budget competition with other projects and agencies, though they increase the debt burden. They also serve as a barometer for public support for the project. Voters rejected bond issues containing provisions for the project in 1971, 1974 and 2000. But they approved them in 1951 and 1967 (though, in both cases, the money was spent for other purposes), as well as in 2005. The 2005 Bond Issue Act was crucial for this project.

Part of the support effort was RPA's 1999 MetroLink Plan, which attracted significant media attention. To ensure better functionality of the entire system, and specifically to relieve overcrowding on the Lexington line, the RPA proposed that the time had come to go beyond striving for a "state of good repair" to capital expansion. The document states: "The keystone of MetroLink is a new north-south subway line to be built the length of Manhattan on the east side, largely under Second Avenue, and continuing downtown along Pearl and Waters Streets, and then through a new tunnel under the East River to

⁴⁶ ESTA members include: "Regional Plan Association, co-chair, AECOM, co-chair, American Council of Engineering Companies of New York, Associated General Contractors of New York State, Baruch College/ CUNY, Building Congress, Beaudoin and Co., Citizens Budget Commission, Construction, Industry Council of New York, Drum Major Institute, Environmental Defense Fund, Featherstonhaugh, Wiley & Cline, Fiscal Policy Institute, General Contractors Association of New York, HNTB, International Union of Operating Engineers, Laborer's Tri-Fund, Long Island Contractor's Association, M+R Strategic Services, Machinist Union, Macro Associates, Manatt Phelps & Phillips/Claudia Wagner Associates, MOVE NY, New York League of Conservation Voters, New York Roadway Improvement Coalition, NYPIRG Straphangers, NYU Rudin Center, O.T., Solutions/Machinists Union, Partnership for NYC, PB Inc., Permanent Citizens Advisory Committee to the MTA, Pratt Institute for Community Development, Real Estate Board of New York, Reinvent Albany, Robbett Advocacy Media, STV, Transport Workers Union Local 100, Transportation Alternatives, Tri-State Transportation Campaign" (http://www.rpa.org/esta)

Brooklyn. This trunk line would connect with existing lines or be extended with branches in seven locations, including an extension into the Bronx, a connection to west Midtown, to Queens, to Grand Central Terminal, through the Lower East Side and the East Village, a link to the Nassau Street subway in Lower Manhattan, and an extension towards Jamaica and Kennedy Airport on the LIRR tracks" (RPA, 1999, p. 3).

The RPA plan was crucial in gaining public attention, but even more so in building a broad coalition of project support. Over the years, the Alliance, a coalition of business, industry, union, environmental,⁴⁷ and transportation groups worked successfully to get the Transportation Bond Act approved (Interviewee #1). It won by a 0.1 percent margin. The Second Avenue Subway had been specifically written into the act, but East Side Access was an option also (NYT, Baker, Jul. 13, 2005).

Second, in 2007 the MTA secured part of the funding for the first stage of the Second Avenue Subway through a federal grant. The Federal share constitutes about a third of the total project funding.⁴⁸ Importantly, the grant came with the condition to proceed with the project in phases: this removed the question of a full-length subway from the debates. Federal funding has not always been a certainty: the FTA was never particularly interested in New York and its transit projects. Interviewee #6 suggested that it was the events of September 11, 2001, that might have prepared the grounds for the FTA decision to fund the Second Avenue Subway. He argues that the dramatic impacts of that day made the country more sympathetic, shifting attention towards the needs of New York City – or large urban areas in general – that might be the target of attacks.

⁴⁷ Recent environmental activist support came from environmentalists who had previously been opposed to the project (NYT, Steinhauer, June 7, 2005).

⁴⁸ The program provided funding for both the Second Avenue Subway and East Side Access (another important regional project, connecting the Long Island Rail Road, a regional commuter system, to Grand Central Terminal in Manhattan). The Federal share of \$1.3 billion for the Second Avenue Subway is a larger amount than New Starts usually provides; still, as a share of the total cost for the Second Avenue Subway (the share is 26%), it is lower than for any other New Starts project.

5.3.4. Calibrating Different Interests in New York State

Turning to the politics, the New York State area is divided with respect to its transportation needs: in the upstate area, people rely primarily on their cars, while in New York City and the surrounding boroughs they rely heavily on the subway. The MTA, a state agency, was created to calibrate the competing infrastructure needs. The Governor and the Legislature hold considerable influence over the agency and its projects. There are two different kinds of relevant politics: appointment and CPRB politics. The key decision-makers are the Governor and the representatives on the CPRB Board.

The preferences of New York State's governors matter, because they determine the range of options and funding available to the MTA by their appointment powers and capital plan approvals. Judged by appointment rationale, some MTA Board appointments were more political than others. As Interviewee #3 stated:

"Under three chairmen –Ravitch, Kiley and Stangl— from late 1979 to 1994, the MTA acted pretty much as the independent public authority that was supposed to be. That's not to say Governor [Mario] Cuomo did not have the influence over what MTA did, but there was not a day-to-day interference in MTA's planning or anything. And it made proposals for capital funding and everything like that. Pataki just totally politicized the MTA headquarters – not the Transit Authority, though, because you have to have people who know what they are doing when dealing with railroads and buses. [But] he wanted to have people at the MTA headquarters who would do his bidding" (Interviewee #3).

Governor George Pataki (1995-2006) appointed Virgil Conway (1995-2001) and Peter Kalikow (2001-2007) as MTA chairmen. Both were (initially) following the Governor's agenda, and new subway construction was not high on the list for the Governor (Interviewee #1; NYT, Fisher, Apr. 22, 1995).

Because of the MTA chairs' political involvements, the project had finally (openly) arrived at the center of the complicated political thicket of NYC political complexities

and battles. At this point, support for the Second Avenue Subway became entwined with

that of East Side Access. Senator Alfonse D'Amato, a New York Republican whose career was financially supported by Peter Kalikow and Governor George Pataki, was a strong proponent of the East Side Access project. When the time came to find funding for the Second Avenue Subway, Kalikow departed from his loyalties to Pataki and supported the Second Avenue Subway, although it was not the project of choice for his political mates. This allowed the necessary negotiation leverage for the Second Avenue Subway project's champion, the Democrat Sheldon Silver – also on the Capital Program Review Board – to use the other big MTA project, East Side Access, as a lever for Second Avenue Subway approval.

5.3.5. Directing the Funding Streams: The MTA Capital Programs

Funding for the Second Avenue Subway has been submitted to the CPRB three times so far, as funding was negotiated twice during the relevant time: in the 2000-2004 and in the 2005-2009 capital plans, and then in the 2010 program.

Negotiating the 2000-2004 MTA Capital Program: Capital plan approval from the CPRB required a unanimous vote from the Governor, the State Assembly representatives, and the New York City mayor. An aggravating factor was that, from the 1990s and after, similar five-year capital plans were approved for the State Department of Transportation, which is responsible for highways. So, during both periods, competition for funding was high. When the 2000-2004 capital plan was up for debate, project selection itself was more of an issue in the debates. Still, the agency succeeded in getting \$1.05 billion specifically for the Second Avenue Subway included in the capital program – already quite a commitment. Next, I will consider the different positions of the CPRB representatives during the negotiations for the 2000-2004 capital program. Governor Pataki had influence over agency appointments and veto power over the MTA capital budget. During the 1999 capital plan negotiations, Pataki vigorously supported the East Side Access project, making approval of the project a condition of his support for the 2000-2004 capital program (Interviewee #6). His support for the Second Avenue Subway was less certain and had to be negotiated.

On the other hand, the powerful State Assembly Speaker Sheldon Silver, then representing the Lower East Side, threatened to refuse to approve the budget plan if the Second Avenue Subway was not on it – in full length. Subway access is a strong draw for the Lower East Side, which is underserved by subways. Silver worked with Pataki's East Side Access preference and argued that both projects belonged together: the Second Avenue Subway needed to complement East Side Access, because of the increased ridership on the Manhattan's East Side that would result from the project. Silver was particularly adamant about project length and for a while threatened to veto a truncated version of the project – a position he later relaxed in favor of the incremental plan. He got significant support from citizen groups, e.g. the respected and influential Community Board (Interviewee #5).

Another related issue in the State Assembly was party competition. The first budget proposal for the 2000-2004 capital plan was blocked by Senate Republicans (by Republican Senator Dean Skelos) in 1999 and was subsequently revised. The anti-transit sentiment – less pronounced in New York State than it is in the rest of the United States – plays into this as well. At the state level, transit funding has to compete with the likes of highway funding; Senate Republicans, for whom highway funding was a major political issue, blocked the transit plan and the Second Avenue Subway for some time, arguing that there was no comparable state plan for investing in highways (NYT,

Neuman, Dec. 22, 1999). The same is true for state bond acts, which provide a 50/50 ratio for both agencies.

To address these concerns and avoid future conflict, the MTA and the New York State Department of Transportation's budget programs were then designed to be coordinated. This increased the chances for NYC subway plans, because both groups would get an equal share. However, the anti-transit votes were not necessarily a partisan issue; much of the divide overlaps with upstate (more suburban and rural) vs. downstate (urban) constituencies and their very different transportation habits and needs. In fact, both houses of the legislature had blocked the capital program at various times to demand changes (NYT, Perez-Pena, Mar. 15, 2000).

Just like the legislature, New York's voters tend to be regionally divided into upstate and downstate, or anti-transit and transit, constituencies. A \$3.8 billion Transportation Bond Act was rejected in 2000. It would have provided \$1.6 billion to the MTA for its mass transit systems, and \$1.9 billion to the state highway program. The Second Avenue Subway was officially written into the proposal, as were the extension of the N-Train to LaGuardia airport, a Metro North extension to Penn Station, and an extension of the Long Island Rail Road to Grand Central Station. The outcome of the votes reflected the traditional split between upstate and city (or downstate) voters. Upstate voters rejected the plan 2:1, NYC voters approved it 2:1, and the suburbs voted in narrow approval. In the end, the supporting votes were not sufficient (NYT, Lipton, Nov. 3, 2000). So the money that would have gone towards the subway had to be found elsewhere.

The project was not a priority for New York City's mayor, either. While I have described some of the attitudes in the historical section above, New York City's last two mayors could hardly be considered Second Avenue Subway enthusiasts. Rudolph Giuliani

preferred another capital project: he strongly advocated the extension of the N line in Queens to LaGuardia Airport. And Michael Bloomberg, while supporting the 7-Line Extension, was ambivalent about the Second Avenue Subway project at best, especially if it would not extend all the way down to the Lower East Side. However, each mayor ended up casting a "yes" vote at the CPRB (Interviewee #1).

In summary, all representatives on the CPRB approved the 2000-2004 capital plan – that includes representatives of Governor Pataki, Speaker Sheldon Silver, State Senate majority leader Dean Skelos, and a representative of NYC's mayor. The plan designated \$1.05 billion to the Second Avenue Subway project for environmental studies, as well as some design and construction work. Future funding was left to the next capital plan.

During that capital plan, in 2003, the MTA Capital Construction, an agency set to manage capital projects, was formed to coordinate the ambitious new capital expansion projects within the agency and among its various subdivisions. Among these projects are the Second Avenue Subway, the Fulton Transit Center, East Side Access, the 7-Train Extension and the new South Ferry Terminal.

Negotiating the 2005-2009 MTA Capital Program: By 2005, the Bond Issue Act was approved, providing some money and establishing project support. Little had changed regarding the political frontiers of the project. At this point, George Pataki, Mayor Bloomberg, Senate Majority Leader Joseph L. Bruno and Assembly Speaker Sheldon Silver had representatives on the CPRB. Silver continued to push for the Second Avenue Subway, while Senator D'Amato and Governor Pataki promoted the East Side Access program. Now the issues were about scheduling and phasing: while D'Amato was trying to get the East Side Access project fast-tracked, Silver refused and insisted on having both on the same schedule (Interviewee #3).
At the same time, the financial situation at the MTA worsened again, and chairman Kalikow tried to get New York State to raise taxes to pay for the next 2005-2009 capital program. Under these circumstances, the main debates and political wrestling of the time focused on the capital plan budget and on project finances: the project was, as usual, competing against the funding demands for system maintenance. The MTA requested \$27.8 billion in 2004, but the state and the legislature approved only \$21.1 billion in 2005. The \$21.1 billion made MTA decisions difficult, because it had two capital projects running: the Second Avenue Subway and the LIRR-Grand Central Terminal Link, as well as a third in planning stages – the direct link from Lower Manhattan to Kennedy Airport (which is still not under construction). Emotions ran high. During the budget debates with New York State, MTA Chair Kalikow stated he would be willing to jettison projects like the Second Avenue Subway and just focus on maintenance (NYT, Chan, Dec. 22, 2004).

By 2007, the FTA approved the \$1.3 billion Federal New Starts grant discussed above, releasing the pressure of finding funding, but it came on the condition of project phasing. Powerful NY State politicos, like Senator Charles Schumer and Congresswoman Carolyn Maloney, both supported the approval (Interviewee #3).

Negotiating the 2010-2014 MTA Capital Program: Of course, funding was short for the next requested MTA Capital Plan (\$26.3 billion in total) as well, the pressure having risen from the 2008 recession and years of accumulated bond debts. At this point, there was a \$1.487 billion shortfall to complete the first phase (see Table 19 above), and the MTA succeeded in raising the funds, after a series of budget negotiations and budget threats. Governor Paterson vetoed the first plan in 2009, because of the desolate financial situation of New York State, which would have provided the largest

part of the capital funding. The MTA adjusted their program by shortening the expenditures by \$1.8 billion

Another threat to not approve the budget came from the Republican minority in the State legislature. Power distribution in the NY State Senate was so balanced that Republican votes were necessary. Republicans stated a concern about a billion-dollar state rescue program for the MTA on the one hand and a big gap for highway and bridge funding on the other (Neuman, NYT, 2009).

However, the third and last capital program containing budget allocations for the first phase of the Second Avenue Subway was approved in June 2010.

Image 3 & Image 4: Subway Construction



Sources: http://www.rewonline.com/2013/08/23/second-ave-subwayinformation-center-up-and-running/

http://www.metromagazine.com/news/story/2011/09/n-y-second-avesubway-tunneling-complete.aspx



5.4. Conclusion

In short, in April 2006 the FTA approved construction at a projected cost of \$4.5 billion. Construction began April 2007. The current opening date, although it has been revised several times, is set for December 2016 since 2009. The first phase is fully funded, but the following phases, at this writing (December 2013), are nearly completely up in the air.

With respect to the main policy stages identified in the model (Chapter 3, and at the beginning of this chapter), the following picture forms. In the 1920s, transit planners identified the need to expand the subway system and calculated the costs of building a Second Avenue Subway. The plan failed because of the recession. Over the next few decades the perceived need for a subway extension vanished with the car boom. With the destruction of the elevated trains and subsequent overcrowding of the 4/5/6 lines, the project idea remained on a vague agenda. It was fully restored with the reorganization of the transportation landscape in 1968 - the creation of the MTA. Without specific studies, project planning and construction began, only to be derailed again in the next economic crisis. Followed by years on the back burner because of the new prerogative to restore the entire subway system back to a state of good repair, planners within the Transit Agency revived it. They put it on the MTA agenda first, and after successful approval the project was subjected to state approval.

The considered project alternatives included alternative bus systems, combination systems, and also the route as it is being constructed at present in the form of a general approval of the various MTA capital programs. Project approval took place on an MTA internal level and then on the state level. Indirect federal approval was provided through the federal funding share, which came at the recommendation of proceeding to implement the project in stages. Another approval, also related to funding, was the state bond issue vote in 2005.

After outlining the history and politics behind the Second Avenue Subway decisions, I came to the following conclusions with respect to the hypotheses:

Macro-level government arrangements matter for transportation decision-making because they organize the political arenas and institutions. Infrastructure governance is dependent on these structures and permeated by the dynamics and values of fragmentation, devolution and privatization.

The devolution of transportation authority from the federal government to the state and local level ensured the importance of state level decision-makers, while the highly fragmented nature of decision-making in New York was somewhat offset by the political strength of the MTA. Though dependent on state-level approval, which requires compromising with more car-prone upstate constituencies, the agency successfully implemented the first stage of the project

Physical attributes like project modes, types and location determine which actors are involved in project decisions.

The MTA organizes transit operations in the New York metropolitan area. All decisions were made within the parameters of this agency. Constructing in New York City would be difficult.

Various political, economic and social interests drive transportation investment decisions, and their respective impact is dependent on institutional arrangements and financial means.

Outside project champions that understand the rules of decision-making are necessary for project success: in this case, Sheldon Silver's support as a Lower East Side representative was crucial. Community boards and a powerful coalition of stakeholders, consisting of unions, businesses and environmental groups, backed him up. The fact that the CPRB decisions need to be unanimous and other board members were championing other projects was helpful in this case because board members took to trading votes.

In addition to Silver's influence, the coalition of business, labor, transportation experts and agencies, and environmentalists was crucial to secure part of the funding for the project (the 2005 Bond Act). Transportation authorities serve as the hinge between the general political and societal context and the projects themselves and thus channel national, regional or local politics. Depending on their degree of autonomy they are often the driving force behind project decisions.

Special-purpose agencies have the power to hang on to project ideas, negotiate political support, and find funding. In this case, I find that transportation agencies hung on to the project over the decades, and in the end the special-purpose agency (MTA) finally implemented the Second Avenue Subway, despite budget constraints. The MTA's internal decision to build the project (which also served to build up outside support) was based on the MESA study comparing different major investment alternatives, but not on a cost-benefit study. Though the MTA needed approval from state and local actors, its leadership skillfully navigated the politics.

The politics of infrastructure investment decisions is the art of directing funding streams.

The nature of funding and its arrangements has the power to overcome politics. In the case of the Second Avenue Subway, funding from the Federal Transit Administration Start-Up program, as well as federal loans, directly sustain large parts of the project, so that the pressure to compete for funds locally and statewide was diminished. The federal grant did require the project to be built in phases, too. The Transportation Bond Act, another funding mechanism, dodged the crucial upstate reliance by providing equally for both highway and transit projects. The State DOT funding plans that are synchronized with those of the MTA are another important conceptual lever that somewhat removed the pressure from the highway constituencies in the budget competition.

Additional factors, not captured by the hypotheses, include: first, what policy theorists might call "window of opportunity," which is an extremely unlikely "alignment of stars and galaxies" (Interviewee #6) that synchronizes agendas, politics and funding streams. As one of my interviewees (#6) argued, the horrific events of September 11 made the

federal government and Americans in general more sympathetic to the (underfunded) plight of the large cities and more willing to give.

Second, a long project history that provides the project idea with some legendary character may be of advantage. The Second Avenue Subway, over the years, was used as rallying point and slogan; it has been promoted for so long that it had become a "tradition" to promote it. Further, over the course of time the larger political-cultural environment has shifted from a heavy focus on individual travels and highways and subsequent riots, to a more balanced approach to transportation and more understanding for the plight of urban areas and their needs, which led to a shift in federal investment strategies.

Chapter 6: The Politics of Large Infrastructure Investment Decision-Making: The Case of Alameda Corridor

Compared to the Second Avenue Subway, much has been written about the Alameda Corridor. Much of the literature on the project is devoted to assessments of what went right; indeed, it is considered one of the most successful recent megaprojects, in terms of on-time completion, budget performance and its innovative funding scheme. Despite the views of some of my interviewees (Interviewees #7, 9, 2013),⁴⁹ who opined that there was nothing "political" about the project because it was seen as so urgently needed, there was a good deal of politics involved in the Alameda Corridor project, as well. This chapter explores how and where politics intervened. The chapter follows the research questions laid out in the introduction. They involve the decision-making steps, which stages have been taken in the process, and in which order. I examine the contextual, macro-political factors and dynamics that shaped the project. Further I will illuminate the project rationales and interests behind those involved in project decision-making and explore the role of the responsible transportation authority. As with the Second Avenue Subway project, funding played a major role in this project, as well.

The Alameda Corridor, a freight rail tunnel project in Southern California, had a much shorter history than the Second Avenue Subway. It responded to a widely acknowledged need and was completed in accord with the approved design, within the authorized budget, within the initially approved schedule and with an innovative governance and complex financing scheme and a high degree of federal lobbying. Projections assumed maximum utilization to be reached in 2020.

⁴⁹ Appendix I lists all interviewees with their main affiliations. For data protection and IRB purposes they are only cited anonymously.

On the surface, project need appears equally unquestioned as that of the Second Avenue Subway. But like the Second Avenue Subway, the project was implemented within a particular "window of opportunity" and with the help of some extraordinary funding resources, and both projects hinged in part on federal funding. The main differences between the projects concern the length of the project history, the transportation problem to be addressed, and the different role of the implementing agency. While the implementing agency for the Second Avenue Subway is a special purpose agency, responsible for a larger chunk of transportation in the New York metropolitan area, the joint powers authority that implemented the Corridor was (at first) created as a *singlepurpose* agency solely dedicated to this project.

An updated version of the model developed in Chapter 2 (Figure 2) illustrates the difference that makes for political-contextual interaction: Figure 11 reflects the different agency structure with its different anchorage in the area and the decision process.



Figure 11: Decision-Making Model for a Single Purpose Agency

While in Figure 2 the actors and the agency are separate, in Figure 11 the decisionmaking agency encompasses all political actors already. They do not act on the decisionmaking agency.

As a function of the strong fragmentation in the region, no individual agency or authority was originally responsible for a project like Alameda Corridor – a project that would cross and touch upon multiple jurisdictions. So in this project, the political compromise had to come first: multiple jurisdictions and actors founded the Alameda Corridor Transportation Authority (ACTA) to implement the project. In that sense, the decision agency and many of the political actors are the same, and thus their color in the picture is the same as that of the decision agency. But the agency channels the politics and actors involved in a very different way. That does not mean that the decision-process was less conflicted, but a number of stakeholders – or friendly competitors – were pulling in the same direction. The biggest obstacles were the railroad companies and the cities along the corridor.

The Alameda Corridor's implementation agency was structured in a uniquely integrative way but really functioned only after internal legal struggles and an external legal decision. A general pro-business climate that arose from globalization pressures through projected port growth forced the competing ports to come up with a joint solution. Further, project implementation was also due to the exercise of political threats towards the private railroad companies that now share the tracks of the new corridor. Project opposition led to the implementation of an accompanying job-training program, a trend that is not unusual for large-scale infrastructure investment in the United States. Federal funding played a crucial role in securing the project's financing and, thus, the project itself.

I will first review the main project features and characteristics. As in the previous chapter, I will then examine the project context, the project study and the project politics. I conclude with a summary of the main findings. An overall conclusion will be drawn in the final chapter (Chapter 8).

6.1. Project Summary

Alameda Corridor is a 20-mile (32.2 km) grade-separated freight rail corridor connecting the Port of Long Beach and the Port of Los Angeles with the regional transportation hubs of downtown Los Angeles. Construction started in 1997, and the project opened in 2002. The corridor consists of three parts: the South End Project, including a "fork" to serve each of the two ports; the North End project area with the Redondo Junction flyover and multiple rail and street bridges; and the projects' centerpiece, the 10-mile Mid-Corridor Trench, 33 feet deep and 50 feet wide; 30 bridges connect the street traffic on both sides of the trench and reconnect the Corridor communities. Figure 12 provides a project outline



Figure 12: Alameda Corridor Plan: From the Ports to Downtown L.A.

Source: http://www.sjcite.info/acp.html

In 1995, the ACTA hired a joint venture of four major engineering firms as the project management entity, called the Alameda Corridor Engineering Team (ACET), which was responsible for the preliminary design, environmental reviews, engineering and

construction oversight of the corridor. ACTA and ACET designed and built the project to increase port efficiency in the Southern California transshipment bottleneck.

By consolidating four formerly separate freight rail lines into one line, partially below grade, Alameda Corridor allows for more efficient freight rail transport, reducing train trip time from more than two hours to about 45 minutes, and eases regional road traffic congestion, as well. (In California, passenger trains have the right-of-way during the day. Before construction of the Corridor, freight trains needed to yield to passenger traffic and, in addition, would often block road traffic while waiting.) The project removed 200 road/rail crossings and cut noise and air pollution in the Corridor cities and the region. The Corridor's impact is expected to reach beyond regional confines, as the San Pedro Ports are the largest U.S. port complex and the efficiency of cargo distribution impacts the national economy (Nobbe and Brecher, 2009).

The public-private partnership project has a complicated funding structure. The funding sources are displayed in Figure 13 below. Each of the funding sources is associated with political efforts, and I will touch upon the story of each in the remainder of the chapter.



Source: NCHRP, 2003 (own presentation)

The Corridor's largest source of funding is the \$1.16 billion revenue bonds that were issued - \$520 million in tax-exempt bonds and \$643 million in taxable bonds. In addition, \$394 million came from the ports, \$347 million as a grant from the Los Angeles County Metropolitan Transportation Authority (MTA) and – after long struggles - a \$400 million federal loan. Other sources contributed \$131 million to complete the financial package. To date, the revenues collected from the use fees and container charges have been sufficient to cover ACTA's annual debt service obligations without using the ports' shortfall advances.⁵⁰

The major portion of funds, \$1.5 billion, went into construction, design and engineering costs. The main contract for the mid-trench corridor, the below-grade part of the Corridor, went to Tutor-Saliba as a single design-build (DB) contract of \$778 million. Other cost items included the initial purchase of the rights-of-way from the railroads for \$394 million. Financing costs and legal fees took \$329 million, and \$200 million was allocated as a contingency fund. Particularly controversial were the trench and right-ofway costs.

Currently, the Corridor remains underutilized in terms of its capacities, peaking in 2006 with 55 trains a day and 3.4 million TEUs (twenty-foot equivalent units, the standard transport unit for containers), and declining since. As of 2009, this was in line with project expectations laid out in the EIS, as the project was built to fulfill its capacity by 2020, when 97 trains per day were projected to move in and out of the ports (EIR, 1996). The maximum capacity is 150 trains per day.

⁵⁰ As scheduled, ACTA paid off a tax-exempt subordinate lien 1999B bond series in 2006, while the other series are due in 2015 and 2037, respectively (ACTA 2009). Also, the \$400 million federal loan was paid back far in advance in May 2004 instead of 2034. ACTA paid back nearly \$475 million in tax-exempt bonds, plus interest of \$211 million accrued on the taxable bonds (FHWA 2004). Traffic volumes over the next years will determine the likelihood of paying back the revenue bonds by 2032, as scheduled. The DOT loan repayment requirements were subordinated to some of the revenue bonds. The entire project, including the DOT loan, required bond rating agency evaluation. The DOT loan provided ACTA with some flexibility of timing. However, as noted, the DOT loan was repaid thirty years early in 2004.

6.2. Project History and Context

Transportation investment responsibility is increasingly localized in the United States (Altshuler and Luberoff, 2003). To stay competitive and confront projected growth, the ports of L.A. and Long Beach had to convince local and state stakeholders to help them get a project off the ground – just like the MTA did. There were no national or state-level models for the development of a freight rail corridor and no national public financing program for intermodal freight transportation. The resulting lack of "organizing principles" (Petersen, 1998, Special Report 252, 258) had all stakeholders involved starting from scratch. Yet the financing mechanism of the Corridor was so successful that it became a model for the national Transportation Infrastructure Finance and Innovation Act (TIFIA).⁵¹

Further, like the New York Metropolitan Area, the Southern California region is politically fragmented – and, hence, politically complex – according to a fragmentation score cited by Giuliano (2007). Decision responsibility for the ports is entwined with that of the cities and overlaps with various regional planning agencies and jurisdictions. Other large projects in the region had already failed because of regional animosities (Erie, 2001).

Both ports combined are one of the busiest port areas in the world, channeling a large share of global and regional freight traffic. They were adversarial competitors until the 1980s. In contrast to most ports in the United States, the Long Beach and L.A. ports are

⁵¹ The TIFIA "program provides Federal credit assistance in the form of direct loans, loan guarantees, and standby lines of credit to finance surface transportation projects of national and regional significance. TIFIA credit assistance provides improved access to capital markets, flexible repayment terms, and potentially more favorable interest rates than can be found in private capital markets for similar instruments. TIFIA can help advance qualified, large-scale projects that otherwise might be delayed or deferred because of size, complexity, or uncertainty over the timing of revenues. Many surface transportation projects - highway, transit, railroad, intermodal freight, and port access - are eligible for assistance. Each dollar of Federal funds can provide up to \$10 in TIFIA credit assistance - and leverage \$30 in transportation infrastructure investment" (FTA, 2013).

municipally, not regionally, run and enjoy a comparatively high degree of policy and fiscal autonomy (Erie, 2004, p. 31). Administratively, they are connected to the cities of Long Beach and Los Angeles. The Port of Los Angeles is part of the government of the city. The port governance structure is the same for both: five commissioners, appointed by the respective mayor and approved by the relevant city council, run each port, although the Port of Long Beach is much more independent from the mayor than the Port of Los Angeles (Interviewee #9, 2013). When freight backlog became an issue, the ports and other actors started cooperating to address the problem through a variety of task forces and studies.

Three larger trends benefited the project: globalization, beneficial political circumstances, and few environmental requirements.

The San Pedro ports in the 1990s, expecting vastly increasing trade volumes by 2020, needed to expand their capacities to remain globally and regionally competitive. The streets and ports were already overburdened. More cargo would only make sense if goods could be transported efficiently and without much processing time to and from the ports; otherwise, the ports would lose competiveness (Erie, Ch. 2) against other regional ports that competed for their share of the global market.

Politically, the circumstances were unique: the powerful Los Angeles mayor, Richard Riordan, and his pro-business administration were in power from 1993-2001. At the same time, at the beginning of the 1990s, President Bill Clinton was preparing for election and made friends in the State of California by supporting several beneficial deals. For example, Clinton supported the federal loan for the project that came to be the powerful catalyst for the remainder of the funding.

Third, the environmental requirements are important for project decisions. As one of the interviewees (#9, 2013) stated, the project barely slipped through and could not have been built a few months or even years later. Instead, powerful environmental groups would have sued, or project implementation would have at least been delayed at enormous expense (Interviewees #9, 2013, #10, 2009, #11, 2009, #12, 2009).

6.2.1. Project Need and Project Studies

A series of studies projecting port growth became the basis for the decision to build the project. Subsequent studies and reports evaluated project alternatives and different organizational forms, and in time an Environmental Impact Statement (EIS) followed. Project need was easily established and received significant support from all sides, although the region is known for the large number of adversarial cities, agencies and institutions, and the Corridor goes through several different governing districts. There was no cost-benefit analysis.

Since the 1980s, a series of studies was conducted that established the desirability of a consolidated railway. In general, the project did not face much opposition, because the rail traffic situation in the Southern California region was notoriously bad: long cargo trains from three different rail carriers slowly went from the ports to L.A. On their way, they would block countless streets, worsening already horrendous traffic jams. With port activity projected to grow even more, the Southern Californian Association of Governments (SCAG), the local Metropolitan Planning Organization (MPO), took the initiative to propose a solution.

At the beginning of the 1980s, SCAG created a Port Advisory Committee (PAC) to address the growing rail-freight traffic problem. The board was composed of a broad range of local elected officials, port representatives, engineers, trucking companies, the

several private railroads that served the area, and the Los Angeles County Transportation Commission. PAC sponsored two highway and rail technical studies. The 1982 highway findings were actually constructed with the help of a federal grant.

The 1984 Rail Access Study dealt with the projected increase in train traffic demand over the coming decades and, specifically, its impact on the surrounding communities. The proposed rail project at that point was budgeted for \$220 million (in 1983 dollars) for surface-grade tracks. The first study already suggested the consolidation of different lines into one corridor and the creation of a task force to analyze the legal, financial, design and environmental implications (Erie, 2004, p. 150f).

SCAG proposed an Alameda Corridor Task Force (ACTF) to address these railway concerns. ACTF was implemented in 1985 and included a similar set of stakeholders as PAC and additionally included the cities along the proposed corridor. ACTF consisted of one commissioner from each of the ports, one each from the Cities of Long Beach and Los Angeles (city council representation), one each from the L.A. County Board of Supervisors and the Los Angeles County Transportation Commission, a non-voting member from SCAG itself, a voting member from Caltrans, and a voting member from each of the six small cities along the Corridor. Joan Milke Flores, councilwoman from L.A.'s 15th District, chaired ACTF for four and a half years. In the meantime, PAC worked on the institutional arrangements (Agarwal et al., 2004, p. 7ff).

In April 1988, a long-term freight and traffic study commissioned by the ports projected massive freight growth by the year 2020. The purpose of the study was to determine the steps to be taken and the amount of capital investment needed to stay competitive with other West Coast ports. While most of the studies were directed at on-port facilities, the ports commissioned a study to solve the problem of long-haul freight trains that would

have enough potential to further distribute the freight. They hired Transportation Marketing Services to determine the preferred routes and important operating and engineering issues (ACTA, 2013, p. 28f). In November 1988, the study concluded with the recommendation of a single rail right-of-way.

A "newly built grade-separated rail line, completely rebuilt to handle high volumes of train movements, would be cheaper than the sum of individual capacity expansion projects that would have to be undertaken by the individual railroads along with the multiple grade separations that continued use of the other rail lines would require. Of the choices, one alignment appeared to contain sufficient land and to lie largely in industrial territory: a line along Alameda Street known by its owner, the Southern Pacific, as the San Pedro Branch" (1988 study, p. 21).

Among other recommendations, the study outlined several ownership structures for the corridor: 1) ownership could remain with the current owners; 2) a jointly-owned company might be developed, with ownership vested in the three railroads at an agreed percentage; or 3) an independent organization might be formed that would acquire the property rights – the solution that was eventually picked. Regarding the organizational structure, the study presented the following three alternatives: 1) the establishment of an independent operating authority under the auspices of the ports; 2) the creation of an operating entity jointly owned by the railroads with equal shares; and 3) retention of existing ownership, having the individual railroads grant reciprocal trackage rights to each other.

The study further recommended evaluating a 2.5-mile below-ground segment through Compton. However, it was "generally believed that such an undertaking would be politically challenging and prohibitively expensive, given the number of communities

along the corridor who might also want the line below ground in their city" (ACTA, 2013, p. 27). Subsequently, several at grade/combined bridge options were considered.

In the Environmental Impact Statements and reports the rail corridor was projected to cost \$2.4 billion, a number which, in the end, the project did not exceed. Further, the actual design does not differ from the initial design as laid out in the EIR of January 1993 and the EIS of February 1996. Both reports define the main outline of the project. Depressing the largest part of the Corridor below surface level was among several conceptual engineering alternatives considered, already circulated in the EIR, and identified in the Final EIR/EIS as the preferred alternative of the cities. Other possibilities considered were trainway, roadway or other grade separation alternatives, or a combination of these elements. All alternatives were rejected, in large part because they would affect a larger population along the route (FEIS, 1996). There were only minor deviations from the EIS, which included a variety of additional improvements along Alameda Street and some specific additions to public space, as separately negotiated with the cities, further discussed below. Traffic forecasts played a crucial role, as the project is funded by revenue bonds. Both the EIR and the EIS expected increases in freight volume due to port growth (FEIS, 1996).

In sum, the decision to build the Corridor was supported by a range of traffic forecast studies. No cost-benefit analysis, however, was conducted to compare the project's costs and benefits with alternatives or a "no-build" option.

6.3. The Politics of Decision-Making

In the previous sections I situated the project decision process within the larger context and political climate of the time, and described the project studies that were conducted. Now the most frustrating part, crucial for the project, were the negotiations with the railroads for the rights-of-way, which had to be secured before any other project

decisions could be made. The ports paid the sum of \$394 million to obtain the rights-ofway from the hard-bargaining railroads, which initially refused to cooperate. After this was settled, the next problems occurred on the ACTA Board, where not everybody was pulling in the same direction, with looming consequences for the requested federal funding. In the remainder of the chapter I will describe in more detail the actors, their rationales and their interactions as they participated in and shaped the decision process.

6.3.1. Negotiations With the Railroads

Three private railroad companies, Southern Pacific Railroad, Santa Fe and Union Pacific served the Southern Californian area since the 19th century. On their old rights-of-way, laid out for the requirements of that time, long freight trains were slowly moving to their destination, clogging the now extensive road network at 200 at-grade crossings. These three competitors for port access had to be convinced to give up their own tracks in favor of one consolidated freight corridor. Besides the general problem to find the funding for the corridor, these negotiations proved to be a great obstacle.

The railroads were concerned about their loss of value on the properties, their loss of exclusivity, and the associated loss of competitive edge. Therefore, they demanded high prices. To resolve the freight traffic bottleneck, the ports agreed that they should put up the money for the railroad rights-of-way and started to negotiate with them in 1992. The mayors of L.A. and Long Beach and several advisors facilitated the negotiations, but the ACTA board itself was not part of it.

The negotiations were fierce. A transcript of a 1993 Joint Hearing by the Assembly Select Committees on the Alameda Corridor Project and on California Ports reveals the frustrations felt by all the relevant California representatives and agencies. Co-chaired by assembly members Martha M. Escutia and Betty Karnette, the hearing established

several problems with the right-of-way purchases: at that stage in the negotiations, no public information concerning the prices was available, only rumors of substantial demands. Further, there appeared to be no established procedures for property appraisals and criteria, nor any acknowledged precedents by the railroad spokespersons (in this case: Robert Starzel of the Southern Pacific Railroad). There also was a degree of incredulousness about the fact that the railroads had been, at the time of their founding, given the land and rights-of-way for free (testimony of Daniel Fessler, the President of the California Public Utilities Commission), and that they now demanded large sums of money to transfer them (Escutia and Karnette, 1993).

In fact, the railroads needed the project. They were motivated by the prospects of rail track improvements in the future – like grade separations at Redondo Junction, which would eliminate conflicts between passenger and freight trains. It helped that the charges were implemented uniformly for all rail companies, so that they could likely be included in the cost of the goods and products shipped. Originally, they had not been willing to put any money into the project (Interview #13, 2008). In particular, the idea of future user fees prolonged the negotiations. The Southern Pacific Railroad was especially reluctant, as it had the strongest competitive edge among the three rail operators and was using the corridor that would become the joint right-of-way (Starzel at the Public Hearing, Escutia and Karnette, 1993).

When the negotiations failed, politics took over. In 1993, Assembly Member Juanita MacDonald introduced a bill that would grant the California Department of Transportation "the right to condemn the railroad property should negotiations fail" (ACTA, 2013, p. 49, Escutia and Karnette, 1993). One of the proposed options, should negotiations fail, was to implement new state legislation establishing the right to exercise the state's eminent domain power (e.g. pp. 21, 56, 93). A bill to that effect was actually

passed by the state legislature in August 1993. The bill authorized the State Department of Transportation to exercise the right of eminent domain over property owned by "a railroad corporation" upon request of ACTA, if "necessary, incidental, or convenient for the construction of the Alameda Corridor project" (AB 871, 8/93). Pressure on the railroads increased. However, the substantial cash benefits emerging from the immediate sale of the railroad rights-of-way to the ports finally convinced them (Interview #13, 2008).





Source: http://www.bizjournals.com/twincities/morning_roundup/2013/02/snapshot-feb-25.html

The original deal with Southern Pacific was set at \$260 million and was approved by both harbor commissions but was annulled a short time after the port commissioners had approved it by the new mayor of Los Angeles. The prior mayor, Democrat Tom Bradley, had presided over the negotiations, but the incoming mayor, Republican Richard Riordan, cancelled the proposed agreement because it was "expensive and incomplete" (ACTA, 2013, p. 50). In the next round of negotiations, the right-of-way costs were negotiated together with the future user fees the railroads would have to pay, and which would be funded by bonds. The railroads entered an unprecedented "Memorandum of Understanding for Joint Use and Operations Agreements" that was 60 pages long and included the railroad companies' use of the corridor as well as their payment of user fees.⁵² However, it would take another four years until the details were hammered out and memorialized in a final agreement (Hahn, 2002, ACTA, 2013, p. 54). Although the ports had initially resisted calls for them to pay for the rights-of-way, the final deal resulted in the ports' paying \$394 million to the railroad companies.

The ACTA remained responsible for securing funding. The Memoranda of Understanding with the railroads and ports, based on various freight projection studies, established user fees as a source of revenue for the future bond repayments. In return for the port's contribution to secure the rights-of-way, the understanding held that the railroads would pay for user fees. This financial base made it possible to support the project's revenue bond obligations of more than \$1.1 billion and also served to underwrite repayment of the DOT loan, thus contributing 65 percent of the \$2.4 billion project budget (Agarwal et al, 2004).

⁵² Railroad use fees and container charges were calculated as follows: for each loaded 20-foot equivalent unit the railroads would initially pay a fee of \$15 (and \$4 for each empty container; \$8 for other types of loaded rail cars), with increases of between 1.5 percent and 4.5 percent per year (depending on inflation) over a 60 year period. Effective January 1, 2010, the fees are \$19.60, \$4.96 and \$9.92, respectively (ACTA 2010).

Paying the railroads was quite controversial. In a *Los Angeles Times* article entitled "A Robbery from Downtown to the Sea," Jerry Epstein, a member of the California Transportation Commission, questioned the rationale of paying \$200 million more to the Southern Pacific Railroad than the State Board of Equalization's valuation of the property. Epstein wrote: "If consummated, Southern Pacific Railroad will have received approximately \$945 million – almost \$1 billion—in public funds in the past three years for rights-of-way that Southern Pacific will continue to use after billions more of public funds are spent to finance improvements to the lines. California's other railroads also have profited from similar public largess, even when the railroads were granted the rights-of-way for free more than a century ago" (Epstein, *Los Angeles Times*, 1993).

6.3.2. Politics on the ACTA Board

The Alameda Corridor Task Force formed a Joint Powers Authority, because a variety of government agencies and boundary crossings were involved in the project, and SCAG, the regional planning agency, was legally excluded to take on that role (ACTA, 2013, p. 29f). The Joint Powers Authority (JPA) agreement that formalized cooperation of the cities, the ports and all other actors, including the cities along the corridor, on implementation of the corridor, was signed on August 30, 1989. The JPA (or, rather, the "Consolidated Transportation Corridor Joint Powers Authority" (CTCJPA)), changed its name into the less confusing acronym ACTA in October 1990. ACTA held design and implementation authority over the corridor.

The JPA's broad responsibilities were: the development of a comprehensive plan and implementation schedule for a consolidated corridor; handling the financing, land and right-of-way issues; and potentially managing construction, maintenance and operations (ACTA, 2013, p. 33). Upon execution of the final agreement, the ACTF was disbanded and some of its managers went to other positions. This is also when the first political

differences with the corridor cities, which wanted greater representation on the JPA, arose.

6.3.3. The Corridor Cities

Alameda Corridor runs through the cities of Long Beach, Carson, Compton, Lynwood, South Gate, Huntington Park, Vernon and Los Angeles. The political clout of some of these (very poor) communities was not as big as that of the port cities or Los Angeles. The communities were uncomfortable with a train running through their neighborhoods and questioned their share of the project's costs and benefits. They would have to bear construction noise and disruption, air and noise pollution, increased truck traffic alongside the corridor, and potentially hazardous freight coming through, which led to severe conflicts.

The cities had been represented in the project on the Alameda Corridor Task Force, the JPA and now on the ACTA. According to the ACTA (2013), there was some negotiation around the representation on the JPA board. ACTF, which created the JPA, suggested that only (financial) stakeholders should be represented on this board. This would include Los Angeles and Long Beach but not the inland corridor cities. After protests by the latter, they were offered one (consolidated) vote on the board (for all six corridor cities), which they opposed on the ground that one vote would not adequately reflect the diverse needs of the different cities. They nearly had to acquiesce, but the ACTF chair Joan Milke Flores took their side and negotiated a voting representation for all six. She says: "I could identify with them. [...] My (council) district with its discrete, identifiable areas had the feel of several little cities within it." Eventually, the ports relented (ACTA, 2013, p. 30ff). So for a number of years, the corridor cities were voting members on the ACTA board.

For the corridor cities, the megaproject, though beneficial for the region, was most invasive, because it cut through residential neighborhoods. The main achievement of the corridor cities was securing the long mid-trench stretch of the Corridor. The initial project proposal envisioned tracks at surface grade the entire length of the Corridor, and the ports resisted the idea of a trench because of increased cost. It became obvious very soon (in 1989) that the corridor cities would use their voting power on the board if the increased train traffic would run through their communities at surface grade. So, moving forward, the ACTA agreed to an open-air trench, which added an estimated \$700 million to project costs. According to the ACTA (2013, p. 36), it was Huntington Park mayor Tom Jackson, later the ATCA chair, who fought relentlessly for the below-grade option. **Image 6: Alameda Corridor: From the Ports to Downtown L.A.**



Source: http://www.khurramhashmi.org/crbasic_info/images/14.jpg

Some actually argued that a trench could lower costs, given the overpasses that would have to be built for automobile traffic to cross tracks at surface grade. The below-grade option was analyzed in the DEIS and FEIS and declared the preferred option, because the corridor cities would not have supported the document otherwise. The ports, since they were already spending so much money on railroad properties, agreed to the trench option if it were funded by other sources (ACTA, 2013, p. 42).

The problems on the board increased, however, with the ACTA arguing that the corridor cities were posing too many demands. From the ACTA's perspective, the corridor cities tried to "milk" the project for financial support, economic development and ongoing compensation. Job training and local labor turned the project into one of the most significant public-works projects in the United States. For instance, local workers accounted for thirty percent of the hours worked on the trench (Interview #16, 2009). The general perspective on the ACTA governing board was that the ACTA had made substantial investments already – e.g. by agreeing to the mid-Corridor trench at enormous expense. The ACTA insisted the project was not an economic development project. As Interviewee #10 (2009) argued, it was important to keep the job training and employment programs in perspective, avoiding the situation (which occurred with the Big Dig) of permitting local employment to become the main focus of the project.

At first, the ACTA amended the joint powers agreement and introduced a clause that held that only financial stakeholders could vote on decisions concerning project finances. All fourteen voting members on the board approved the amendment (including the corridor cities' representatives), possibly because they did not understand what they were doing (Erie, 2001). The corridor cities came to regret this decision. When they discovered they no longer had direct leverage, they tried to gain influence over projectrelated decisions in other ways.

When they resorted to legal action, the situation further deteriorated. In 1996, the court ruled against them, holding that the ACTA and the financial stakeholders could structure their decision-making processes "any way they like." This led to the removal of the six corridor cities from the governing board (ACTA, 2013, p. Ch. 4&5). The remaining parties on the board all had some kind of financial stake in the project and thus had an interest in quick decisions.

The corridor cities continued to possess political leverage through (potentially) causing construction and permit delays, complaints to their Congressional representatives, and lawsuits.

First, the cities were in control of the crucial local permitting process, which could potentially be used to delay construction and project implementation (Erie, 2004, p. 161). Second, some corridor cities filed a series of lawsuits over the course of several years pertaining to a variety of issues, among them suits seeking reinstatement on the board under the terms of the original JPA or attempting to block a terminal expansion project on the waterfront in 1994. (In an angry response, the City of Long Beach initially announced it would withdraw from the ACTA) (ACTA, 2013, Ch. 5). Both options carried several problems: first, they threatened bond funding, as the time-sensitive revenue bonds relied on the timeliness of project approval. Second, the cities directly threatened to withhold approval of important project documentation, like the EIS. Third, discord with the cities might threaten the united front that the ACTA touted when lobbying for financial support for the project in Washington.

Third, the corridor cities, according to the ACTA, negatively influenced their Congressional representatives:

"On the political front, while ACTA was trying to convince Secretary of Transportation Frederico Pena that the project should receive federal funding, in part, because it enjoyed the support of local governments, the small cities were reporting just the opposite to their state and congressional representatives. Community support for the project was essential. Competition for federal dollars was keen and many other competing projects had strong, united, broad-based community support. The small cities' political strategy of blocking project funding, therefore, threatened to derail the project" (ACTA, 2013, p 57f).

So it became necessary for the ACTA to negotiate individual agreements with the small cities to ensure the fast forward momentum of the project and to create the united regional front that would help obtain federal funding (described below). Individual "settlement agreements" allocated a total sum of \$12 million to the cities for mitigation of construction activities, agreements to not challenge the EIS/EIR, and for Memoranda of Understanding that eliminated uncertainties like permit licenses (Hicks 2008).

(I have several times (over the course of 3 years) attempted to reach representatives from some of the corridor cities, but they have either been out of office for too long, or even imprisoned, as I learned by calling the official numbers) (local administrators, and Interviewees H and K).

6.3.4. Other Political Struggles: Putting Together the Funding

The costs of the project were a concern, and piecing together project funding became a political masterpiece. When project planning began in 1989, the project was thought to cost \$400 million. Although the ACTA struggled to keep project costs under \$2 billion (Interview #13, 2008), by the time of final budget approval costs were projected at \$2.4 billion – which the actual project costs did not exceed. About \$700 million of this

increase was attributable to the decision to build the project below ground, as preferred by the communities it passes through. Another reason for the increase was that the ACTA originally did not know how much money would be needed to secure the rights-ofway from the railroads until the final route was defined in the EIS/EIR.

Since the ports are municipally regulated in Southern California, their problems and needs must be met locally. By this point, they had already paid the \$394 million right-ofway costs to the railroads (which in the end constituted 14 percent of the entire sum). But most of the money still needed to be found. The ACTA had looked into different ways to finance the Corridor and finally put together an elaborate financing scheme.

The contractual arrangement helped establish trust in the revenue-based financial model for all parties involved. A special section in the Los Angeles City Charter provided the ACTA with the legal authority to proceed with a design-build (DB) procurement, which treats two project stages simultaneously. The DB contract enabled the ACTA to shift the risk of liquidated damages to the contractor, if the project was not completed on time. Thus, it produced strong incentives to complete the work on time, which was necessary because the financial model was based on future revenue streams. The incentives worked, and the contractor delivered the project seven days ahead of schedule (Hicks, 2008). The financing structure (revenue-dependent) disciplined both the project time and budget, making it easier for other parties to approve of the project, because financial risks were minimized. Further, a certain degree of flexibility was also built in because of a \$200 million contingency fund, which eventually became available to spend on additional small projects related to the corridor (Interview #9, 2009).

6.3.5. Obtaining the Federal Loan

The federal portion of the money (\$11 million in 1982, \$42 million in 1987) had been earmarked a long time before but had never been used, because the state and local matching funds were not available. In an effort at fiscal house-keeping, Congress threatened to remove the earmarked allocations, a move that the ACTA had not expected. After failed attempts to secure some state funding for the project and declined federal allocations, the ACTA had to change its strategy.

The enormous dimensions of the project and the absence of freight transportation structures made it difficult for the ACTA to obtain funding from traditional sources (FHWA, 1999). The ACTA decided to apply for federal funding, requiring an environmental analysis under the National Environmental Policy Act (NEPA) of 1970, and applied for a \$700 million federal grant from the Surface Transportation Subcommittee of the House of Representatives in 1994. One of the strategies to obtain federal support was to provide a unique regional front in favor of the project. The corridor cities' opposition and lawsuits did not help that cause, setting incentives for the ACTA to placate them with financial support, employment programs and lowering the tracks below grade, as described above. The ACTA was successful: in the words of Assemblywoman Escuria, vis-à-vis the federal government, everybody involved presented a united front when lobbying for federal support like "one big, happy dysfunctional family" (cited by Erie, 2004, p. 155).

Another lobbying strategy was emphasizing the project's global and national importance. For instance, with regard to economic issues, the ACTA commissioned an economic study that characterized Alameda Corridor's potential economic impact and trade and transportation benefits for each Congressional district (all 435), giving each member of Congress reason to support the project (Interview #13, 2009, ACTA, 2013, p. 69f).

As a consequence, the ACTA was able to establish strong bi-partisan support among Senators and House members. Among the supporters for the high-priority designation were Republican Congressmen Steve Horn and David Dreier and California Governor Pete Wilson. California was well-represented on transportation-related Congressional committees: there were eight California members on the House Public Works and Transportation Committee, Senator Barbara Boxer sat on the Senate Environment and Public Works Committee, and Senator Diane Feinstein sat on the Senate Appropriations Committee. Both Democratic senators (especially Boxer) were crucial in promoting key legislative provisions, particularly opening the federal highway program and National Highway System Designation Act up to the support of a freight rail corridor (Interview #7, 2013).

But still, securing funding was a tall order, and few believed funding would be secured (Buntin, Los Angeles Times, March 16, 1994). Because of the budget crises and the federal government's concern that the railroads would be unnecessarily subsidized by a grant (Interviewee #9), the support waned. A crucial change came about in 1995, when the Alameda Corridor project was elevated by Congress to a project of national significance – designated as "high priority corridor." The argument was that the cargo bottleneck became a national security problem when a tremendous amount of material had to be transported through the ports during the first Gulf War in 1990-91.

Reportedly, a then-staff member in Mayor Riordan 's office first brought up the idea for a federal loan rather than a grant (Erie, 2004, p. 263). The project's status as a "high priority corridor" provided the legal authority for the U.S. Secretary of Transportation to structure a loan (ACTA, 2013, p. 74). The loan was confirmed by the federal DOT and ACTA in 1997. The resulting funding scheme was so successful that the loan became the model for the federal TIFIA loans.

The White House under President Bill Clinton was also crucial for forging a successful federal loan agreement, due to strong California connections. Clinton proposed and promoted a very important \$59 million federal appropriation that was needed to back up the \$400 million DOT loan over three years, and Congress eventually approved it. As a final obstacle, the opposition of Republican Congressman Frank Wolf (Virginia) had to be overcome. His opposition was based on the transportation earmark the federal appropriation held (he generally opposed earmarking), his wariness of public-works projects going wrong (like the Big Dig debacle), and a disagreement with L.A. Mayor Richard Riordan "over the use of airport revenues to supplement police and fire department budgets." This set in motion a series of phone calls among Congressional representatives, the governor and House Speaker Newt Gingrich. In June 1996, the Governor was able to issue a press release announcing the federal loan (ACTA, 2013, p. 74ff).

The White House held a specific signing ceremony for the loan. As the *Los Angeles Times* suggested, both political parties were eager to please the "vote-rich" California area with favors and "pork barrel" spending in order to attract votes for the 1998 presidential elections (Leeds and Borneman, L.A. Times, 1997). Then, in 1999, the ACTA secured the remainder of the funding with revenue bonds.

6.4. Conclusion

The Alameda Corridor was completed in 2004 at an on-budget cost of \$2.4 billion. Revenue service began immediately. Until about 2009, payments on bonds were on schedule, but the ACTA fell behind because the recession decreased the amount of cargo coming through the ports (ACTA website).

With respect to the decision-making stages described in Chapter 3, the process went as follows: The problem of disastrous traffic situation by the 1980s was impossible to

ignore. A range of studies projected the situation would only worsen, and follow-up studies determined a freight rail corridor to be the only viable option. The only choices involved were the route and whether to build it at or below grade. In order to remain competitive on the regional and global markets, the ports of Los Angeles and Long Beach, backed by relevant local agencies and politicians, decided to address the problem. They put it on the regional agenda by establishing a joint powers authority that went looking for solutions and funding. Establishing the implementing authority, which then took up design and the search for funding, implied project approval by the ports, cities and regional agencies. Another source of project approval was implied by the federal designation of the project as a project of "national significance," and subsequent funding. Project approval was wrung from the opposing cities along the corridor with a combination of legal means and economic incentives.

With respect to the hypotheses:

Macro-level government arrangements matter for transportation decision-making because they organize the political arenas and institutions. Infrastructure governance is dependent on these structures, and permeated by the dynamics and values of fragmentation, devolution and privatization.

Similar to the Second Avenue Subway case study, the macro-level structures mainly come in through the nature of federalist systems to delegate infrastructure investment decisions to the state and local levels. In this case, no federal funding precedence was available, and the ACTA successfully carved out a mold to obtain funding from the federal government.

On the other hand, a second aspect of federal influence on project decisions concerns the requirement to document project decisions: one of the interviewees (#9, 2013) remarked that the corridor would not have been successfully implemented in today's era of environmental awareness. Instead, environmental activists and groups would have sued.

The ACTA did fulfill the then-new federal EIS procedures, because they aimed to get federal funding. Further, with an eye on Boston's disastrous Big Dig, ACTA planners and engineers early on integrated the Native American community in order to be able to quickly and adequately deal with old gravesites upon their discovery, which was assumed to be a near-certainty.

Lobbying for the federal loan involved further project politics. It helped that California's Congressional delegation was well represented in transportation-relevant committees, and they all lobbied for the project. The nature of the U.S. congressional system, with its multiple committees, but especially its unique power to actually *draft* bills (and not just vote on them), made it easier for Alameda Corridor proponents to be heard in multiple committees. I assume it facilitated legislation because the already numerous supporters received more widespread consideration. It was a hard but crucial piece of lobbying and strategic effort to secure full Congressional support by presenting material that demonstrated how freight movement to and from the relevant ports affected every Congressional district throughout the country. Further, the federal decision to reject the grant application and extend a loan instead speaks to the uncertain nature of the railroad deal and is testimony to the ongoing delegation of transportation decisions to localities.

Physical attributes like project modes, types and location determine which actors are involved in project decisions.

Because the corridor runs through multiple, horizontally organized (in terms of formal political power) jurisdictions *and* its proponents made the case for the corridor as a project of national significance, the project had to integrate and receive support from a complex political network of stakeholders beyond the metropolitan area at all levels.

The project type, freight rail, influenced the political decision-making process by its lack of formal procedural decision rules: in recent history there were no such projects built. Hence, project proponents had to structure the organizational setting themselves and set up a single-purpose authority.

Transportation authorities serve as the hinge between the general political and societal context and the projects themselves and thus channel national, regional or local politics. Depending on their degree of autonomy, they are often the driving force behind project decisions.

The negotiations with the railroads were a politically delicate endeavor because so much public (port) money went to private railroad corporations (with the stipulation they would pay user fees for the corridor later) that had received their land for free from the public, along with a variety of other public support. Their demands for several hundred millions of dollars seemed excessive to those participating and interested in the decisions. The tension between the public interest (politics) and these private corporations went so far as to provoke new legislation that would have allowed the ACTA to seize the rail properties if no agreement had been reached.

A general pro-business climate furthered this project. The pro-business climate arose from the forces of globalization that entered the two ports in a regional competition for global trade shares. Expected growth projections accelerated the need for better freight distribution in the region. At the same time, the powerful L.A. mayor Riordan, a former business entrepreneur, and his administration were known as business- and development-oriented. Their support was necessary, because, traditionally, Los Angeles exercises strong control over its port. Although the poor communities along the Corridor welcomed the economic opportunities, they might not have chosen these opportunities over their undisrupted neighborhoods, but their veto power was muted.

Job training and employment programs, at least in the United States, became an important element in negotiating the implementation of megaprojects (e.g. Big Dig, AirTrain JFK). Structuring project construction in part as a public-works project appears
to consolidate political support for projects, especially among constituencies with NIMBY concerns.

A variety of political, economic and social interests drive transportation investment decisions, and their respective impacts are dependent on institutional arrangements and financial means.

Because freight rail corridors did not have established decision structures, stakeholders had to create new organizational forms and funding sources. The ACTA, the main organizational agency, was uniquely structured, because it was established by and included relevant decision-makers, including competitors and opposition. The ACTA still exists, and, in addition to managing the Alameda Corridor, it extended its responsibilities to other projects.

The politics of infrastructure investment decisions is the art of directing funding streams. The ACTA was able to secure funding because it secured a strong group of project supporters in Congress, thus turning the project decision over to the legislature. Negotiating with the corridor cities on and off the board, which allowed the construction of a unified front of project support, was a second mechanism to secure funding. A third mechanism – the nature of the DB contract – was not a stroke of political craft but, rather, a deft managerial move, which built trust in a revenue-based project.

Conclusions

Infrastructure investment decisions were always crucial, but the effects of increasing populations, climate change and international and regional conflicts increase the importance of careful consideration of project alternatives. The accelerating technological progress of the past one and a half centuries, and particularly the last few decades, increased the number of potential transport options. Newer, smarter and more sustainable ways to implement infrastructure are available and necessary. One of the important questions for our time is how projects get selected. I showed that cost-benefit analyses were conducted for only half of the projects in the database, which indicates that various agendas other than transport-economic objectives –politics— account for project selection criteria. Politics can be both supportive and detrimental to the new infrastructure challenges. This dissertation illuminated how murky and contested the decision-making processes are. Informed by the hypotheses, I will present the main findings of the dissertation in turn, then discuss some of their major implications, and provide an outlook for future research. I will draw on the quantitative and case study findings, where appropriate.

1. Any infrastructure investment project is a product of its time. Besides technological advances that open new possibilities, notions of modernity and progress influence infrastructure. In the dissertation they were part of the project "context." For decades, the pro-highway bias in the U.S. hampered the Second Avenue Subway implementation (and then financial constraints). Major events, like the catastrophe of September 11, 2001, which might have opened up national sympathies for large urban areas and their disparate infrastructure security burdens, impact project decisions as well. The decision to build Alameda Corridor was facilitated by declaring it a project of

national significance with respect to national security implications. Further, heightened environmental awareness and documentation requirements might make building Alameda Corridor impossible today, just a few years later.

2. Transportation investment decisions most frequently are funding

decisions. The U.S. does not formally stipulate funding for subways or a project like Alameda Corridor. Instead, federal grants are subject to funding competitions. Both case studies succeeded in getting partial federal financial support. Still, a majority of funding needs to be secured locally. Because a lot of money is at stake and everybody wants a piece, funding competitions are fierce.

3. The dwindling role of national governments across the globe in favor of local decision-making shifts project and funding decisions to the local level.

The database indicates a general proliferation of funding sources for transportation investment projects over the past decades. Though national governments still provide a large share of infrastructure investment funding (in federal and centralized systems alike, although the most in Europe), their share decreased over the past few decades, while that of local funding sources increased. The case studies show, however, that despite both projects being deeply local projects, national-level institutions are routinely involved in project decisions. Initially not involved in the decision-making, Congress became crucial though when ACTA went lobbying them for money. And federal funding stipulated the building of the Second Avenue Subway in phases, as opposed to a complete project.

4. Creating broad pro-project coalitions is crucial. Each transportation megaproject is composed of different sets of support and opposition groups. Agency fragmentation and privatization trends further contribute to more complicated decision and funding schemes.

Changing dynamics that affect the macro level governance arrangements, such as decentralization and fragmentation, strengthen project complexities and thus the

pressure to compromise. Support coalitions become increasingly complicated, as local, urban, regional, state and national departments, agencies, institutions, interest and lobby groups or organizations compete with each other for influence. In recent decades environmental and transportation lobbying activists have joined them, while a push for security measures became an ever-stronger concern, too. The data analysis confirms the increasingly complexity of funding sources for projects.

The composition of actors may vary by project type also. In the U.S., decision-makers are organized by project mode: investment decisions for highways take place in the highway administrations on the federal, state or local level, while investment decisions for rail within the railroad administration. Here the politics of subways is different than the politics of highways because of different institutions, decision-making structures, physical implications in dense urban spaces, and because of different support and opposition coalitions.

Further, certain types of macro-political arrangements actually increase the numbers of actors. The data shows that the number of potential project veto points in federalist governments exceeds those of their centralized counterparts. The state agency MTA, or more specifically, the Transit Authority, was a main driving force behind the Second Avenue Subway project. The MTA answers to the governor and the state legislature (in capital decisions). Thus the city subway became a project of statewide relevance. Actual final approval of the project came from the state level and implied approval from the national government, when the Subway won the grant competition. A metropolitan planning advocacy group, and statewide transportation alliance sufficiently backed the project by lobbying for a 2005 Bond Issue Act that provided crucial seed funding for the subway. Altogether, the stakeholder coalition included 37 regional groups, ranging from transit enthusiasts over research centers to industry, like Parsons-Brinckerhoff, business

associations and unions. The Upper East Side, industry and construction workers got a new subway, the utility of which will be improved when extended further.

The Alameda Corridor was supported by a broad social and political coalition that sought to improve traffic conditions in the metropolitan area. Further, the project benefited from a climate of local and national economic competitiveness that restructured the entire region to fit globalization demands, e.g. gaining a larger share of the global freight traffic (Erie, 2004). On the other hand, some of the actors required "convincing." The consent of the private railways, accompanied by some outside protest, was literally bought: Political pressure was exercised on the three private railroad companies to give up their individual right-of-ways to share one track. That strikes me as a strong instance of politics in transportation decisions. The poor cities along the Corridor were initially concerned about the "concentrated costs and dispersed benefits" of the project (Erie, 2004, p. 158) and thus lost their voting position on the ACTA board in the process. They gained job programs and local projects, especially when their support was needed to present a unified front in Washington to obtain federal funding.

Transportation agencies change only slowly, and they reflect the structures that created them. They are not very flexible because they are in a double bind: they reflect and depend on the structures that created them, and they develop own agendas and institutional inflexibilities over time.

It was the MTA/TA that kickstarted the Second Avenue Subway – a project on the agenda for nearly a century, and throughout changing transportation needs in the area.

^{5.} The nature of transportation agencies matters. Depending on the type (line agencies, special purpose agencies, or single purpose agencies) transportation agencies either contain the inbuilt conflicts of their creators, or they already embody consent for a project. This yields strong impacts on project decision and implementation processes. On the other hand, transportation agencies may act as a potential shield from politics, with the ability to hold and maintain items on a long-term agenda.

The project idea only really took off once the agency was in place. Most importantly, the agency put the project on the relevant decision board in Albany. The TA made the decision to build the project, twice, and in tandem with its support coalitions funding was eventually secured (for the first phase). ACTA, on the other hand, was specifically created to build the Corridor. The agency ensured the project remained on track and, among other things, successfully removed critics from the ACTA board when they delayed project decisions. ACTA was not formally dependent on approval by any higher level institution. Instead, it was able to choose its battles and actively directed a lobby campaign on the federal level for funding.

The nature of the transportation agency determines how the decision process is structured. The Second Avenue Subway project decision process is vertically arranged: the state agency MTA, implementing a local project, requires project approval from state level actors from the legislature and the Governor. ACTA, on the other hand, integrated regional stakeholders whose weight counted equally on the decision board (at least initially). It did not need approvals from higher levels, because it already *embodied* project approval. This reflects the different degrees of autonomy of the implementing authority and thus their necessity to compromise, or their potential for independent decision-making respectively.

6. National governments disproportionately fund projects that have cost overruns and long implementation times.

The database shows that projects underwritten by national funding are less efficient than privately funded ones: they experience longer implementation times and more cost overrun. This finding is particularly relevant as it indicates potential decision rationales: It is possible that the national level takes on more high scale and complex projects that could not be handled by lower levels to begin with. Another explanation might be that nationally funded projects tend to be poorly implemented. Privately funded projects, on the other hand, have shorter completion times. The explanation then might be that the private sector only takes on "simple" projects. In the Alameda Corridor project, the national government was involved in project funding with a loan only – and the project came in on time and without cost overrun. Second Avenue Subway is still under construction at the time of this writing.

7. Generally, national level and grant-funded projects face weaker opposition. Further, opposition and cost overrun are associated.

The data confirms that bond funding raises the likelihood of ("issue-oriented") opposition in general. However, the finding requires further investigation, as the direction of the relationship is not clear. In both case studies, bonds provided a missing piece of funding. Politics come in because bond funding can serve to shift the financial risks of a project away from a dissenting party: In the Second Avenue Subway case the risk remained in parts with the tax payers who approved the Transportation Bond Act after a tough fight. Particularly Alameda Corridor drew opposition, mainly initial resistance from the railroads, and then NIMBY-type opposition from the Corridor Cities. Because of the Corridor Cities' opposition and also because of reservations about "subsidizing" the private railroads, the federal government withdrew its grant earmark (and provided a loan instead). As a consequence the revenue risks remained entirely with the project sponsors responsible for the bonds, overcoming opposition and allowing the project to succeed.

Public grants, on the other hand, are statistically associated with the absence of opposition (and with extended construction times), both in correlations and the regression analyses. The analyses show that project opposition is less likely, particularly when the projects are additions to already existing networks, and not entirely new ones.

The in-depth analysis of the case studies confirms the relationship. Second Avenue Subway –pretty much without any major project opposition— is a network addition with partly national grant funding. Alameda Corridor, on the other hand, (was) entirely new and with a federal loan (and not a grant) and did encounter opposition. The case studies support the statistical findings.

Implications for Infrastructure Investment

New transportation infrastructure investment ideally addresses increasing population, environmental, and security concerns. Solutions include long-term energy saving measures through resilient infrastructure projects that can withstand changing weather conditions and anomalies and introduce or integrate more sustainable ways of transport, and affordable mass transit systems. Questions of context, decision structures, funding schemes and actor coalitions –of politics—become important for addressing these challenges. Political influence determines whether infrastructure investment benefits political constituencies or maybe under- or over-privileged social groups and neighborhoods, or whether it benefits industries and contractors, or whether transportation investment includes environmental goals or not.

Using social and environmentally friendly types of infrastructure investment as a yardstick, the findings in this dissertation highlight the following limitations and opportunities in the politics of transportation decision-making.

First, the diminishing role of national governments in decision-making removes the potential to cut through established local power structures in order to prepare the way for new infrastructure, e.g. environmentally friendly technologies. The role of the national governments –normatively speaking—remains important: in the 1950s the U.S. government implemented the federal highway system, today it could be a national railway system, a central goal of the Obama government.

On the other hand, devolution trend of decision-making power undermines local stakeholder participation, and renders projects more complex. On local and state levels project decisions are often determined by local hierarchies or driven by personal gain. (The national level is not safe from these dynamics, seeing that the California piece of the proposed national highway system is continuously being challenged by Congress Republicans. However, rail investment, an allegedly unprofitable branch of transportation investment, has better chances with national support.) But local level decisions also allow for creating innovative resilient infrastructure projects through stakeholder engagement that reflects the very specific needs on a neighborhood or region.

Second –and related to the first point—that project decisions were frequently funding decisions makes innovative projects dependent on old and new funding sources, and not on the merits of transportation utility, social justice or environmental friendliness. It is potentially more difficult for local projects to secure funding sources for innovative experiments, especially with respect to expensive transportation infrastructure.

Third, inflexible political arrangements put comprehensive and innovative planning at risk, especially when separate departments deal with different transportation modes. I discussed that above. However, even though "picket fence federalism" prevails, national funding is associated with less project opposition and some positive success measures. Hence national governments could play a positive role in future infrastructure decisions as well. Thus restructuring national governance arrangements (in the U.S.) to open them for intermodal decisions, which might effectively open transportation options and address investment challenges.

Fourth, depending on the type, transportation agencies could facilitate investment in new technologies, or be a barrier to it. As pointed out, most types of agencies are still dependent on outside approval that first needs to be established and thus enshrine old partisan frictions. Also, research suggests that agencies become less flexible over time. Therefore they might be slow to respond to new challenges. New agencies are more promising tools to address new infrastructure challenges.

Fifth, looking forward and beyond economic rationales, the role of decision criteria like social, security and environmental sustainability goals need to be strengthened in the decision-making process. Many countries have already introduced social and environmental criteria in their decision processes. Sometimes they are included in the cost-benefit analyses, at other times individual studies are required. However, existing partisan politics, power structures and hierarchies that make changes difficult often overcome these criteria. While practitioners critique the required documentation because it is expensive or holds up project implementation, environmental and neighborhood groups often hold that such documentation is ineffective or manipulated. It is up to the national government to emphasize and fund appropriate goals and solutions.

Outlook for Future Research

I suggest the following points to be addressed in future research on transport investment politics:

First, the analysis of the politics of infrastructure investment needs to collect more information on and explain why certain projects did not happen. This is to gauge and evaluate the relative impact of politics in their capacity to block projects. This point is also related to the study of project alternatives, and how they affected decision-making. Second, there is a need to more thoroughly identify new transportation challenges in the light of technological progress and environmental risks. A growing literature is already underway to do so. Henceforth, the attempts to introduce new transportation systems need to be included in the analysis, and where they fail within the old structures of power that might be in place. The study of discarded project alternatives will be useful. Valuable lessons may thus be drawn for the relative impacts of expertise vs. politics.

Multi-methods research should be extended. It is an appropriate approach to questions of political decision-making because it weakens the trade off between depth and breadth. In future research we must expand the range of quantifiable transportation project data, to learn more about political dynamics. Data collection should include, for instance, party constellations and time overrun. Due to the sensitive nature of the data collection because megaproject decision-making is not very transparent by nature, all megaproject research should verify information by at least two sources.

Appendices

APPENDIX A: List of Projects

- 1 Argentine/ Rosario-Victoria Bridge; Nuestra Señora del Rosario (Our Lady of Rosario); Puente Rosario-Victoria
- 2 Australia/ City Link
- 3 Australia/ South West Corridor Railway: Mandurah Line New MetroRail; (Mandurah Line); South West Corridor Railway
- 4 Australia/ Sydney Cross City Tunnel
- 5 Australia/ Sydney Harbour Tunnel
- 6 Canada/ Canada Line
- 7 China (Hong Kong)/ Highspeed Airport Express Line (AEL), excludes Tung Chung
- 8 China (Hong Kong)/ KCRC West Rail (Kowloon-Canton Railway Corporation)
- 9 China (Hong Kong)/ Western Harbour Crossing
- 10 Denmark/ Copenhagen Metro
- 11 Denmark/ Great Belt Fixed Link; Great Belt Fixed Link Rail and Road Project
- 12 Denmark/ Oeresund Link; Øresundsbroen
- 13 France/ Météor; Paris Météor
- 14 France/ Millau Viaduct
- 15 France/ LGV Méditerranée; TGV Med
- 16 France/ LGV Est-Européenne; TGV Est
- 17 France/ TGV Nord; LGV Nord
- 18 Germany/ BAB 20 Motorway; Bundesautobahn 20; German Unity Transport Project 10; Verkehrsproject Deutsche Einheit 10/ VDE10; Baltic Sea Highway; Ostseeautobahn
- 19 Germany/ ICE; Intercity Express (ICE) line Cologne-Rhine/Main; (Neubaustrecke (NBS) Koeln-Rhein-Main)
- 20 Germany/ Tiergartentunnel Tunnel Tiergarten Spreebogen; larger project: transport facilities in the central area (Verkehrsanlagen im zentralen Bereich)
- 21 Greece/ Attiki Odos
- 22 Greece/ Athens Metro; Attiko Metro
- 23 Greece/ Rion Antirion Bridge
- 24 Israel/ Tel Aviv Light Rail
- 25 Italy/ Frejus Road Tunnel
- 26 Japan/ Kyushu Shinkansen
- 27 Japan/ OEDO Line (Loop Section)
- 28 Japan/ Linimo Aichi; Aichi High-Speed Transit Tobu Kyuryo Line
- 29 Japan/ Yamate Tunnel; Metropolitan Expressway Central Circular C2 Shinjuku Route (Shuto Expressway)

- 30 Korea/ KTX-1 Korea Train Express; Gyeongbu High Speed Rail
- 31 Netherlands/ HSL-Zuid; (Hogesnelheidslijn) Zuid
- 32 Netherlands/ RandstadRail
- 33 Netherlands/ Beneluxlijn
- 34 Russia/ Severo-Murskiy Tunnel
- 35 Sweden/ Arlanda Air-Rail Link; Arlandabanan (the Arlanda Rail Link)
- 36 Sweden (and Denmark) Oeresund; Öresundsförbindelsen
- 37 Sweden/ Southern Link; Södra länken
- 38 Thailand/ Bangkok/ Metro Blue Line; Mass Rapid Transit (MRT) system"; officially known as Chaloem Ratchamongkhon (Thai สายเฉลิมรัชมงคล) – "Celebration of Royal Auspice"
- 39 Thailand/ Bangkok/ BTS Skytrain; รถไฟฟ้าบีทีเอส rot fai fa BTS or: "Elevated Train in Commemoration of HM the King's 6th Cycle Birthday (รถไฟฟ้าเฉลิมพระเกียรติ 6 รอบ พระชนมพรรษา)" or Green Line
- 40 United Kingdom/ CTRL; Channel Tunnel Rail Link, CTRL; now High Speed 1
- 41 United Kingdom/ Jubilee Extension; London Underground Jubilee Line Extension (JLE)
- 42 United Kingdom/ M6 Toll Road
- 43 United States/ Second Avenue Subway Phase 1
- 44 United States/ AirTrain JFK
- 45 United States/ Alameda Corridor
- 46 United States/ Big Dig; Central Artery/ Tunnel Project (CA/T); sometimes Central Artery/ Third Tunnel Project
- 47 United States/ Big Dig (Tunnel); Ted Williams Tunnel
- 48 United States/ Big Dig (Road); Big Dig Central Artery
- 49 United States/ Honolulu Rail
- 50 United States/ Denver FasTracks
- 51 United States/ Portland-Milwaukie Light Rail
- 52 USA/ ARC Tunnel
- 53 USA/ Florida High Speed Rail
- 54 Turkey/ Istanbul-Ankara HSR
- 55 Turkey/ Marmaray
- 56 Panama/ Panama Metro
- 57 Israel/ Yitzhak Rabin Trans-Israel Highway 6
- 58 Thailand/ Bangkok/ Elevated Road and Train System
- 59 Germany/ Maglev
- 60 Portugal/ Lisboa-Madrid Highspeed Rail

APPENDIX B List of Variables

Variable	1
Variable Name	Project Name
Variable	2
Variable Name	Country
Description	The political state or nation in which a project is located.
Coding	Coded into digits
Variable Variable Name Description Coding Comments	3 Continent Continent on which the project is located. 1. EU (member states), 2. North America, 3. South America, 4. Asia, 5. Australia Recoded into binaries (not overlapping – only one choice possible)
Variable Variable Name Description Comments	4 National Population Population of a Country (2011) Source: Information from Index Mundi, http://www.indexmundi.com/g/r.aspx?t=0&v=21&l=en, (November 11, 2011; based on CIA world fact book)
Variable	5
Variable Name	GDP PPP per Capita
Description	Purchasing Power Parity, in 2010 US\$
Comments	Source: Google public data, accessed April 29, 2012
Variable	6
Variable Name	GDP per Capita 2010
Description	Gross Domestic Product in 2010 US\$,
Comments	Source: Google public data, accessed April 29, 2012
Variable	7
Variable Name	GDP per Capita 2000
Description	Gross Domestic Product in 2000 US\$
Comments	Source: Google public data, accessed April 29, 2012
Variable	8
Variable Name	GDP per Capita 1990
Description	Gross Domestic Product in 1990 US\$
Comments	Source: Google public data, accessed April 29, 2012
Variable Variable Name Description Coding	9 Political System National level distinction, by country, between unitary System (centralized political system) or federalist system 1. Federal System, 2. Unitary System

Variable Variable Name Description Coding	10 Legislative Structure National level legislative distinction between one and two chamber legislatures 0. Two-chamber systems, 1. One-chamber systems
Variable Variable Name Description	11 Location The type of region spanned by the project. Five categories: Inner-city projects: Projects within the confines of cities or counties (the smallest political unit with transportation agencies). Metropolitan Area projects crossing city or county lines within the larger statistically defined metropolitan areas. Regional Projects serve specific regions, understood as areas with more than one city or metropolitan core. National projects: Projects a) spanning the large areas of a country or b) parts of larger, national infrastructure systems, like France's high-speed rail system. International projects are projects that cross international borders.
Coding	1. Inner-city projects, 2. Metropolitan projects, 3. Regional projects, 4. National projects, 5. International projects
Comments	Recoded into binaries (not overlapping – only one choice possible)
Variable Variable Name Description Coding Comments	 12 Project Type The type of the project refers to the main structure of the project. E.g. highway, rail, bridge or tunnel. 1. Highway, 2. Rail, 3. Tunnel, 4. Other Recoded into binaries (not overlapping – only one choice possible)
Variable Variable Name Description Coding	13 International Border Project crossing international border O. Not crossing international border, 1. Crossing international border
Variable Variable Name Description	14 Physical Dimensions I Project length in kilometers
Variable Variable Name Description	15 Physical Dimensions II Project length in lane or track kilometers.
Variable Variable Name Description	16 Nature of Project Whether the project is publicly funded, or has private funding participation
Coding	O. Purely private or PPP, 1. Purely public
Variable Variable Name	17 Concession Type

Description Comments	Type of concession or contractual arrangement Data uncertain and incomplete
Variable Variable Name Description Coding	 18 Description Distinction whether a project is a new project, including improvements of former transportation options, i.e. Alameda Corridor, AirTrain JFK, Randstadrail, or an additional piece to existing projects (i.e. CTRL, Arlandabanan, Hongkong Airport Expressline) or a piece of a larger megaproject (i.e. tunnel in Big Dig); Additional piece in a larger network (i.e. TGV system, highway system) o. Additional project, 1. New project
Variable Variable Name Description Coding	 19 Project Stimulus Naming the main project stimulus, as far as it could be determined; 1. Public effort (e.g. Part of a larger, long-term development plan) 2. Special interest effort; e.g. International Bank for Construction and Redevelopment for KTX 3. Crises/ opportunities (e.g. system change (i.e. German re-unification); mega-events (Olympics, world fairs) 4. Project history (since the 1920/30S) 5. Addendum to other project (CTRL, Hongkong Express Rail, Arlandabanan)
Comments	Recoded into binaries (multiple choices possible)
Variable Variable Name Description Coding	 20 Project Status This variable informs about the project status with the following five options. 1. Completed (includes those where I just look at first stage, too), 2. Partially completed, 3. Under planning, 4. Under construction, 5. Cancelled
Comments	Not used in the analysis
Variable Variable Name Description	21 Years in Planning Time measured in years from the beginning of planning to the year of inception. >In years
Coding Comments	In years Determining a specific date when project planning has started is difficult because either there is only an idea mentioned, or a project mentioned in a larger development plan, or the available information is not sufficiently specific, or because of different available dates, due to different definitions of what constitutes planning. I chose, wherever possible, that year in which first careful, but specific studies and analyses have been conducted.
Variable	22

Variable Name	Year of Inception
---------------	-------------------

Description Coding	The year of inception is the year the project got formal approval by decision-makers, usually political approval in the form of legislative or other consent, depending on the political system. If the exact year or date could not be determined, or there were multiple occasions fitting that characteristic, either the most likely year considering the history of the project, or the year of construction begin was chosen. In years
Variable Variable Name Description	23 Years to Completion "Year to Completion" describes the time measured in years from the year of inception (project approval) until project completion. Often it varies from the construction time of a project.
Coding Comments	In years Projects in planning or under constructions are counted as missing.
Variable Variable Name Description Coding	 24 DUMMY Years to Completion Dummy variable; measures time from official project approval to opening. In years. 0. Less than 10 years, 1. More than ten years
Variable Variable Name Description Coding Comments	25 Construction Time This variable provides the construction time from begin to end. In years Projects in planning or under constructions got no value.
Variable Variable Name Description Coding Comments	26 Project History Project history from the first project idea to project approval. In years Variable originally provided a summary of the significant events that lead up to approval, construction and completion of the project.
Variable Variable Name Description Comments	27 Project Support A list of project backers and promoters. Reliable information was not found.
Variable Variable Name Description	28 Project Opposition Summary of any major opposition to the project. I created four categories: 1) political opposition (opposition at crucial political decision-making points, like parliament, party issues, international cooperation problems, etc.); 2) Finance/ funding opposition/ neoliberal critique + Competing project alternatives (i.e. transit advocates vs. highway constituencies); 3) Very clear, issue-oriented opposition (environmentalists, NIMBY); 4) No opposition/ no opposition mentioned/ unclear opposition; only post-construction complaints

Coding	1. Political opposition, 2. "Ideological critique", 3. Very clear, issue- oriented opposition, 4. No opposition/ no opposition mentioned/ unclear opposition		
Comments	Recoded into binaries (projects can fall into more than one category)		
Variable Variable Name Description Status/ Comments	 29 Initially Estimated Costs Projected price at the time of project approval. I chose the costs estimated at the time of inception or political approval of the project – or the closest figure I could find to that year, in the currency the project was built in. Many of my cost values are taken from OMEGA Centre research. There were various problems: sometimes there were whole lists of estimated costs available through cost analyses, while for other projects it was difficult to find any reliable cost estimate at all. Cost estimations were also not necessarily provided in a form comparable to the finished project. For example, in some projects the estimated costs referred to a different-sized project than the final one. Wherever possible, in original currency. Variable used to calculate the Cost-Overrun Ratio variables. 		
Variable Variable Name Description Comments	30 Actual Costs Actual price at the time the project opened. If possible, in the original currency.		
Variable Variable Name Description Comments	 31 Capital Costs This figure represents the total costs necessary to bring the project to completion (in \$2010). Wherever possible, I use the currency corresponding to the initially estimated costs. If that was not possible, I used other credible values, mainly in dollar. The main problems with this variable was that different sources might name different project costs, which often reflects different measures of what constituted the specific project, or which connectors were in or excluded from the calculations, without specifying that. 		
Variable Variable Name Description Coding	32 Cost Overrun Ratio I This variable is the cost overrun ratio, <i>not inflation-adjusted</i> . It is calculated by dividing capital costs by the estimated costs. Calculated cost-overrun ratio from the original currency values if possible. Ratio		
Variable Variable Name Description	33 Cost Overrun Ratio IICost Overrun DummyThis variable is the cost overrun ratio, <i>inflation-adjusted</i> , and calculated by dividing capital costs by the estimated costs.0. <0		

Coding	Calculated cost-overrun ratio from the original currency values if possible, and inflation- adjusted. Ratio Dichotomous		
Variable Variable Name Description Coding	34 Costs per Kilometer The price per lane/ track in 2010 U.S.\$ In U.S. Dollar		
Variable Variable Name Description Coding	35 Sources of Funding Origin of financing for the project (in percent of the total) 1. Local, 2. Provincial, 3. State/National Authority, 4. National, 5. International, 6. Private		
Variable Variable Name Description Coding	36 Type of Funding Involved funding types (in percent of total) 1. Grants, 2. Bonds/ Loans, 3. Equity, 4. Government Loans, 5. Other		
Variable Variable Name Description Comments	 37 Financial Data 1. Interest rate on main loan, 2. Main loan period (years), 3. Interest rate on secondary loan, 4. Secondary loan period (years). Currently: data incomplete and quality uncertain. 		
Variable Variable Name Description Comments	38 Planned Level of Utilization Estimated levels of use in terms related to the project, e.g. passengers per hour or vehicles per hour. Variable used for calculation of utilization ratio (Var. 40)		
Variable Variable Name Description Comments	39 Actual Level of Utilization Recorded levels of use in terms related to the project. Variable used for calculation of utilization ratio (Var. 40)		
Variable Variable Name Description Coding	40 Utilization Ratio Actual Level of Utilization/ Planned Level of Utilization Ratio		
Variable Variable Name Description	41 Cost-Benefit Analysis A summary of any official cost benefit analyses done for the	Cost-Benefit Analysis II A summary of any official cost benefit analyses done for the	
Coding	o. Not done (not found or not obviously available)	o. Not done 1. Partial/ possible/ fishy	

Comments	1. Done2. DoneOptimistic counting of the doneLess optimistic countCBAs.2. Done
Variable	42
Variable Name	Year Cost-Benefit Analysis
Description	Year
Coding	Year
Variable	43
Variable Name	CBA Value
Description	Value of Cost-Benefit Analysis
Comments	Information found not sufficiently comparable
Variable	44
Variable Name	Risk Analysis
Description	A summary of any official risk analyses done for the project.
Coding	O. Done, 1. Not done
Comments	Optimistic counting of the done risk analyses.
Variable	45
Variable Name	Year Risk Analysis
Description	Year Risk Analysis was done
Variable	46
Variable Name	Environmental Impact Study
Description	Summary of Environmental Impact Statement, if possible
Coding	0. Not done, 1. Done
Comments	Optimistic counting of the done EIS.
Variable	47
Variable Name	Year Environmental Impact Study
Description	Year of Environmental Impact Statement, if possible
Coding	Year
Variable	48
Variable Name	Economic Development Analysis
Coding	0. Done, 1. Not done
Comments	Unreliable data
Variable	49
Variable Name	Type Economic Development Analysis
Description	Type of Economic Development Analysis
Variable Variable Name Description	50 Project Transparency The variable captures the transparency of decision-making by adding or subtracting the presence and availability of the studies of variables 40, 43, 45, 47. Scale from 0 (not transparent) to 4 (very transparent)
Counts	

Variable Variable Name Description Coding	 51 Stakeholders Major parties who contribute capital costs or at least retain partial ownership 1. Local, 2. State/provincial, 3. Transportation authority, A. National/federal 5. International 6. Private
Comments	(Categories not overlapping)
Variable Variable Name Description Coding Comments	 52 Decision-Makers People or entities involved in decision-making 1. Local, 2. State/provincial, 3. Transportation authority, 4. National/federal, 5. International (Categories not overlapping)
Variable Variable Name Description Coding	53 Funding Sources: Count Count of different funding sources to gauge project complexity Scale from 1 to 7, counts number of funding sources
Variable Variable Name Description Coding	54 Political Type While Variable 12, Project Type, codes projects according to their <i>physical</i> structure, this variable codes them according to their political context and potential support and opposition 1. Highway, 2. Passenger rail, 3. Subway, 4. Other
Variable Variable Name Description Coding	55 Party System Political party organization on the national level 0. Two party system 1. Multiple party system
Variable Variable Name Coding Source	56 National Voting System 1. Proportional, 2. Plurality/ Majority, 3. Mixed http://www.idea.int/esd/world.cfm
Variable Variable Name Description Coding	57 Utilization Ratio Dummy Actual Level of Utilization/ Planned Level of Utilization o. Below projections, 1. On target or above projections
Variable Variable Name Description Coding	 58 Inception Decade Scale variable, capturing project approval years in four decades 1. 1970s 2. 1980s 3. 1990s
Comments	4. 2000s Inception Decade 2 (grouped) → more equal distribution across categories

- 1. Until 1989
- 2. 1990-1994
- 3. 1995-1999
- 4. 2000-present

Variable	59
Variable Name	Anglo-Saxon Countries
Description	Dummy Variable
Coding	o. Non-Anglo-Saxon State, 1. Anglo-Saxon State
Variable	60
Variable Name	Presidential/ Parliamentary Systems
Description	Dummy Variable
Coding	0. Parliamentary, 1. Presidential
Source	http://www.semipresidentialism.com/?cat=56

APPENDIX C

Database Description - International Transportation Megaprojects

This Appendix provides an overview over the database. I will briefly describe the variables and their categories, and add either brief lists of counts, or graphs and figures, as appropriate. Wherever necessary, I also outline the main problems I encountered in the data collection process. The presentation of the findings follows the numbering of the variables. For presentation purposes I grouped the variables into seven subsections: Context variables, project characteristics and costs, timing, funding, studies and actors involved.

1. POLITICAL AND ECONOMIC PROJECT CONTEXT

Country (variable 2) and Continent (v3)

Variables 2 and 3 provide the name of the country and continent where a project is located. As shown in Table 1 I have data on 60 transportation megaprojects, from 5 different continents, and in 21 countries. (Variable 1, "Project Name" will be addressed together with the physical dimensions variable 14 below.)

Table 1: Geographical Distribution ofTransportation Mega-projects			
Continent	# of Projects	# of Countries	
European Union*	28	10	
North America**	12	2	
Asia***	14	6	
Australia	4	1	
South America	2	2	
Total	60	21	
*except Turkey			
**only one project in Canada			
***includes Israel and Russia/ Soviet Union			

Most of the projects (28) are located in 10 European countries. All of these countries, except for Turkey, are also EU-member states. But while 5 European countries with 15 projects are also part of the EU monetary union, 3 EU member states (Great Britain, Sweden, Denmark), with a total of 9 projects, are not part of the Eurozone, as well as Turkey. (One Italian project was implemented prior to European monetary integration.)

Two North American countries are home to 12 projects in the database. Except for one project in Canada, all of them are US projects. Only 6 projects are actually implemented, and the remainders are either in planning, under construction, or entirely cancelled. (See Variable 21, project status.)

Of the list of 14 projects are from six Asian countries (including Russia/ Soviet Union, and Israel), four Australian projects, two South American projects.

Country (v2) and Population (v4)

Table 2 below shows the list of all countries in which the projects are located, and the respective population of each country. The United States, with over 300 million inhabitants, is the most populous country of all, and Panama the least.

Table 2: Countries and Population*				
Country	Population	Country	Population	
USA	313,232,032	Argentine	41,769,728	
Russia	138,739,888	Canada	34,030,588	
Japan	126,475,664	Australia	21,766,712	
Germany	81,471,832	Netherlands	16,847,008	
Turkey	78,785,552	Greece	10,760,136	
Thailand	66,720,152	Portugal	10,567,178	
France	65,312,248	Sweden	9,088,728	
United Kingdom	62,698,360	Israel	7,473,052	
Italy	61,016,804	Hong Kong/ China	7,122,508	
South Korea	48,754,656	Denmark	5,529,888	
		Panama	3,405,813	
*from http://www.indexmundi.com/g/r.aspx?t=0&v=21&l=en, based on CIA factbook. Accessed November 11, 2011; number for Panama accessed July 2012				

Purchasing Power Parity (PPP) 2010 (v5), and GDP 2010, 2001, 1990 (v6-v8)

For each country, I collected data on the purchasing power parity (2010), in U.S. Dollar.⁵³ Figure 1 shows that in 2010, the United States citizens had the highest most purchasing power, and the Thai citizens the least.

⁵³ **Source**: World Bank information; link through:

http://www.google.com/publicdata/explore?ds=d5bncppjof8f9_&ctype=l&strail=false&bcs=d&nselm=h&m et_y=ny_gdp_pcap_cd#!ctype=l&strail=false&bcs=d&nselm=h&met_y=ny_gdp_pcap_pp_cd&scale_y=lin &ind_y=false&rdim=country&idim=country:ARG:AUS:DNK:FRA:DEU:GRC:ITA:NLD:RUS:SWE:TUR:GB R:ISR:JPN:CAN:KOR:THA&ifdim=country&hl=en_US&dl=en_US&ind=false, accessed April 29, 2012



Additionally, I collected World Bank Data on GDP per capita for the years 2010, 2000 and 1990, in US\$, as contextual information. In Figure 2, the numbers are arranged by highest GDP per capita in 2010.⁵⁴



National Level Political Variables (v9, v10, v55, v56, v57)

Another aspect of each country's decision-making context is the political and legislative structure (see Table 3). Both variables have an effect on the economic policies and decision-making (e.g. Persson, 2002). Variable 9 (political system) is important for investment decision-makers because it affects funding, or impacts the policy and decision autonomy for regions and metropolitan areas. Table 3 displays a count of 21

⁵⁴ **Source**: World Bank information; link through:

http://www.google.com/publicdata/explore?ds=d5bncppjof8f9_&ctype=l&strail=false&bcs=d&nselm=h&m et_y=ny_gdp_pcap_cd#!ctype=l&strail=false&bcs=d&nselm=h&met_y=ny_gdp_pcap_cd&scale_y=lin&in d_y=false&rdim=country&idim=country:ARG:AUS:DNK:FRA:DEU:GRC:ITA:NLD:RUS:SWE:TUR:GBR:U SA:HKG&ifdim=country&hl=en_US&dl=en_US&ind=false], accessed January 10, 2012; figures for Panama added August 2012, hence the \$U.S. value is slightly different).

projects under federally organized states (more than half of these projects in the U.S.), and 39 under centralized governments.

Table 3: Political and LegislativeSystem						
uni- cameral	bi- cameral		Total	repre varia		
31	8	39	60	electi		
0	21	21	00	whet		
31	29 0			maki		
	litical an uni- cameral 3 ¹ 0 31	litical and Legisla uni- bi- cameral cameral 31 8 0 21 31 29 60	litical and Legislative uni- bi- cameral cameral 31 8 39 0 21 21 31 29 60	litical and Legislative uni- bi- cameral cameral Total 31 8 39 60 0 21 21 31 29 60		

Variable 10 is the legislative structure: Both, unicameral and bicameral parliaments are equally represented in the database.⁵⁵ This variable suggests how the main elective body in a country is structured, and will allow us to see whether there are effects on decisionmaking. Further: 5 projects are in federal *monarchies* (Canada and

Australia), and 17 projects in constitutional *monarchies*. I have not found any literature suggesting that decision-making in monarchies differs in significant respects.

Variables 55 and 56 provide further macro-political information. The party system variable (v55) holds that 14 projects are located in two-party systems, and 46 projects in multiple party systems. The "party system" binary (V55) distinguishes between two- and multiparty systems on the national level. 44 projects (73%) are in multiparty systems. The variable "type of voting system" (V56) distinguishes between proportional, majority/plurality and mixed voting systems. 20 (33%) projects are in proportional systems, 24 (40%) in the second category, and 12 (20%) in the third. Four projects could not be clearly categorized. The "cultural" variable, "Anglo-Saxon countries" (the U.S., Great Britain and Australia) (59), which hosts 19 projects (32%) – the majority in the United States

2. PROJECT CHARACTERISTICS

Project Type (v12, v54 v80, v81)⁵⁶ and Location (v11)

Table 4 provides a count of project location and project types. More than half of the projects are located in inner city and metropolitan areas, nine are regional projects, five national, and seven⁵⁷ cross national boundaries. I have 22 rail (includes one freight rail) and 22 tunnel projects (which include 12 subway projects). They are followed by multimodal projects. The greatest concentration of projects is inner-city subways.

Table 4: Project Types and Location

	Highway	Rail	Tunnel	Multimodal	
Inner-city	2	4	17	2	25
Metropolitan	1	8	2	3	14
Regional	2	2	1	4	9
National	1	4	1	0	5

sinternationalist for projects in federal states with unicameral parliaments is likely a result of the relationship between state size, states rights, and governability: larger states tend to have a federal, and hence bicameral setup, while smaller states do not. Federal bicameralism is historically modeled after the U.S.-American type, to balance the difference between regional population differences and the influence of the subordinated polities. In the U.S. the federal system is supposed to ensure the political weight of small states, or states with low population densities, in the face of large states with dozens of millions of voters. ⁵⁶ V80 and v81 are counted out of order because I added them very late.

⁵⁷ Actually, only five of the projects cross national boundaries, because I collected data on the Oresund link, a link between Sweden and Denmark, from the perspective of both countries.

6 22 22 11 60 The categories

determining the location of a project are quite clear, but not always mutually exclusive, so I made some judgment calls: Inner-city projects are those within the boundaries, and usually the core, of cities, and which are also serving an important function for inner-city transportation needs. Metropolitan projects are not limited to a core, and are often of longer physical length than inner-city projects. The rationale was to allocate projects, which serve two or more important cores in a metropolitan area as metropolitan. Distinguishing between regional projects and national projects was most difficult. Regional projects connect two or more metropolitan areas, like the Florida High Speed Rail. If projects were parts of national transportation networks, like the French TGV rail system, I allocated them into the national category, even if they connect two metropolitan areas.

The distinction between project types was particularly challenging as there are different ways to do so, each with their own underlying rationales, and all relevant to the project. For example, one might distinguish by the principle construction of a project, like tunnel, bridge, road, and rail. This distinction would be most meaningful regarding project costs and engineering complexity. However, it would not capture e.g. subways, which might be reasonably subsumed under "tunnel." But a subway distinction carries political implications, as well as a distinction between freight and passenger rail. The importance of subways in that respect lays in their usually specifically regulated agency and institutional structures. (Usually there are special agencies in place responsible for metropolitan or inner city transportation structures, in addition to the national or state transportation structures.) The freight/passenger rail distinction is politically relevant because transporting passengers -because of their agency- holds very different dynamics, characteristics, and challenges than carrying freight.

In the end, I decided to simplify and distinguish, classically, according to the principal project structure: highways, rail, tunnel and multimodal projects, as shown in Table 4 above, but also to add a "political type," in which I coded highway, subway, passenger rail and other, to account for the different politics behind the projects. In this variable I have 6 highways, 21 subways, 13 passenger rails, and 21 other projects (v54).



Physical Dimensions, in km (v14, v15)

The projects range from 2 km length (Western Harbour Crossing, Australia) to 640 km (Portugal Highspeed Rail) and more. Figure 3 provides the length and names of some of the projects in order. (I plotted the distribution of project costs per lane km in Section 3.3. on project costs.)

Table 5 below provides more detail on the length of the physical structure, and the cumulated approximate lane or track lengths. The average length of the projects is 82.12 kilometers, with a standard deviation of 131 km. The median is 22,6 km.

Table 5: Length of Projects (in km)							
	Count	Median	Average	Standard Deviation	Maximum	Minimum	
Project Length	60	22.6	82.12	131	640	2	
Lane/Track Length	53	64.4	186.2	245.05	928	6	

The lane or track lengths of a project were more difficult to determine than expected, as precise numbers of lanes, tracks, and associated structures like repair tracks or overhaul lanes are not always provided. The range is between 928 and 6km, the average 186.2, and the median track and lane length 64.4 kilometers⁵⁸. In case of rail length, for instance, in the absence of more precise data I assumed a double length of the general project length; I did the same with highway lanes.

Project Status (v20), Project Description (v18) and Project Stimulus (v19)

The projects are in different stages of implementation or completion. At the time of this writing, 42 projects have been completed, 7 are partially completed, 1 is in planning, 5 are under construction and 5 have been cancelled. Both cancelled projects were planned rail projects in the U.S.

Status:

Total:	60	-
Cancelled:		5
Under construction:	5	
In planning:	1	
Partially completed:	7	
Completed:	42	

30 of the projects are new projects entirely, which means they are unrelated to other projects. They are either stand-alone projects, or their construction starts a new network. 30 are additional pieces in already existing larger networks, expansions of existing facilities or projects related to other developments, i.e. the Channel Tunnel Rail Link, which is serving the larger Channel Tunnel (UK), or Arlandabanan (Denmark).

Description:

New projects:	30
Additional piece in a larger network:	30
Total:	60
Project Stimulus:	

⁵⁸ These are approximations because the specific numbers were not always provided.

44 projects were public efforts or parts of larger, public long-term development plans. 12 projects were special interest efforts, like the International Bank for Construction and Redevelopment initiating the KTX high-speed rail project in South Korea. I think that seven projects are the result of crisis or opportunity situations - like post-German reunification projects, or infrastructures servicing world fares. Eight projects are results of historical long-term plans. Three projects were necessary constructions to serve even larger megaprojects, and two of the projects to some degree the result of party competition.

Public effort	44
Special interest effort	12
Crises/ opportunities	7
Project history	8
Necessary addendum	3

Some projects were allocated into multiple categories, explaining why the sum is not 60, the project total. For instance, public efforts may easily correspond with opportunity moments or project history. I have chosen this particular distinction between different project stimuli to test for some political implications. (This will be discussed in more detail in another paper.)

The main problem with collecting information for this variable is that project stimulus is often not obvious, especially if there are special interests at work, which may or may not influence political positions. For instance, in the case of the cancelled Florida High Speed Rail (in the U.S.), a connection between the governor's decision to cancel the project, and some think tanks with anti-rail positions may be assumed, but not entirely proven. The other way round, I assume that project stimulus and the investment pushes are not always as visible as in the Argentinean case, where international development agencies pushed for investment. Also, the Argentinean bridge had been on the public mind for several decades.

3. CAPITAL AND COSTS

Capital Costs (v30) and Costs in 2010 \$ (v31)

I recorded each project's capital costs in their original currency and subsequently converted it to 2010 dollars (own calculations). Since the figures varied at times, I used those either provided on the project websites or those, which were most often cited among the sources. Wherever possible, I tried to find those figures (in the specific currency), which corresponded to the initially estimated costs. If that was not possible, I used other credible values, provided by different sources, and mainly in dollar.⁵⁹

The most expensive projects are the Boston Artery Tunnel project, and the Korea Train Express, a high-speed rail line in South Korea (both over \$15 billion). Three projects are between \$10 billion and \$15 billion, 16 between \$10 and \$5 billion; 32 projects are between \$1 and \$5 billion. Six projects were below or around \$1 billion (in 2010 US dollars): three of them between \$520 and 620 millions, and two projects over \$900 million.

⁵⁹ I often faced the problem that different sources named different project costs, depending on where they drew the project boundaries, whether rolling stock, if applicable, was included or not, conversion values used, etc. Often the characteristic of the provided value would not be specified. Wherever possible, I used the value given on the project website.

Number of Projects Volume

Total	60	
Unknown/ Cancelled		6
Under \$1 billion	6	
Between \$1 and 5 billion	32	
Between \$10 and \$5 billio	n	16
Between \$15 and \$10 billi	on	3
Over \$15 billion	2	

Total Investment

\$32.01 billion
\$36.96 billion
\$115.64 billon
\$72.5 billion
\$4.19 billion

\$262.3 billion

Nature of the Project (v16)

I have divided the projects into three major categories: public, private, and publicprivate partnerships (PPP). Public projects are those projects with exclusive public funding and which clearly remain in public control for most of the project's life span. Private projects are projects with minimal public sector risk: they derive their funding entirely from private sources, and their maintenance remains in private hands until an agreed date. Public-private partnerships are those projects where risk is split between the two parties. The private partner may also carry out maintenance. Though this division is sometimes ambivalent, and the true nature of a project might be difficult to determine, the sample has a significant number of public projects - and an equal number of PPPs. Only five projects qualified as exclusive private projects, they are included in the PPP projects. For one project, the Panama Metro, I was unable to find reliable documentation, so it is missing in this count.

Public	25
PPP	34
Total	59
Concess	ion (v17)

In this variable I collected information on the type of project contracts and their structures. However, I will use this information for background analyses, and did not quantify it.

Costs per Lane/ Track km (v34)

To assess the price per km of actual lanes or tracks built, I have collected data not only on the total length of projects but also on the lane and track kilometers effectively built. Figure 4 provides an overview of the cost/lane distributions of the projects. The numbers are calculated in 2010 US dollars. More than half of the projects cost less than \$50 million per kilometer, 12 projects more than \$50 million per kilometer, and 9 were more expensive than that, among them. I did not find data, either on the project price, or on the actual track or lane kilometers, for 6 of the projects. 3 projects are missing because of imprecise information.







Rail projects include subway projects, and road projects include tunnel projects as well. The combined count is different from that in Figure 4, because the database contains intermodal projects.



Initial Costs (v29), Actual Costs (v30), Cost Overrun Ratio (v32) and Cost Overrun Ratio Inflation-adjusted (v33)

I calculated cost overrun ratios for the projects using figures provided, if available, in the original currencies. I have two values of cost overrun ratios. The first is the result of dividing actual project costs by the estimated project costs at the time of project inception. I was able to obtain data (for any, or both values) for 37 projects. The numbers show that project cost overrun, without taking into account inflation, averages 1.52, with a maximum of 2.98, and cost under-run of 0.63. The second type of cost overrun ration

is inflation-adjusted figures. 45 projects have overrun average of 1.32, with a 2.98 maximum, and a cost under-run of 0.67:

Table 6: Cost Overrun Ratios							
	Count	Median	Average	Standard Dev.	Maximum	Minimum	
Cost Overrun (not inflation adjusted)	37	1.44	1.52	0.53	2.98	0.63	
Cost Overrun (inflation adjusted)	45	1.22	1.32	0.48	2.98	0.67	

The more detailed frequency distribution provides the following picture:



Figure 8 illustrates a comparison between 35 project cost overrun ratios with and without taking into account inflation rates. The data shows that in most cases the noninflation adjusted cost overruns are higher than in the six cases, where the ratio is equal or negative (cost-underrun). I was unable to calculate the necessary cost overrun information for either inflation adjusted or non-adjusted figures for the remaining projects, because either the projects were not completed, yet, or I did not find sufficient, appropriate or trustworthy data.



4. PROJECT TIMELINES

Year of Inception/ Project Approval (v22), Project Planning Time (v21), Years of Construction (v25), Years to Completion (v23) and Project History (v26)

I collected several project planning and construction time measures. They include planning time, year of inception, and construction time. Planning time is defined as the numbers of years it took to plan a project and is measured in years from the beginning of planning to the year of inception. I was able to determine the project planning time for 46 projects. (Table 7).

Determining a specific date when project planning has started is difficult for the following reasons. a) Often there is an idea mentioned, which may or may not start the planning process immediately. b) A project might be mentioned in a larger development plan, but gets built decades later. c) The available information is not sufficiently specific. d) Often there were different available dates, due to different definitions of what constitutes planning. I focused on the year at which more comprehensive studies on how to solve a perceived transportation problem has begun.

The year of inception is the year the project got formal approval by decision-makers, usually political approval in the form of legislative or other consent, depending on the political system. If the exact year could not be determined, or there were multiple occasions fitting that characteristic, either the most likely year considering the history of the project, or the year of construction begin was chosen. Most of the projects are fairly recent and were decided upon after 1990, only 14 projects got consent before that year.

Next, I measured the time from the year of inception to the end of construction ("implementation time), and from the beginning of construction to the end of construction ("construction time"), because some projects, although having been approved, took some time until construction actually began. If projects were in planning still, or construction has not begun, yet, I assigned the planned values, anyway, and included them into the calculation. Project history gives the time from the first idea to project approval. Table 7 summarizes these measures.

Table 7. I famming, implementation, and construction times (in years)							
	Count	Median	Average	Standard Dev.	Maximu m	Minimu m	
Planning Time	46	6.5	7.67	5.46	22	1	
Implementation Time	51	9	11.5	11.17	72	3	
Construction Time	54	5.5	7.2	4.6	26	1	
Project History	51	20	28.9	31.19	136	0	

Table 7: Planning, Implementation, and Construction Times (in years)

The more detailed frequency distribution provides the following picture:



*Not included: two outliers for implementation time, with 49 and 72 years each.

5. PROJECT STUDIES

Estimated Utilization, Actual Utilization, Utilization Ratio (v38-40)

Another important indicator is project utilization, which I define as the ratio between utilization estimates, and actual utilization after project implementation. I calculated utilization ratios, presented in Table 8 below. I collected comparable data –pre-project estimates, and those after construction- for 38 cases (the number is low because not all of the projects have been completed at the time of this study). The data shows that de facto project utilization is at 90 percent, the values ranging between three times the expected utilization, and not even 20 percent of the calculated range.

Table 8: Utilization Ratio									
Count	Median	Average	Standard Deviation	Maximum	Minimum				
38 (60)	0.9	0.88	0.53	3.28	0.19				

Table 8 shows that 11 projects were above the initial user estimates, and five projects right on target. The majority of projects (20), however, came in below the original estimations when actually used. The positive outlier here is the CTRL project with 33 percent more users than expected, the Blue Line in Thailand has achieved the lowest utilization ratio. The distribution is as follows: nine projects (15 percent) have a utilization ratio of below .5. Another 9 projects are between 0.5 and < 0.9. 15 projects (25 percent) are between 0.9 and 1.2. Four projects (6.7 percent) had a utilization ratio of higher than 1.2.



Cost-Benefit Studies, Risk Studies, Environmental Impact Studies, Economic Development Studies (v41, v44, v46, v48)

Table 9 provides an overview of the various studies done on the projects in the database. Note that many countries require Environmental Impact Statement (EIS) studies before a project starts but these then serve as substitute for a complete cost-benefit analysis. I found that 40 projects conducted (publicly available) EPS studies. 20 projects have conducted cost-benefit studies (or included those aspects in their feasibility studies). Risk studies were barely available.

Studies, Economic Development Analyses							
	Done/availabl	Not done/not					
	e	available	Partial	# Projects			
Cost Benefit Studies	20	29	10	55			
Risk Studies	8	46	1	53			
Environmental Impact Studies	40	14	3	57			
Economic Development Studies	19	36	4	57			

Table 9: Cost-Benefit Studies, Risk Studies, Environmental Impact Studies, Economic Development Analyses

Cost-Benefit Values (v43)

Of the 28 cost benefit studies I was able to obtain 19 values, expressed variously in ratios or net present benefit values. The average ratio is 1.7, with 0.91 as the lowest, and 4.18 as the highest value.

Cost-Benefit and Other Studies (v41, v42, v44, v45, 46, v47)

An important indicator for the influence of environmental, risk or cost-benefit studies (CBA) on decision-making is the point of time when they were actually conducted, respectively released. This is important because these studies are designed to guide and support the decision process, and hence should be available before inception (the year a project received formal, e.g. legislative, political approval). In one of the Swedish projects (Southern Link), for example, cost-benefit studies were publicly released only after the project received its official political confirmation, and as it turned out, they did not

indicate a positive cost-benefit ratio. I found that most CBAs were done (or available) before inception, but a significant number was only done after the point of inception. Most of the few risk studies I found were done after inception, too. Environmental impact studies were far more often done, available, and conduced before the year of inception (as far as I was able to locate information). This also might have to do with strong U.S. American and European requirements regarding environmental concerns. Table 10 summarizes a lot of information on various project studies and their timing.

Table 10: Cost-Benefit Studies, Risk Studies, and Environmental Impact Studies/ Year of Inception

· · · ·	Before inception	At year of inception	After inception	After Construction
Cost Benefit Studies	17	2	11	3
Risk Studies	2	0	6	1
Environmental Impact Studies	16	7	16	0

Note: The discrepancy in the sums of the various studies in this table from the numbers provided in Table 9 above is explained by the fact that I was not always able to tell when studies had been released.

Degree of Transparency (v50)

I collected information on the availability of cost-benefit analyses, risk studies, environmental impact studies, and economic development studies, in order to assess the degree of transparency of different projects. I looked for studies which were sponsored either by the project management, by a public entity, or by a university. I did not count studies done by groups and think tanks with a clear political agenda. Those documents were registered under project opposition or support.



Figure 11 shows the degree of transparency, measured in terms of the availability or nonavailability of the studies. The degree of transparency has been calculated by assigning value 1 for an available study, value or for non-available studies. I then calculated an availability average for each study by adding what's available and dividing the sum by four. I grouped the results on a scale from very transparent to not that transparent. The average project has fair transparency, leaning towards not transparent.

6. PROJECT FUNDING

Sources of Funding (v35)

Projects are often funded from multiple sources, often corresponding to the different layers of the political system. I collected data on funding sources for each project, and tried to determine the approximate percentage of the funding source vis-à-vis the project capital costs. Some sources of information provided very clear funding distributions, others provided only approximations. Using this information, I calculated rough estimates. For some projects any distribution was difficult to estimate.



Nearly all of the 60 projects were funded by more than one funding source. Among the projects with reliable data, the average project received 38 percent national funding, 30 percent private funding, 13 percent funding channeled through transportation authorities, and 9 percent came from provincial sources, and 5 from local funding sources. This distribution is based on 56 projects; missing data is the result of insufficient public data. Figure 12 shows the average megaproject and its funding sources.



The more detailed frequency distribution provides the following picture:

Type of Funding (v36)
I distinguish between grants, bonds (including private loans), government loans, equity, taxes, and others. The main types of funding of the projects in the database are grants, bonds and loans. Equity funding plays a role in over a third of the projects. As can be expected many projects have multiple types of funding (thus the total does not add up to 55). Here is the count for how many projects have any of the following funding types.

Grants:	36	
Bonds/ loans:		37
Equity:	23	
Government loan:	12	
Revenues/ other:	14	

Both variables - the sources and the type of funding - are not sufficiently clear or transparent in many project documents. Plan changes and shifts over time render nontransparent projects even more ambiguous. So these categories and allocations need to be understood as cursory. Figure 14 displays the average funding type composition of a project.



The more detailed frequency distribution provides the following picture:



Financial Data (v37)

I collected data on interest rates on both main and secondary loans, and the respective loan periods. I was unable to obtain a sufficient amount of comparable data, so this information is only of limited use. Below I list the data counts, and the calculated average.

Interest rate on main loan:
percent
Main loan period:
Interest rate on secondary loan:
Secondary loan period:

7 counts with an average of 4.4

21 counts with an average of 25 years 1 count of 7.5 percent 3 counts with an average of 29.66 years.

7. ACTORS: PROJECT STAKEHOLDERS, POLITICAL DECISION-MAKERS, OPPOSITION and SUPPORT

Project Stakeholders and Political Decision-Makers (v51, v52)

I define project stakeholders as those actors with a financial stake in the project. I define political decision-makers as main actors responsible for major project approvals and decisions. The comparison between stakeholders and decision-makers on different levels shows that national governments are heavily involved in large infrastructure investments, and slightly more often as stakeholders than as decision-makers. In the following order, the national and the provincial (political sub-units like states and regions) actors are most heavily financially involved in the decision-making; they are also the main political decision-makers. The private sector is, to different degrees, financially involved in 23 projects. International and transport authorities channeled funding are next. The local level has the least stake, and is financially involved in only 12 projects.



The data on decision-makers and stakeholders is comparable in the sense that I chose the same categories: stakeholders, defined as having a financial stake in the project, may come from local, provincial, national, international or private backgrounds, as well as from transportation agencies. The same goes for decision-makers, except for the private category (Here the problem of non-transparent decision-making presumably comes into play, as private sector lobbying and support, are not openly linked to political decisions). The discrepancy between the two variables might be telling in terms of geo-political power relationships. According to the data, the international category is much more involved in the funding, than in the decision-making of projects. (Of course, funding is one of the most crucial and factual aspects of large infrastructure investment, and difficult to separate from a political decision.) The national and sub-national entities are also stronger involved in the funding than in the decision-making. That relationship is reversed regarding the local and transport authority categories.

Main Project Opposition (v28)

Reliable or specific data on project opposition is difficult to obtain. Official sources tend not to mention it, so I relied on newspaper and journal accounts to gather information on project's opposition. I collected data on the main sources of opposition, which were mentioned in more than one source. However, it is difficult to evaluate the degree of actual input of opposition on the decision-making process, because it is either nontransparent, or does not exist. Even in cases where the public protest was officially integrated into the decision-making process, it is difficult to assess whether opposition to the project was immense or meager, and what was opposition's real impact on decisionmaking. Many projects faced multiple sources and themes of opposition, which is why the total count is more than 60.

I grouped opposition into 4 themes, though I think that several categories might be under-represented because data has not been available, or opposition has not been touted, for instance lawsuits. Issue-oriented opposition is, numerically, the strongest data point. It includes very clear opposition aims and goals, for instance NIMBY opposition, or environmentally motivated protest. "Political" opposition is the second largest data point. It captures opposition at crucial political decision-making points, e.g. in the parliament, party issues, problems of international cooperation, etc. For 14 projects I could not find any opposition, except for maybe some citizen complaints during construction, but I was careful to not overestimate that finding. It is equally likely that project opposition just did not receive a good platform. The next point relates to opposition to the type of funding and is often grounded in some sort of neoliberal critique of land-use or need for the project, especially with such large budget items. Related to that is opposition due to competing project alternatives, for instance transit advocates vs. highway. In a few cases I found some opposition, but the information available was not sufficiently specific, unclear or seemed unreliable, so I integrated it under "no or little opposition."



Project Support (v27)

Political support for a project was –like project opposition-- difficult to establish. Moreover, the literature states that it often is indirect. Thus I was unable to collect reliable, trustworthy data to be used in an analysis. Parts of project support are captured in variable 19 "project stimulus."

SUMMARY AND CONCLUSION

The projects share most megaproject characteristics observed in the relevant literature, which is not surprising, because both the dataset and the general megaproject literature are skewed towards projects in developed countries (e.g. Flyvbjerg et al., 2003, Altshuler and Luberoff, 2003, Swyngedouw, Hall, 1980, UCL-OMEGA Project Study, 2011).⁶⁰ However, the 60 projects are in a broad range of 21 countries, which includes countries with the highest GDPs, like the U.S. or Germany, and countries with very low ones, like Thailand or Panama. All countries are legislative democracies with a roughly similar distribution of federal vs. centralized states, and bi-cameral vs. uni-cameral legislative structures.

Close to half of the projects are inner-city projects, mainly subways. The remaining projects are metropolitan, regional or national projects. Five projects cross international borders. Passenger rail and subway projects constitute the majority of projects. Further I included highways, bridges and tunnels, or mode combinations. The majority of projects are completed, or at least partially (49), while the remainder is incomplete, except for two, which were cancelled. The number of public projects (nearly entirely publicly funded) and public-private partnerships is nearly equal; both sets constitute the majority, and thus reflect the typical funding distribution. Only five projects are private projects entirely. Only a minority of projects was more expensive than US \$100 million per kilometer. Most were below \$10 million per kilometer. Generally, the rail projects are cheaper than highway projects. In accordance with the literature, the projects experience heavy cost overruns as well, even if I take inflation into account.

By average, the planning and implementation times of the projects (more than 20 years in total) are longer than the construction times (which are with 7.4 years part of the implementation time). The utilization ratios are mostly negative, which is typically one of the standard points of critique on megaprojects (Siemiatycki, 2010, Flyvbjerg et al., 2010), so the projects fit the bill as well. The projects do not seem very transparent, either, which is another main point of critique in the literature. Project-related assessment and evaluation studies are only insufficiently publicly available. Environmental studies are best available – but they are required in most countries. The availability of studies is followed by cost-benefit analyses and economic development studies, while they often seem quite superficial or partial though. That also follows some of the transparency concerns in the literature (mainly Flyvbjerg, 2003).

Most of the projects have funding from the national state, followed by private funding shares. Transport agencies were an important channel for funds. 16% of all projects received funding from regional and local sources. Grants, bonds and equity account for most of the funding, while government loans are not nearly as common.

APPENDIX D Investment Volume by Country

This Appendix establishes the representativeness of the data in the database by stating the database investment volumes as a percentage of the total investment volume of a country for a given period of time (last column).

The data is from the OECD website. The rail and road investment figures are sums of gross road and rail infrastructure investment spending (in Euro) in each country between 1992 and 2010. The numbers do not include maintenance expenditures. I

⁶⁰ There are exceptions, of course. There is a range of studies focusing on megaprojects as development tools in developing countries. (See Kennedy et al., 2011)

summed up rail and road spending over the years, converted the database infrastructure investments per country from U.S. dollar into Euro, and calculated the percentage in terms of the entire infrastructure investment spending over that period of time.

	Doil (in	Bood (in	Cum	Detebage:	Databaga	Detebacc
	Kall (In	Koad (In	Sum	Database:	Database:	Database
	million	minion Euros) 1992-2010		Project Investment Volume	Investment Volume	Volume of Total
	Euros)					
	1992-2010					
				(2010 billion ¢)	(2010 million f)	Investment (%)
Argentine				0.052		(/0)
Australia	20.100	04.679	114 790	6.64	5 000	4.96
Conodo	20,100	94,0/2	114,/20	0.04	5,000	4.30
Uang Vang	8,000	102,380	110,980	2.13	1,000	1.44
Hong Kong China				11.12	8,300	
Denmark	10,300	11.078	21.374	11.75	8.800	41.17
France	68,000	207.810	275.810	22.46	16.800	6.09
Germany	102.000	210.085	312.085	23.05	17,300	5.54
Greece	6.100*	13.224*	19.324	11.28	8,500	43.98
Israel		-0,1	-7,0-1	4.3	3,200	10.74
Italy	82,700	114,630	197,3	10		
Japan	150,400	1,593,226	1,743,626	24.97	18,700	1.07
South Korea				15.96	12,000	
Netherlands	n.a.	n.a.		12.32	9,200	
Russia	[n.a.]	[n.a.]		0.65	0,500	
Panama				1.4	1,100	
Portugal	6,900	22,400	29,300	7.8	5,900	20.13
Sweden	17,500	19,900*	37,400	6.5	4,900	13.10
Thailand				6.7	5,000	
Turkey	5,100	19,200	24,300	4.28	3,200	13.17
United	99,100	109,800	208,900	18.14	13,600	6.51
Kingdom						
USA	61,500*	935,600*	997,100	70.33	52,700	5.28
						Average: 13.5%

APPENDIX E List of Hypotheses

This Appendix lists all hypotheses tested in Chapter 4.

Macro-Political Influences

H2.1: Project success varies by political system: Projects built in centralized governments are more successful.

H2.2: Macro-political factors such as the political system, the legislative structure, the party and the national voting system impact funding sources for projects.

H2.3: Bond-funded infrastructure investment is more prevalent in federalist than in centralized countries.

H2.4: Project decision-making in federalist countries is more transparent than in centralized countries.

H2.5: Infrastructure projects in two-party systems are underwritten by a greater variety of funding sources than projects in multiple party systems.

H2.6: Projects in Anglo-Saxon countries experience more opposition than projects in centralized countries.

H2.7: The nature of the voting system affects project success measures like cost overrun.

H2.8: Macro-political organization affects choices between project types like highways or rail projects.

H2.9: Local decision makers are more involved in project decisions in federalist countries than in centralized ones.

Project Decision-Making Levels

H3.1: Anglo-Saxon projects involve more local and regional decision-makers in project decisions.

H3.2: The types or nature of the project stimuli influence the types of project decisionmakers.

H3.3: There is less project opposition when national decision-makers are involved than when decisions are made on sub-national levels.

H3.4: National level decision-makers conduct more cost-benefit analyses than project decision-makers on local or regional levels.

H3.5: Project planning varies depending on project decision levels. Project-planning times are longer for national level projects than projects on any other level.

H3.6: The higher the GDP PPP, the more project decisions are taken at the national level.

H3.7: If (special-purpose) transportation agencies are involved, cost overruns are smaller.

H3.8: National level decision-makers tend to take on more complex, long-term projects.

H3.9: National level decision-makers are involved with the more expensive projects (costs/km).

H3.10: Project decision-making levels changed over time, specifically from the 1980s onward. More projects are now decided on sub-national levels.

Project Transparency

H4.1: Project transparency or cost-benefit analyses differ by project type: rail projects are more transparent than highway projects.

H4.2: The project stimulus affects transparency: projects that arise out of special occasions are less transparent.

H4.3: Project transparency increases with the rank of the decision-maker.

H4.4: The wealthier a country, the more transparent are its projects.

H4.5: Projects in centralized countries are more transparent than in federalist countries.

H4.6: Entirely new projects are more likely to have CBAs than extensions to existing networks.

H4.7: *The less transparent a project, the more protest potential is there.*

H4.8: Project transparency affects project success (here, cost overruns) negatively.

H4.9: Inner-city projects are more typically based on cost-benefit analyses.

Funding Sources

H5.1: The wealthier a country, the more sources of funding are available at the national level.

H5.2: Local funding sources became more important over time.

H5.2.1: The number of funding sources (or funding complexity) increases over time.

H5.3: Projects underwritten with national funding will take longer to implement.

H5.4: Projects underwritten with national funding will experience more cost overruns.

H5.5: The more national funding, the better the projects meet utilization goals.

H5.6: Projects underwritten with private funding will experience fewer cost overruns or better utilization ratios.

H5.7: When special interests are involved in project decision-making, the funding sources become more complex.

H5.9: Project funding varies by region (like continent, or culture).

H5.10: Inner-city projects, because of their limited reach, are less likely to receive international funding.

*H*5.11: *Funding sources impact project opposition types.*

H5.12: The type of funding and the availability of a cost-benefit analysis for a given project determine the general degree of project support (measured by the absence of opposition).

H5.13: Project types are associated with funding sources – e.g., rail projects are less likely to be privately funded than any other project type.

Funding Types

H5.13 GDP impacts funding types.

H5.14 The nature of project funding impacts project-related factors like construction time.

H5.15 The nature of project funding impacts project utilization ratios.

H5.16 Projects with equity funding are more often canceled than projects with other types of funding.

APPENDIX F Statistical Tests

This Appendix provides an overview over the statistical tests that were used.

Pearson's Correlation Coefficient: Pearson's correlations are measures of linear statistical correlation or the dependence between two variables, e.g. if the value of one variable increases or decreases depending on the value of another one. The values of the outcome coefficient range between -1 and 1. The closer the coefficients are to the values 1 and -1, the stronger the correlation. With a coefficient of 0 the variables show no statistical association. The negative or positive value describes the direction of the curve. The Pearson's test, a parametric test, works best with scale data. It may be calculated as follows:

 $r = \frac{\sum_{i=1}^{n} (X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\sum_{i=1}^{n} (X_i - \bar{X})^2} \sqrt{\sum_{i=1}^{n} (Y_i - \bar{Y})^2}}$

Spearman's Rank Order Test: The Spearman Rank Order Test is a non-parametric measure testing an association between two variables, e.g. if the value of one variable increases or decreases depending on the value of another one. The test may be used with discrete or ordinal data. Similar to the Pearson's Correlation coefficient, ranges of outcomes are between -1 and 1, with -1 being a negative correlation, 1 being positively correlated, and a value of 0 describing no correlation. Spearman correlations are less sensitive to outliers than the parametric Pearson's correlations. The formula is this:

$$p = \frac{\sum_{i} (x_{i} - \overline{x}) (y_{i} - \overline{y})}{\sqrt{\sum_{i} (x_{i} - \overline{x})^{2} \sum_{i} (y_{i} - \overline{y})^{2}}}$$

Mann-Whitney U Test: The non-parametric or rank order Mann-Whitney U Test ranks two independent groups by ranking them or comparing their means against an assumed distribution (for instance whether one population features larger values of a specific outcome than another). As opposed to parametric alternatives, the Mann-Whitney U Test is less susceptible to abnormal distribution of the data and unequal sample sizes. The output is the Mann-Whitney U value, the interpretation of which depends on the sample size, and the p value, which indicates whether there is a statistically significant difference between both groups (if so, then p<.01).

$$U_1 = R_1 - \frac{n_1(n_1 + 1)}{2}$$

Kruskal-Wallis Test: The non-parametric Kruskal-Wallis test is an extension of the Mann-Whitney U Test. The test allows comparing more than two independent groups. Similar to the Mann-Whitney Test, the data does not need not be in equal interval scale, the population does not need to be normally distributed, and the samples need not have equal variances. It assumes that the dependent variable is measured at an ordinal level, and that the independent variable consists of more than two independent categories. The test provides a ranking for each group, and the statistical significance, which allows for conclusions about the effect of the independent variables on the groups. The test statistic is given by:

$$K = (N-1) \frac{\sum_{i=1}^{g} n_i (\bar{r}_{i.} - \bar{r})^2}{\sum_{i=1}^{g} \sum_{j=1}^{n_i} (r_{ij} - \bar{r})^2},$$

Binomial Tests: Binomial tests test the probability that a binary sample reflects a likely distribution in the general population. Statistical tests operate with the default threshold of .5 (50%). With this threshold, the sample distribution is evaluated against the probability that the data distribution corresponds to 50/50 in the real world. The test value reflects the deviation from that probability. The threshold may be changed to reflect hypothesized proportions of the given general population based on theory or observation.

An example: A binomial test may establish whether the observed frequencies of two categories of a dichotomous variable, for instance heads or tails in repeated coin tosses, correspond to the equal probability of heads or tails (a hypothesized 50% chance): if your coin tosses produce tails 70% of the time, the very small significance level indicates that that your 70% sample is unlikely to happen by chance. Hence the null hypothesis (50% probability in either direction) must be rejected. One possible conclusion is that the hypothesized real-world threshold is wrong. But since a 50/50 probability has been generally accepted for coin tossing, the other conclusion must be that the coin has probably been tampered with.

Multivariate Regressions: Regression analysis allows making quantitative predictions about the effects of one or more variables on a "dependent" variable. The independent variable/s exercises a hypothesized influence on the dependent variable: depending on the values of the independent variable/s, the dependent variable changes as well. Depending on the type of model, the relationships may be linear, quadratic or cubic.

Linear Y=bo+(b1*t)

Quadratic Y=bo+(b1*t)+(b2*t**2)

Cubic Y=bo+(b1*t)+(b2*t**2)+(b3*t**3)

In the given relationships Y is the dependent variable and b represents the slopes of the functions. In linear, quadratic and cubic model specifications, the dependent variables are continuous. Linear, quadratic or cubic model choices refer to the hypothesized curve of the slope: a linear function assumes a straight curve, quadratic and cubic ones curved slopes (i.e. they signify thresholds at which the association noticeably changes). Associated tests of statistical significance evaluate how likely it is that the predicted shapes of the associations reflect the true associations in the real world.

R Squared: R Squared is the typical "model fit" test that assesses how well the hypothesized model fits the sample data. The closer the value is to 1, the better the model.

Regression Assumptions

Generally, the data must meet four assumptions to conduct linear regression.

Linearity Test: The relationship should indeed be linear, otherwise the reported results lose their explanatory power. Linearity tests test whether the best model fit is, in fact, linear, and not logistic, quadratic or cubic. We used the SPSS "lack of fit" test. The test statistic, in order to meet the linearity assumption, must have a p-value larger than the set "alpha value."

Homoscedasticity/ Heteroscedasticity: Another assumption for linear regression is homoscedasticity, which refers to the equal distribution of residuals. The opposite, heteroscedasticity, refers to the situation in which the residuals of a model are unequally distributed, also called the inequality of variance. Heteroscedasticity indicates correlations between the independent variables. Homoscedasticity is the desirable state of the data; heteroscedasticity might distort the regression results.

Independence of Error: This assumption presumes that the independent variables are not correlated. Looking at a plot of residuals, residuals must be randomly distributed and do not form any kind of pattern.

Durbin-Watson Test: The test provides a value to test the "independence of error." The statistic ranges from 0-4; a value around 2 is desirable (meaning: the assumption of the independence of error is met). The acceptable range is given with 1.5-2.5.

Normality of Error: Shapiro-Wilk Test: This test uses studentized residuals to determine whether the assumption of the "normality of error" is met. That means that residuals, or errors, should be random and normally distributed at the values of the dependent variable. Any value that is larger than p<.05 (if that it the set threshold, or "alpha value") is good to go, meaning that the errors are normally distributed, and p=1 is perfect.

Binary Logistic Regressions: The dependent variable in logistic regressions is binary, and the independent variables scale or ordinals. Non-parametric tests require the data to meet fewer assumptions than parametric tests. The model is then as follows (sample data from the data analysis):

$$P(Var28 = 1) = \frac{1}{1 + e - (a + bVar59 + cVar12 + dVar52)}$$

Receiver Operating Graphs: Receiver Operating Graphs (ROC) may assess the strength of binary logistic regressions. ROC curves allow conclusions about the strength of a specific test on the model and the test population, by measuring the sensitivity and specificity of the results. Sensitivity and specificity refer to the intrinsic quality (appropriateness) of a test, and allow conclusions about the property of a test AND the population. Sensitivity refers to the power of a test to identify positives (the proportion of cases correctly identified by the test as meeting a certain condition) – specificity to identify negatives (proportion of cases that do *not* meet a certain condition).

The closer the curve is to .5 (a diagonal line), the less meaningful is the test. The closer the curve is to the left and upper border of the ROC space, the more accurate. For instance, a ROC value of .673 indicates that 67 percent of pairs (bond funding/ no bond funding) are identified as true positives, when randomly drawn. It also indicates that the

results from the model are of poor quality, using the following quality scale: .50-.60 (fail), .60-.70 (poor), .70-.80 (fair), .80-.90 (good), and .90-1 (excellent). Poor test results may either indicate problems with the choice of the test, or the quality of the data.

Model Fit Values for Logistic Regression:

The **Cox & Snell R Squared** and **Nagelkerke R Squared** are used as model fit tests for binary regressions. I report both values in the database. The two model fit tests technically differ from the R Squared values that assess model fit in linear regressions, but their interpretation is similar: The closer the value is to 1, the better the does the model fit the data points in the database – or, the larger the value the better the model fit.

APPENDIX G

Sample Questionnaire for Interview Questions

- 1. What was your role in the Second Avenue Subway decision-making? Did that role change during the process?
- 2. Where did the idea, or project stimulus, come from? What were the main objectives for building this project?
- 3. Which were the most relevant actors involved in the decision-making process, and why? What were their objectives?
- 4. What was the role of the implementing agency?
- 5. Which were the main sources of opposition or project support? Did they further, complicate, or delay the project?
- 6. How was funding secured?
- 7. Were there major changes during project implementation?
- 8. What are the specific problems or benefits of transportation decision-making in this jurisdiction?
- 9. How should this project be evaluated? What are its main measures of success?
- 10. What, in your or your agency's view, constitutes a "successful" megaproject? What are the main defining features and characteristics?
- 11. In your view, what do you consider to be the most important factors and actors that determine the outcome of decision-making process in the planning and delivery of any megaproject?

APPENDIX H Data Quality Assessment Graphs

This Appendix collects data assessment graphs to evaluate the strength of regression

models, e.g. ROC Curves, Scatterplots, Durbin-Watson and Shapiro-Wilk Tests. The tests

are described in more detail in Appendix F.

Table 2.5/ Model 1: ROC= .726, S.E076, Lower	Table 2.5/ Model 1: ROC= .761, S.E064, Lower
Bound .579, Upper Bound: .874, sig006	Bound .636, Upper Bound: .887, sig002









References

In addition to the references listed here I conducted 16 interviews between 2009 and

2013. For reasons of anonymity, I keep a confidential list.

- ACTA. "Investor Presentation." 1999.
- ----. *The Alameda Corridor Story*. Alameda Corridor Transportation Authority (ACTA), 2013.
- Administration, Federal Transit. "Capital Investment Program: New Starts, Small Starts and Core Capacity Improvements." http://www.fta.dot.gov/12347_5221.html.
- Agarwal, Ajay, Genevieve Giuliano, and Christian Redfearn. "The Alameda Corridor, a White Paper." 2004.
- Altshuler, Alan, and David Luberoff. *Megaprojects: The Changing Politics of Urban Public Investment*. Washington, D.C.: Brookings Institution Press, 2003. Bachelor, Jones and. "1994."
- Baker, Al. "Transportation Spending Plan Gets Approval from Board." *New York Times*, Jul. 14, 2005, 3.
- Baumgartner, Frank R., and Bryan D. Jones. *Agendas and Instability in American Politics*. Chicago: University of Chicago Press, 1993.
- Berechman, Joseph. *The Evaluation of Transportation Investment Projects*. 2009.
- Berechman, Joseph, and Robert Paaswell. "Evaluation, Prioritization and Selection of Transportation Investment Projects in New York City." *Transportation*, no. 32 (2005): 223-49.
- Berg, Bruce F. *New York City Politics: Governing Gotham*. New Brunswick: Rutgers University Press, 2007.
- Berry, Jeffrey. The Interest Group Society. Little: Brown, 1984.
- Beukers, Els, Luca Bertolini, and Marco de Brommelstroet. "Why Cost Benefit Analysis is Perceived as a Problematic Tool For Assessment of Transport Plans: A Process Perspective." *Transportation Research Part A* 46 (2012): 68-78.
- Bourdeaux, Carolyn. "Politics Versus Professionalism: The Effect of Institutional Structure on Democratic Decision Making in a Contested Policy Arena ".*Journal of Administrative Research Theory* 18, no. 3 (2008): 349-73.

- Brash, Julian. *Bloomberg's New York: Class and Governance in the Luxury City*. Athens: University of Georgia Press, 2010.
- Brecher, Charles and Patrizia Nobbe. *AirTrain JFK: A Case Study*. Unpublished case study, 2009.
- Brenner, Neil, Peter Marcuse, and Margit Mayer. "Cities for People, Not for Profit." *City* 13, no. 2 (2009): 176-84.
- Callahan, Richard. "Governance: The Collision of Politics and Cooperation." *Public Administration Review* March (2007): 290-300.
- Cantarelli, Chantal, Bent Flyvbjerg, Eric Molin, and Bert van Wee. "Cost-Overruns in Large-Scale Infrastructure Projects: Explanations and Their Theoretical Embeddedness." *European Journal of Transportation and Infrastructure Research* 10, no. 1 (2010): 5-18.
- Caro, Robert. The Power Broker. New York: Randomhouse, 1975.

Brar, Kaur. 2005.

- Cerro, del Santamaria, Gerardo (ed). *Urban Megaprojects: A Worldwide View*. Research in Urban Sociology, Volume 13 (2013).
- Chan, Sewell. "Mta Says Expansion Plans Are in Jeopardy." *New York Times*, Dec. 22, 2004.
- Chisholm, Donald. "Problem-Solving and Institutional Design." *Public Administration Research Theory* 5 (1995): 451-91.
- Cobb, Roger W., and Charles D. Elder. "The Politics of Agenda-Building: An Alternative Perspective for Modern Democratic Theory." *Journal of Politics* 33, no. 4 (1971): 892-915.
- Cohen, Michael D., James G. March, and Johan P. Olsen. "A Garbage Can Model of Organizational Choice." *Administrative Science Quarterly* (1972).
- Collingridge, David. *The Management of Scale*. London: Routledge, 1992.
- Dahl, Robert. "Who Governs? Democracy and Power in an American City.". New Haven: Yale University Press, 1961.
- Derrick, Peter. *Tunneling to the Future*. New York: New York University Press, 2001.
- Derrick, Peter, and Robert Paaswell. "Transportation Policy and Politics in New York State." In *The Oxford Handbook of New York State Government and Politics*, edited by Gerald Benjamin: Oxford, 2012.
- Derthick, Martha, and Paul J. Quirk. *The Politics of Deregulation*. Washington, D.C.: Brookings Institution, 1985.
- Doig, Jameson. *Empire on the Hudson: Entrepreneurial Vision and Political Power at the Port of New York Authority*. New York: Columbia University Press, 2001.
- Doig, William. "Should It Take Decades to Build a New Subway?" In *Salon*, February 4, 2012.
- Donahue, John, and Joseph Nye. "Market-Based Governance and the Architecture of Accountability." In *Market-Based Governance: Supply Side, Demand Side, Upside, and Downside*, edited by John Donahue and Joseph Nye, 1-25. Washington, D.C.: Brookings Institution, 2002.
- Duffus, R.L. "Our Great Subway Network Spreads Wider." *New York Times*, September 22, 1929 Sep. 22, 1929.
- Dye, Thomas. Top Down Policy Making. CQ Press, 2001.
- Editorial. "A Terrible Transportation Bill." The New York Times, 2012.
- Edwards, Marion, and Roger L. Mackett. "Developing New Urban Transport Systems an Irrational Approach." *Transport Policy* 3, no. 4 (1996): 225-39.
- Eisinger, Peter. "City Politics in an Era of Federal Devolution." *Urban Affairs Review* 33, no. 3 (1998).
- Erie, Steven P. *Globalizing L.A. Trade, Infrastructure and Regional Development.* Stanford: Stanford University Press, 2004.
- Erie, Steven P., Vladimir Kogan, and Scott A. MacKenzie. "Redevelopment, San Diego Style: The Limits of Public-Private Partnerships." *Urban Affairs Review* 45, no. 5 (2010): 644-78.
- Escutia, Martha M. (Assemblyperson), and Betty (Assemblyperson) Karnette. "Joint Hearing by the Assembly Select Committees on the Alameda Corridor Project and on California Ports." edited by California State Assembly: California State Legislature, 1993.
- Esping-Andersen, Gosta. *The Three Worlds of Welfare Capitalism*. Princeton University Press, 1990.
- FHWA. 1999.
- ----. "A Guide to Transportation Decisionmaking."
- ----. "TIFIA Trailblazers." 2004.

———. "Transportation Performance Management, Economic Primer: Cost-Benefit Analysis." Federal Highway Adminstration.

- FHWA, FRA, and CalTrans. "Alameda Corridor Environmental Impact Statement." 1996.
- Flyvbjerg, Bent. "Five Misunderstandings About Case-Study Research." *Qualitative Inquiry* 12, no. 2 (2006): 219-45.
- Flyvbjerg, Bent, Nils Bruzelius, and Werner Rothengatter. *Megaprojects and Risk: An Anatomy of Ambition*. Cambridge/ New York: Cambridge University Press, 2003.

Fortuna, Diana. "We Don't Need a New Subway Line." New York Times, Oct. 2, 1999.

- FTA. "Annual Report on Funding Recommendations: Report of the Secretary of Transportation to the United States Congress." In *Annual Report*, edited by Federal Transit Administration. Washington, D.C., 2007.
- ———. "The Second Avenue Subway, Phase 1: Full Funding Grant Agreement." In Project Profiles - Full Funding Agreement. Washington, D.C.: Federal Transit Administration, 2009.
- Giuliano, Genevieve. "The Changing Landscape of Transportation Decision-Making." edited by Thomas B. Deen Distinguished Lecture, 5-12, 2007.
- Grava, Sigurd. "Is the Second Avenue Subway Dead in Its Tracks." *New York Affairs* 6, no. 3 (1980): 32-41.
- Gregory, Steven. *Black Corona: Race and the Politics of Place in an Urban Community.* edited by Power Princeton Studies in Culture, and History Princeton, New Jersey: Princeton University Press, 1998.
- Grossman, Gene M., and Elhanan Helpman. *Special Interest Politics*. Cambridge, Massachusetts: MIT Press, 2001.
- Haeussermann, Hartmut, and Walter Siebel. "Festivalisierung Der Stadtpolitik. Stadtentwicklung Durch Grosse Projekte." *Leviathan* Sonderheft/ Special Issue, no. 13 (1993).
- Hall, Peter. Great Planning Disasters. Berkeley: University of California Press, 1980.
- Harvey, David. "Neoliberalism as Creative Destruction." *The Annals of the American Academy of Political and Social Science* 910 (2007): 21-44.
- Helms, Ludger. "Five Ways of Institutionalizing Political Opposition: Lessons from the Advanced Democracies." *Government and Opposition* (2004).
- Hibbs, Douglas A. Jr. "Political Parties and Macroeconomic Policy." *American Political Science Review* 71, no. 4 (1977): 1467-87.
- Hicks, Gil. "Alameda Corridor Case Study." 2008.
- Higashide, Steven. "Meet the Mta Capital Program Review Board." In *Mobilizing the Region*, edited by Tri-State Transportation Campaign, 2009.
- Hood, Clifton. 722 Miles. Edited by Johns Hopkins University Press Baltimore 2004.
- Isin, Engin F. "Governing Toronto without Government: Liberalism and
 - Neoliberalism." Studies in Political Economy 56 (1998): 169-91.
- Iversen, Torben, and David Soskice. "Electoral Institutions and the Politics of Coalitions: Why Some Democracies Redistribute More Than Others."*American Political Science Review* 100, no. 2 (2006): 165-81.
- Jenkins-Smith, Hank C., and Paul A. Sabatier. "Evaluating the Advocacy Coalition Framework." *Journal of Public Policy* 14, no. 2 (1994): 195-203.
- Jones. 1994.

---. "2003."

Jones, Bryan D. "Bounded Rationality." *Annual Review of Political Science*, no. 2 (1999): 297-321.

- Kabak, Benjamin. "Second Avenue Sagas." http://secondavenuesagas.com/second-avesubway-history/.
- Kelley, Tina. "Officials Urge M.T.A. To Build Full Second Ave. Subway Line." *New York Times*, Sep. 9, 1999.
- Kennedy, Loraine, Glen Robbins, Dianne Scott, Cathy Sutherland, Eric Denis, Julia Andrade, Aurelie Varrel, Veronique Dupont, and Berenice Bon. "The Politics of Large-Scale Economic and Infrastructure Projects in Fast-Growing Cities of the South - Literature Review." 2011.
- Kennedy, Randy. "Voters Weight Initiatives on Spending for Transit." *New York Times*, Nov. 8, 2000, 14.
- Kenny, Charles. "Transport Construction, Corruption, and Developing Countries." *Transport Reviews* 29, no. 1 (2008): 21-41.
- King, Seth S. "City Approves 2d Ave. Subway and 11 Other New Transit Lines." *The New York Times*, Sep. 21, 1968, 1, 55.
- Kingdon, John. Agendas, Alternatives, and Public Policy. Little Brown & Company, 1984.

Krasner, Stephen. "Approaches to the State: Alternative Conceptions and Historical dynamics." *Comparative Politics* 16, no. 2 (1993): 223-46.

- Lardner, James. "Painting the Elephant." *The New Yorker* (June 25, 1984): 41-72.
- LeDuc, Lawrence, Richard Niemi, and Pippa Norris. *Comparing Democracies: Elections and Voting in Global Perspective*. Thousand Oaks: Sage, 1996.
- Lewis, Raphael. "Public-Private Trust Urged to Oversee Greenway Design." *Boston Globe*, May 31, 2002.
- Lewis, Raphael, and Sean P. Murphy. "Artery Errors Cost More Than \$1 Billion." *Boston Globe*, Feb. 9, 2003.
- ----. "Easy Pass: Why Bechtel Never Paid for Its Big Dig Mistakes." *Boston Globe Online*, Feb. 2, 2003.

Lijphart, Arend. *Electoral Systems and Party Systems: A Study of 27 Democracies*. Oxford: Oxford University Press, 1994.

- Lindblom, Charles. "The Science of Muddling Through." *Public Administration Review* 19, no. 2 (1959): 79-88.
- Lindqvist, Erik, and Robert Oestling. "Political Polarization and the Size of Government." *American Political Science Review* 104, no. 3 (2010): 543-65.
- Lipton, Eric. "Mayor Says He Has Little Use for State Transportation Bond." *New York Times*, Nov. 6, 2000, 4.
- Lueck, Thomas. "M.T.A. To Propose Spending Billions on Rail Expansion." *New York Times*, Sep. 26, 1999, 45.
- Lui, Tai-lok. "City-Branding without Content: Hong Kong's Aborted Kowloon Mega-Project (1998-2006)." *International Development Planning Review* 30, no. 3 (2007).
- Mackie, Peter, and John Preston. "Twenty-One Sources of Error and Bias in Transport Project Appraisal." *Transport Policy* 5 (1998): 1-7.
- MacManus, Susan. ""Bricks and Mortar" Politics: Howe Infrastructure Decisions Defeat Incumbents." *Public Budgeting and Finance* Spring (2004): 96-112.
- Maloney, Carolyn. "Victory for New York in Federal Transportation Bill." (2005) http://maloney.house.gov/press-release/victory-new-york-federaltransportation-bill.
- Mercado, R., A. Paez, D.M. Scott, K.B. Newbold, and P. Kanaroglou. "Transport Policy in Aging Societies: An International Comparison and Implications for Canada." *The Open Transportation Journal* 1, no. 13 (2007).

Metropolitan Transportation Authority. "Board and Leadership

Info." http://www.mta.info/mta/leadership/board.htm.

- ----. "Second Avenue Subway." http://www.mta.info/capconstr/sas/outreach.html.
- Moe, Terry. "Politics and the Theory of Organization." *Journal of Law, Economics & Organization* 7, no. Special Issue (1991): 106-29.
- ----. "Power and Political Institutions." *Perspectives on Politics* 3, no. 2 (2005): 215-33.

Mollenkopf, John. *The Contested City*. Princeton: Princeton University Press, 1983.

Morelli, Massimo. "Party Formation and Policy Outcomes under Different Electoral Systems." *The Review of Economic Studies* 71, no. 3 (2004): 829-53.

Morelli, Massimo. "Party Formation and Policy Outcomes under Different Electoral Systems." *World Bank Economic Review* 15, no. 1 (2001): 165-76.

Morris, Peter W.G., and George H. Hough. *The Anatomy of Major Projects: A Study of the Reality of Project Management*. edited by Major Projects Association New York: John Wiley & Sons, 1987.

MTA, and FTA. "Second Avenue Subway: Final Environmental Impact Statement." 2004.

Murphy, Sean P. "Big Dig Pushes Bottlenecks Outward Artery Has Cleared, but Commutes Longer on Several Major Routes." *Boston Globe*, Nov. 16, 2008.

- Myra L. Frank and Associates. "Alameda Corridor Environmental Impact Report." 1993.
- Neuman, Andy. "Senate Republicans Block Transit Plan." *New York Times*, Dec. 22, 1999.
- Neuman, William. "Is That Finally the Sound of the 2nd Ave. Subway?" *New York Times*, Apr. 9, 2007, 1.
- Nobbe, Patrizia, and Charles Brecher. "Alameda Corridor." NYU Wagner Rudin Center for Transportation Policy and Management, 2011.
- Norris, Pippa. "Choosing Electoral Systems: Proportional, Majoritarian and Mixed Systems." *International Political Science Review* 18, no. 3 (1997): 297-312.
- OMEGA Centre. "Case Studies on International Mega-Projects." http://www.omegacentre.bartlett.ucl.ac.uk/.
- Oral Testimony of the Honorable Janice Hahn to a Joint Hearing of the U.S. Senate Environment & Public Works Committee and Finance Committee., 2002.
- Osland, Oddgeir, and Arvid Strand. "The Politics and Institutions of Project Approval a Critical-Constructive Comment on the Theory of Strategic Misrepresentation." *EJTIR* 10, no. 1 (2010): 77-88.
- Panero, Marta, and Ian Botha. "The Nature of Context Sensitive Solutions, Stakeholders Involvement and Critical Issues in the Urban Context." In *MTI Report*. San Jose: Mineta Transportation Institute, 2011.
- PCAC. "The Road Back: A Historic Review of the Mta Capital Program." edited by Permanent Citizen's Advisory Committee to the MTA. New York: PCAC, 2012.
 ———. "The Road Back: A Historical Review of the Mta Capital Program." 2012.
- Perez-Pena, Richard. "Assembly Speaker Links Subway to Budget Vote." *New York Times*, 2000, 1.
- Persson, Torsten. "Do Political Institutions Shape Economic Policy?". *Econometrica* 70, no. 3 (2002): 883-905.
- Peters, Deike. "Digging through the Heart of Reunified Berlin: Unbundling the Decision-Making Process for the Tiergarten-Tunnel Mega-Project." *EJTIR* 10, no. 1 (2010): 89-102.
- Peters, Deike, and Sandra Huning. "Mega-Projekte Und Stadtentwicklung." *Planungsrundschau* (2003). Published electronically

2003. http://www.asl.uni-

kassel.de/~altrock/webauftritt/pr/planungsrundschau08/frameset.htm.

- Petersen, John E. "Public-Sector Financing in Intermodal Freight Transportation." In *Policy Options for Intermodal Freight Transportation*, edited by Transportation Research Board. Washington, D.C., 1998.
- Pierre, Jon. "Models of Urban Governance: The Institutional Dimensions of Urban Politics." *Urban Affairs Review* 34, no. 3 (1999): 372-96.
- Pierson, Paul. "Increasing Returns, Path Dependence, and the Study of Politics." *The American Political Science Review* 94, no. 2 (2000): 251-67.
- ———. *Politics in Time History, Institutions, and Social Analysis*. Princeton, New Jersey: Princeton University Press, 2004.
- Pressman, Jeffrey, and Aaron Wildavsky. *Implementation*. Berkeley: University of California Press, 1984.
- Priemus, Hugo, ed. Decision-Making on Mega-Projects: Cost-Benefit Analysis, Planning and Innovation, 2008.
- ----. "Decision-Making on Mega-Projects: Drifting on Political Discontinuity and Market Dynamics." *EJTIR*, no. 1 (2010).
- ———. "How to Improve the Early Stages of Decision-Making on Mega-Projects." Chap.
 6 In *Decision-Making on Mega-Projects: Cost-Benefit Analysis, Planning, and Innovation*, edited by Hugo Priemus, Bent Flyvbjerg and Bert van Wee, 105-19. Cheltenham, North Hampton: Edward Elgar, 2008.
- Regional Plan Association. "Metrolink New Transit for New York." edited by Regional Plan Association (RPA), 1999.
- Rochefort, D.A., and R.W. Cobb. *The Politics of Problem Definition*. Lawrence: University Press of Kansas, 1994.
- RPA. "Regional Plan Association: Our History." http://www.rpa.org/about/history.
- Chan, Sewell. "The Bond Passed. Now Comes the Hard Part: Actually Building the 2nd Avenue Subway." *The New York Times*, Nov. 14, 2005.
- Samiolo, Rita. "Out of Control: Exploring the Relevance of the Theme Of "Megaprojects" For Social and Institutional Accounting Studies." In *The 8th Interdisciplinary Perspectives on Accounting Conference*. Cardiff, UK: unpublished! no further quotation or circulation!, 2006.
- Sartori, Davide. "Multi-Level Governance in Large Transport Infrastructures." edited by Centre for Industrial Studies. Milano, Italy, 2008.
- Scharpf, Fritz. "Institutions in Comparative Policy Research." *Comparative Political Studies* 33, no. 6/7 (2000): 762-90.
- Scharpf, Fritz W. Games Real Actors Play: Actor-Centered Institutionalism in Policy Research. Boulder: Westview Press, 1997.

Schattschneider, E.E. The Semi-Sovereign People. New York: Holt, 1960.

- Schmidt, Manfred G. "The Welfare State and the Economy in Periods of Economic Crisis: A Comparative Study of Twenty-Three OECD Nations." *European Journal of Political Research* 11, no. 1 (1983): 1-26.
- Scott, James. "Corruption, Machine Politics and Political Change." *The American Political Science Review* 4 (1969): 1142-58.
- Siemiatycki, Matti. "Managing Optimism Biases in the Delivery of Large Infrastructure Projects: A Corporate, Performance Benchmarking Approach." *EJTIR 10(1)*. (2010): 30-41

- Simon, Herbert. "A Behavioral Model of Rational Choice." In *Models of Men*, edited by H. Simon, 241-60. New York: John Wiley, 1957.
- Steinhauer, Jennifer. "Another Big Idea Brought Down by Politics." *New York Times*, June 5, 2007.
- Stelter, Lawrence. "Analysis of Demolishing New York City Elevated Transit Lines." *The Municipal Engineers Journal* 78, no. II (1990): 21-47.
- Stone, Clarence. *Regime Politics: Governing Atlanta, 1946-1988*. Lawrence: University Press of Kansas, 1989.
- Stone, Deborah. *Policy Paradox: The Art of Political Decision-Making*. New York: Norton & Company, 2002.
- Swyngedouw, Erik, Frank Moulaert, and Arantxa Rodriguez. "Neoliberal Urbanization in Europe: Large-Scale Urban Development Projects and the New Urban Policy." *Antipode* (2002): 542-77.
- Taagepera, Rein. *The Effects and Determinants of Electoral Systems*. New Haven: Yale University Press, 1989.
- True, James, Bryan Jones, Frank Baumgartner, Theories of the policy process (pp. 155–188). Denver In P. Sabatier (Ed.), and CO: Westview Press. "Punctuated Equilibrium Theory: Explaining Stability Andchange in American Policymaking." In *Theories of the Policy Process*, edited by Paul Sabatier, 155–88. Denver: Westview Press, 1999.
- Tsebelis, George. *Veto Players. How Political Institutions Work*. Princeton: Princeton University Press, 1992.
- van Wee, Bert, and Lorant A. Tavasszy. "Ex-Ante Evaluation of Mega-Projects: Methodological Issues and Cost-Benefit Analysis." In *Decision-Making on Mega-Projects: Cost-Benefit Analysis, Planning and Innovation*, edited by Hugo Priemus and Bent Flyvbjerg: Edward Elgar Publishing, 2008.
- W., de Jong Martin. "Institutional Structures and Variation of Information: An International Comparison of Transport Infrastructure Decision-Making."*Knowledge, Technology, and Policy* 12, no. 2 (1999): 52-74.
- w/o name. "The Line That Time Forgot." In New York Magazine.
- Wachs, Martin. "When Planners Lie with Numbers." *Journal of the American Planning Association* 55, no. 4 (1989): 476-79.
- Winston, Clifford. "Lecture: Performance and Policy Reform of the U.S. Transportation System." New York: UTRC2 Event Series, 2012.
- Witkin, Richard. "2.9 Billion Transit Plan for New York Area Links Subways, Rails, Airports " *The New York Times*, Feb. 29, 1968.
- Yin, Robert K. *Case Study Research: Design and Methods*. Thousand Oaks: Sage Publications, 1994.
- Zahariadis, Nikolas. "The Multiple Streams Framework: Structure, Limitations, Prospects." Chap. 3 In *Theories of the Policy Process*, edited by Paul A. Sabatier, 65-92. Boulder, Colorado: Westview Press, 2007.