2011-08-10

The Sex Ratio Tipping Point: An Exploration of Crime during Frontier America

Steven Matthew Stearmer

Brigham Young University - Provo

The Sex Ratio Tipping Point: An Exploration of Crime during Frontier America

S. Matthew Stearmer

A thesis submitted to the faculty of
Brigham Young University
in partial fulfillment of the requirements for the degree of

Master of Science

Carol J. Ward, Chair
Howard Bahr
John Hoffmann

Department of Sociology

Brigham Young University

December 2011

ABSTRACT

The Sex Ratio Tipping Point: An Exploration of Crime during Frontier America

S. Matthew Stearmer
Department of Sociology, BYU
Master of Science

Prior research confirms that the number of men in a population is associated with elevated levels of crime. The connection between higher numbers of males relative to females and crime is far less studied in larger aggregate populations, and the nature of the relationship is less clear. This study seeks to answer three questions: are unbalanced sex ratios associated with crime at the state level? At what level does the skew begin to matter? How quickly is the impact observed? These questions are examined through analysis of a novel longitudinal dataset of social characteristics and crime indicators for frontier American states between 1850 and 1920. Fixed effects longitudinal analysis reveals a positive association at the state level between skewed sex ratios – towards both men and women - and crime. This study concludes that any deviation from an equal sex ratio is associated with higher levels in crime, and this impact was demonstrated to occur within a short time frame.

Key Words: sex ratio, unbalanced sex ratio, crime, frontier America

ACKNOWLEDGEMENTS

First, to Janille, my wife and love of my life, I would like to thank for her constant support encouragement, intellect, and editing abilities. If there is anything worthwhile in this thesis is it because of her. Second, Carol Ward, for her continuous input, and support. I cannot adequately express my appreciation in words. Thank you for everything. To my committee at large, I appreciate your patience and input that have helped me develop into a better scholar. I wish to also express thanks to the Sociology department for their support though the years with funding and encouragement to finish. Finally I would like to thank my children Conner, Savannah, Emmaline, Tess and Isaac, whose support I have desperately needed and whose love is so unconditional that it has lifted me even in the most challenging times.

That which is united becomes visible. That which is visible becomes valued. That which is valued becomes powerful.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

Gender is one of the most basic organizing factors of human society. Gender alone constitutes a primary influence, but it is its intersection with other variables that tends to exacerbate gender as an organizing force (Acker 2006). The intersection of gender and other variables is what necessarily makes the relationship between sex ratios and crime complex. In general, at the individual level, men are far more prone to deviant behavior than women. A generalized extension of this micro level phenomenon then is that male dominated groups are more prone to deviance. This relationship, however, is likely moderated by other factors. Since at least 1937, male-skewed sex ratios have been theoretically linked with higher rates of crime and moderated by low family formation and weak community development (Hayner and Reynolds 1937). However, the link between the micro-level phenomena of male deviance and higher levels of male deviance in male-dominated groups is less than straightforward (Messner and Sampson 1991).

While the exact impact or causal mechanism remains unclear, there is a general agreement that deviant behavior outcomes will be impacted by both micro-level phenomena as well as macro-level pressures (Peterson and Krivo 2010). Thus, despite the confusion and difficulty of assessing the impact of an unbalanced sex ratio on higher aggregate levels of organizations (moving the level of analysis from the individual to the group, neighborhood, city, or the state), a desire remains to understand how the gender balance of an institution might affect its behavior because this variable would potentially constitute a natural systemic risk to the institution. In order to test this link appropriately a longitudinal approach is necessary, however appropriate case studies are difficult to identify. A few causal mechanisms have been suggested linking unbalanced sex ratios and crime: changed due to marriage, and change due to shifts in

power structures (Goldstein 2001). These changes will occur over the course of several years. Thus while the impact of skewed sex ratios may develop quickly, it is possible that its effects at an institutional level may not be observable for several years. Most studies have focused on single cohort years, or more recent periods without a great deal of variation in the time frame examined (Vandello 2007).

A key transitional period in the United States occurred during what is called the frontier era. This time period between roughly 1850 and 1920 constituted one of the most rapid periods of social change documented in United States' history. The size of the nation more than doubled. The number of states/territories increased substantially. Millions of inhabitants relocated to the west. Several wars, including the civil war, were fought. The industrial age began. These changes certainly affected the entire United States in unprecedented ways; however, this era was also affected by severe distortions in the sex ratios as men migrated westward at substantially higher rates than women and children. Prior research has tended to understate the role women played in frontier development. In other cases, it oversimplified and essentialized the roles of women. However, more recent studies have begun to address the role of women more accurately during this period of rapid social change (Irwin and Brooks 2004).

Numerous lessons from this era have been explored from several angles for over a hundred years, and yet despite all of the attention, little work has been done to quantitatively explore the impact that skewed sex ratios had on crime during the frontier period. The purpose of this research then is four-fold. First, I will review relevant literature on the frontier era and explore the role sex ratios played in its development. Second, I will present a conceptual model for understanding the role of sex ratios and their impact on the frontier. Third, I will utilize a new database compiled from census records to test the relationship between sex ratios and crime. And

finally, I will answer three questions: are skewed sex ratios related to crime? At what point does the skew begin to matter? How quickly is the effect measured?

LITERATURE REVIEW

The American frontier experience is permeated with significant lessons for the modern day. Since Frederick Jackson Turner's original work in 1890 our collective understanding of the American frontier continues to shape the American experience (Carlton 1946). Nowhere is this truer than our perceptions of the predictors of crime. Crime, in particular violent crime, is a hallmark of our perception of the Wild West. The reasons often given for the high levels of crime range from the availability of guns (Bellesiles 1996 and 2003), alcohol (Boessenecker 1988), lack of institutions (Ellis 1999 and 2005), race (Rawley 1979), and even population pressures (Cronon et al. 1986). Central to the predictors in each of these studies is the presumption that single men foster crime.

Why men are more prone to crime is still being debated, but man's association with violence is rarely questioned. Men are significantly more likely to commit every form of crime from theft to murder (Wrangham and Peterson 1996). The assumption has been that the West was violent and crime-ridden because there were increasing numbers of men migrating west, but herein lies a paradox.

Crime on the Frontier

Overall, population on the frontier increased dramatically throughout the whole frontier period, and the number of men coming to the frontier far outpaced the number of women through the entire period. That evidence combined with the fact that the number of guns increased throughout this period, that alcohol was continuously available, that many towns lacked significant governmental institutions, and that a growing number of racial minorities entered the

scene during the latter portion of this period, suggested to observers that crime rates would be high and would increase during this period. This is not the case, however. According to census data the overall crime rate dropped for all but the first decade of the frontier period. What would explain this paradox?

Two aspects of frontier development that have remained stubbornly understudied in relationship to crime are the skewed sex ratios of the frontier era and the impact of women on the frontier – not just in relation to their absence, but the effects of their presence (Cronon et al. 1986). A skewed sex ratio, also referred to as a gender imbalance, has been implicated in a number of studies as a significant stressor on society and its ability to absorb and control behavior. For example, increases in general conflict both within societies and between nations, crime (Courtwright 1996, 2008), and terrorism (Baruch 2003, Brynar and Skjølberg 2000) have been attributed to male dominated sex ratios (Kimmel 2003, Hudson and Den Boer 2002, Buvinić et al 2008, Goldstein 2001). Anecdotal evidence suggests that such a connection may also be plausible on the frontier.

Census data confirm that the frontier period was characterized by a mass male-dominated migration, to various locations in the underdeveloped West. This mass migration of men created enormously skewed sex ratios on the frontier compared to other regions in the country. However, men and women traveled to different regions of the country at different rates. Due to both the agrarian economy, which was more conducive to family life (where more help was needed to sustain an agrarian home economy), and easier access due to the shorter distance and a growing transportation network, portions of the mid-west were settled by more equal numbers of men and women, sometimes with children, traveling together. These agrarian states had less skewed sex

4

ratios than the mining states, and significantly lower crime rates (Ellis 1999, 2004, McKanna 2004).

Interestingly, the frontier migration not only affected the frontier states but the eastern states as well. Due to the massive migration from both new immigrants as well as more established eastern citizens, eastern state sex ratios were affected by the frontier era, but in an opposite direction. In the east, states developed female skewed ratios. These dramatic shifts occurring at the same time provide an excellent opportunity to examine the effect of sex ratios on crime. While we often conceive of an unbalanced sex ratio as being a predominately male phenomenon the skewness can favor women as well. If the sex ratio imbalance were only related to higher crime rates when more men were present, it would be difficult to argue that the imbalance itself was the causal mechanism. However, if an imbalance favoring women, such as occurred in the eastern states, were also related to crime then that relationship would strengthen the case that the imbalance was the causal mechanism and not just the presence of more men. Indeed, several studies suggest that such a connection to crime and female skewed sex ratios is probable (Hudson and den Boer 2004; Courtwright 1996). At least two potential explanations associate low sex ratios and crime. First, as more men are taken, or leave, a particular area tipping the sex ratio towards women a certain amount of economic power would also leave the area. Decreased access to economic resources would result in a collective disadvantage leading to conditions favoring increased crime rates. Alternatively, a second scenario could be posited that as more women are available in the marriage market, especially if the women are relatively disempowered, their increased availability could render them more vulnerable. Men may become less likely to choose marriage, as women may be less empowered to demand it, because as

demands increase men are able to more easily move to another. In this scenario the normally positive influence of family formation on crime may be diminished.

[Figures 1 and 2 about here]

Over the course of 70 years the sex ratios began to normalize in both the east and west. These changes in the sex ratios and the crime rates, as well as various other factors to be examined as control variables, were tracked in the decennial census records of the United States government and other historical archives. These well-documented conditions provide an exceptional test to the impact of skewed sex ratios on crime. Prior to presenting the conceptual model of the effect of an unbalanced sex ratio on crime, other factors known to be associated with crime need to be considered.

Micro to Macro Crime Theory

Several criminological theories highlight the determinants of crime. A short list would include theories examining the individual (Glueck & Glueck 1968; Mednick Ganrielli and Hutchings 1984), social (Shaw & McKay 1972; Bursik & Grasmick 1993), cultural (Matsueda 1987; Sampson & Laub 1997) and structural (Felson and Cohen 1984; Messner & Rosenfeld 1994) aspects of crime. At the individual level there is an interest in gender composition of groups and the outcomes in male- or female-dominated groups vs. mixed groups (Steffensmeier 1983, Steffensmeier and Allan 1996). Even in young children, male-dominated groups tend to result in more confrontational negotiations and play (Busch et al 1996; Clayton, Ballif-Spanvill and Hunsaker 2001).

As the level of analysis increases from personal and group interactions to more macro-level societal constructions, the connection between male/female composition and crime outcomes becomes less clear. Of those criminological studies focused on structural factors,

6

several demographic pressures have been explored, includes population pressures that create tensions between groups, such as migration, race, population density and, tangentially, gender (South and Messner 2000, Ellis 1999 and 2005). One must be cautious in the extension of logic from micro to macro level, as it risks committing the ecological fallacy. The causal mechanism relating gender to crime at the micro level might not be the same at the macro level. In fact, there are a number of reasons to believe this to be the case.

The idea that there may be a macro-level link between sex ratios and crime has been studied for several decades. However, results from this research have been mixed. Although sex ratios are an easily accessible variable, the effect of sex ratio variations is difficult to model because of the dual impact skewed sex ratios have on conflicting institutions or pressures (Messner and Sampson 1991, Vandello 2007). I will consider two competing pressures here.

First, Messner and Sampson argued that while high sex ratios are associated with higher rates of crime, high sex ratios also signify a more competitive marriage market. Messner and Sampson hypothesized that with more prospects for marriage stronger marital unions will form. These stronger unions will create less family disruption. Lower levels of family disruption are associated with lower crime rates. They test this relationship on robberies and murder at the city level. Consistent with their model they find that increased numbers of men are associated with higher crime as well as with more stable families, which they conclude may explain why skewed sex ratios are not directly related to crime (1991).

Second, sex ratios may inspire different motivations to crime. Vandello (2007) suggests, based on Guttentag and Secord's (1983) theory, that marriage market success may be a key factor predicting violence. Increased scarcity of women, under certain social power dynamics, may result in higher rates of violence because of increased competition and riskier behavior.

However, Vandello asserts that this reasoning should only hold true for certain types of crime. Under this scenario crimes of passion would likely be affected by skewed sex ratios, however, Vandello hypothesizes that other forms of violence, because they are not connected to the marriage market, would not be associated with higher rates of crime (2007). Thus, while at the micro level scarcity of women is associated with higher crime rates, at the macro level this relationship is less clear.

This reasoning, however, is not without its own flaws. First, regarding Messner and Sampson's research, there is evidence that female-favored sex ratios do not produce a favorable marriage market (Guttentag and Secord 1983, Darity and Myers 1984, Grossbard-Shechtman 1985). In fact, it may produce even more control of women by men and higher rates of crime and violence (McDermott and Crowden 2007). Regardless of whether there are more or fewer men, there is no guarantee that the number of men, in and of itself, will affect the stability of relationships. Second, touching on Vandello's argument, there is ample evidence that single men are more likely to commit all forms of crime (Messner and Sampson 1991; Barber 2000; Sampson et al. 2006). If larger numbers of men are associated with all crime, especially when the men are unmarried, and even if sex ratios are not related to a specific type of crime, there is strong reason to conclude that sex ratios would be associated with overall crime rates.

Partially confirming Messner and Sampson's thesis, David Courtwright (1996) suggests that the growing prevalence of women on the frontier led to increased marriages, and that these marriages provided the backdrop to more stable social systems. It is not that there were no institutions prior to appreciable numbers of women on the frontier; businesses, for instance, were interested in a certain amount of law and order, but these institutions were interested in only protecting and promoting certain kinds of law and order. Immediately after women began to

arrive in appreciable numbers things did not automatically begin to change, but the presence of women did change the calculation of risk and reward.

As families form a greater degree of settlement occurs, and different social needs are produced. The more permanent the settlement, the greater is the need for institutions to protect citizens from physical threats and provide a foundation for future generations. The presence of families increases the cost of criminal altercations (Courtwright 1996, 2008). However, we can look for explanations beyond the marriage model envisioned by Messner and Sampson or Courtwright and consider that women were active participants in shaping the frontier through political, moral and economic actions as well (Jensen and Miller 1980; Irwin and Brooks 2004).

The demographic shift from primarily men on the frontier to more balanced sex ratios precipitated several changes in social structure to accommodate the new realities of the lack of men in the east, and the necessity of more fully participatory women in the west. In the east women often found themselves alone to manage the family's affairs, which led to the endowment of greater property rights. On the frontier, the need for survival required women to be more active participants in both personal and civic affairs. Women earned the right to own and manage property in their own name in 1862 with the Homestead Act, and in several locations on the frontier women owned more property than men (Franham 1856, Black 1976).

As women became involved and more normalized throughout the social institutions, male dominated hierarchies were disrupted (Goldstein 2001). This disruption in power had the possibility to begin to produce changes in society, beyond the effects in the family alone. The fact that women first gained the right to vote on the frontier is evidence of a shift in power. The right to vote was only one of several shifts in power that, while falling short of establishing equality between the sexes, empowered women in increasing access to education for themselves

and children, ending slavery, promoting better race relationships, instituting temperance laws, lowering the amount of drinking that occurred over all, and pushing economic legislation to protect workers (Jensen and Miller 1980; Irwin and Brooks 2004).

Here the relationship between sex ratios and crime begins to become more complicated – but also gains more clarity. Analyzed from a single point in time, or even a relatively short time period, Messner and Sampson's conclusions would be completely plausible. Skewed sex ratios might be associated with higher numbers of men to commit crime, while at the same time more stable families might reduce crime, thus producing potentially mixed results. However, over time, the number of excess males would be reduced as sex ratios normalized, thereby reducing the impact on crime, while at the same time increasing the number of families further reduced crime. Over time normalizing sex ratios ought to be associated with fairly drastic reductions in crime.

Institutional Development

When considering frontier development, images of the old west, lawlessness, and vigilantism – essentially the lack of institutional development – come to mind. These conditions certainly existed at times during the early frontier era, however, their generalization to the whole of the frontier period is not historically accurate (Ellis 1999 and 2005; McKanna 1994). The gold rush era of the late 1840s and early 1850s brought many men to the various regions in the west, but they were hardly coming to vacant land. Mining often took place in the mountains, but life (and crime) tended to happen in the cities where larger and stronger governmental organizations had already developed (Dimsdale and Noyes 1915).

Further, the specific era that I am examining is the time period after each state was officially settled and recognized as an official territory. In order to be considered as a territory

each state was required to have a certain amount of governmental infrastructure in place. Land preparing to become a territory with fewer than 5,000 free males in the state would have a governor appointed to make laws and see that they were enforced. Once more than 5,000 free men were present in the territory they would be allowed to organize into local governments and send a non-voting representative to Congress. As a territory approached 60,000 people, they could apply for statehood if they had developed sufficient infrastructure to support themselves (Wilson 1999). This pattern of established governmental organization was exceptionally strong in four frontier regions: west coast, previous Mexican territory, the Mormon settlements, and the agricultural region.

By 1850 California had nearly 100,000 residents and had been settled for over 80 years by individuals coming from the United States. Oregon and Washington each had approximately 12,000 individuals, with migration from the US in place for nearly 50 years. California already had a strong legal system in place, but between 1846 and 1849 the US military occupied the territory and provided both governance and legal enforcement prior to turning control over to a civilian government. And while the system of governance was quite different after taking control of the land from Mexico, the population had been rooted in a system of law and order many years prior to becoming an American territory (Saunders 1996). Other former Mexican territories shared similar fates (Bancroft and Oak 1889). In Oklahoma, the Indian tribes had strong traditions of law and order under their own rules and systems of governance. The tribes were trained and familiar with the US legal system and often before physical confrontations had exhausted every legal means at their disposal to obtain justice (Debo 1970). Areas originally settled by members of The Church of Jesus Christ of Latter-day Saints (the Mormons), which included all of Utah, Nevada, the northern portion of Arizona and the southern portion of Idaho,

brought with them extensive legal systems and a culture based in the rule of law (Firmage and Mangrum 1998)[1]. Agricultural states were built from the beginning on systems of legal structures that were brought with the settlers. In part, this was because farmers they tended to migrate as families but, more importantly, agricultural development requires a significant investment. Families establishing a farming system wanted to guarantee that they would be protected in their investments, and this led to the formation of strong legal systems. This by no means ruled out crime and violence; it only ensured that crime was more likely to be prosecuted (Ellis 1999 and 2005; McKanna 1994).

After examining these regions and finding that they did indeed possess sufficiently strong governmental organizations to enforce the laws, there is one region that should be examined in more detail. Montana, Wyoming and the Dakotas were among of the least developed regions on the frontier[2]. As their histories are somewhat similar I will explore the development of the legal and governmental organizational structures in Montana as a small case study for the development of the region in general.

Contrary to popular notions of the western frontier, it was far from lawless. Montana was organized as a territory in 1864[3]. Although the supreme court was established the same year, the judicial system itself was established prior to the official establishment of the Supreme Court

---

[1] The Church of Jesus Christ of Latter-day Saints' interaction with the US legal system is complicated. Initially it was embraced as a means of protection from hostile interests in the various states where they settled. As they moved west, many of the legal ties were dropped in favor of church based courts. A more standard legal system was eventually readopted. Regardless of these changes, the members of the LDS Church were centered in a legal tradition and the rule of law.

[2] Based on census record data of population and settlement dates.

[3] Montana data was not collected until 1870.

(MT Gov 2011). Like all territories, Montana had a long history of "circuit practice" (Zillmer 1916). Judges and lawyers would travel a specific circuit from town to town throughout the year to conduct business in the more sparsely populated regions. Business was conducted in whatever accommodations could be obtained (from saloons to school houses). Persons accused of crimes were held until the judge and lawyers arrived, and were then tried by judge or jury (Ellis 1999 and 2005; McKanna 1994). While our image of the west is often one of lawlessness, law and order were often one of the first major social developments to take place. It often only took a few years for any boomtown to develop a legal system that rivaled their more established east coast counterparts (Zillmer 1916).

One such example occurred in Virginia City in the southwest region of Montana. In 1864, with ten thousand permanent inhabitants, it was the largest city in Western Montana (containing nearly half the population of Montana). By the time the territory had been officially organized Virginia City already had several judges and at least 24 registered lawyers (Dimsdale and Noyes 1915). According to census record details on registered lawyers in the east and west, the numbers were quite similar, with the West having more lawyers than the East. In the East there was approximately one lawyer per thousand citizens. In the west between 1850 and 1870 there were actually 1.5-6 lawyers per 1000 population (Zillmer 1916). The isolated nature of the west required more lawyers per population, but this isolation does not appear to have limited access to the legal system. By 1868 every territory had a firmly established tradition of lawyers and legal system, and according to the census records in 1870, the numbers of judges and lawyers were roughly equal in both frontier and non-frontier states (Zillmer 1916).

While the legal system itself was sufficiently established during this period of development, one criticism of the system, which has implications for the ability to conduct a

statistical analysis, is that there were substantial changes in how justice was administered. Primarily this change involved a shift from fines being used at the beginning of the frontier period, and primarily on the frontier, to increased reliance on jail time towards the end (Zillmer 1916). As the key variable in question here is the number of prisoners in the system, this change is potentially critical to the analysis of this study. While this is a reasonable concern, the census data for recorded incarceration rates show that they were at their highest at the beginning of the frontier period. By the time states became territories, and as time progressed, fines were used at fairly low rates. As changes took place on the frontier that might affect incarceration rates, one would have logically expected the incarceration rate to increase. And yet the opposite happened, suggesting that something besides a change in the legal or institutional structures led to a significant change in crime on the frontier.

Other institutions may be relevant to the reduction in crime as well. Schools have long been known to aid in the production (or reproduction) of culture and class (Weis 1988; Jewel 2008). Education is also associated with lower crime levels (Putnam 1995; Moretti 2004; Gibbons and Machin 2008). The story of education on the frontier is more complicated, however. Census records indicate that the number of teachers, in general, grew steadily throughout the frontier era. However, compared to the number of children present the ratio of teachers to students fluctuated dramatically between higher and lower student to teacher ratios in both frontier and non-frontier states.

While half of all non-frontier states increased their student to teacher ratios, reflecting both a need and value placed on education, only one in six frontier states increased the number of teachers relative to students, and all four states (IA, MI, NE, WI) bordered non-frontier states and were primarily agriculturally-based economies. Education during this era might have

signified something extremely different from our notions of its importance today. In the east and in the more industrial north education improved, possibly reflecting the importance of education to their industrializing economies. In the south, however, the ratio of teachers to the population began to drop. Lower education levels could then have two different meanings with different results expected. Lower education levels may have signified a lack of opportunity and therefore might be associated with crime, or the lower education level may reflect the perceived usefulness of education and might be correlated with job prospects in the more agrarian south[4].

Another key institution is the economy. The breakdown of society due to economic disadvantage and the effects of poverty, divorce and discrimination is well documented in the criminological literature (Shaw and McKay 1942; Bursik and Grasmick 1993; Sampson, Raudenbush and Earls 1997; and Carr 2003). Similarly, historians have argued that crime on the frontier was also associated with increased social instability (Hackney 1969; Pratt and Colen 2005). However, the economy could potentially have both a positive and negative effect on crime.

When considering disadvantage and crime it is common to perceive poverty as an exacerbating condition. However, on the frontier it was the presence of money that contributed to increased crime. Extra money often allowed the single men to congregate in larger numbers attracted in towns and for alcohol, the company of women, and gambling. These conditions were often the precipitators of crime and violence (Adams 1928; Hollon 1974; McKanna 1995, 2004).

---

[4] Educational opportunity and economic opportunity is primarily addressed in the social capital and neighborhood effects literature for the present day (Vartanian and Gleason 1999; Rephann 2002). It is reasonable to conclude that if economic choices affect current student's decisions to remain in school, that similar economic decisions would have been present in earlier periods as well.

On the frontier both a positive, and negative, economy could be associated with higher levels of crime.

Aggregate individual characteristics also affect crime outcomes. In addition to demographic characteristics like the sex ratio, other demographic characteristics such as race impact the crime rates. The combination of alcohol, weapons and race could be a potent combination for crime in certain regions on the frontier. In one case study, 98% of all homicides were found to have race as a central cause for the altercation (McKanna 1997, 2004). Racial minority migrations, while never contributing a significant portion to the frontier populations, or to the overall crime and violence, nonetheless represented a continuous impact on frontier life (Bellesilles 1999). Census records were not very detailed regarding race. Essentially they tracked White/Non-White/Black and native vs. foreign born. This does not allow for meaningful analysis on race issues on the frontier. Some qualitative historical case studies, however, indicate that as one racial conflict began to subside others would flare up (Gard 1949). This occurred under two conditions: expansion and migration. As the United States expanded new settlers would come into conflict with the former occupants such as American Indians (Billington and Ridge 2001; Andrist 2001), or Mexicans (Carrigan and Webb 2003; Gonzoles-Day 2006). This was especially true in the earlier frontier period, whereas the later portion was more characterized by minority group migrations, such as the large influx of Chinese migrants (Wong 2004; Corbett 2010), the and the African-American migrations after the Civil War (McKanna 1994; Bellesiles 1999).

Conceptual Model

Macro-level variables may be divided into two categories. The first are aggregate demographic indicators of group characteristics within the society, such as racial composition, literacy rates and levels of poverty. The second set consists of social structural changes, such as

governmental organization, schools, and the economy. Balancing sex ratios are predicted to have both an indirect and direct effect on crime outcomes. Indirect effects include changes outlined above such as improved racial relationships due to the increased presence of women. Race on its own may normally constitute a risk factor for crime and violence. However, increasing numbers of women may reduce the potential risk by reducing intolerance and strengthening organizations designed to keep the peace.

[Figure 3 about here]

After accounting for the indirect effect of sex ratios on crime, there will remain an independent effect of skewed sex ratios on crime. This remaining effect can be conceptualized as an aggregate risk of society forming, or expecting to form, around male centered norms. The greater the presence of women within society, the higher the likelihood that structural conditions more commonly associated with male dominated groups, such as competitive norms, hierarchies and risky shifts,[5] will break down and reduce the crime rate. As outlined, the conceptual model is illustrated here in Figure 3.

DATA AND METHODS

All data were compiled from the decennial US Census records. The earliest time period for data collection is limited by the theoretical conception of the opening of the frontier. The frontier period began in roughly 1850 and closed in 1910 (Earle 2003, Otterstrom and Earle 2002). While it would have been useful to track changes prior to the mass migrations, data

---

[5] Originally coined by James Stoner (1968), the concept has developed to mean that groups of individuals will tend to make more extreme decisions together than individually. Several theories seek to explain why, but one key is that group settings create greater risk to any one individual who expresses doubt. Silence lends more authority to the riskier decision being proposed (Yarda 2010). The phenomenon is more pronounced in male groups (DiBerardinis, Rammage and Levitt 1984).

collection was inconsistent prior to 1850. I have extended my period of examination to 1920 in order to capture the effect of the 1910 period. Only aggregate state level data have been used because data at the county level were not consistently available for each frontier state for the entire period of analysis. While this has some potential limitations, a state level analysis is best suited for this particular study.

State level aggregated data do not reflect the diversity within a state or geographic region, but this level of abstraction is critical to testing the theory[6]. Despite this limitation, state level data is justified under a socio-ecological model exploring aggregate effects. While one could argue that state level data are not as fine grained as city or county level data, they do adequately represent societal pressure and, thus, measure an important and direct influence on the dependent variable.

Forty-eight states are included in the data. Twenty-three states qualify as having a frontier period[78]. All available census data were used to create the database. There are a total of 354 observation periods. Each state has at least three observations in the decennial census for each variable of interest. It should be noted that while each frontier state in the sample had a frontier period, some periods were shorter than others (in Iowa and Arkansas, for instance), while other

---

[6] It is possible to argue that some portions of the state may have been a frontier, while others were not, and it is not possible to completely determine where the crime was being reported and where the sex ratios showed the greatest imbalance. It may not be possible to determine that these events are even happening in the same spatial and temporal periods.

[7] Arizona, Arkansas, California, Colorado, Dakota, Florida, Idaho, Iowa, Kansas, Michigan, Minnesota, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, Wisconsin and Wyoming.

[8] North and South Dakota were combined for the first two periods of analysis. The Dakota Territory is treated as a separate case in the model.

states had mixed experience, with some sections (southern) within their borders quickly moving to non-frontier experience (Michigan and Wisconsin). While these are important distinctions the primary purpose of the analysis is to examine, for states with a frontier experience, how the transition occurred over time. Frontier status will be interacted with other variables to test for its effect.

Concerns identified by the census bureau in developing comparative historical tests between states and between years have been noted and incorporated into statistical methods used in the analysis. The data were analyzed using a fixed effects longitudinal analysis. Because of inter-state variations for the period between 1850 -1920, a fixed effects model is the most appropriate test due to its minimization of unobserved heterogeneity. However, a concern with fixed effects models is the impact of unobserved variables not included in the model. To assess the risk of misspecification the Ramsey reset test and linktests were performed. Both tests passed indicating the model was not misspecified. Data in this sample are not balanced, however pooled time series data are not biased in the face of unbalanced panels or cross sections. So few variables were not normally distributed. Log and square root transformations have been used where necessary. Variables adjusted for skewness are noted in tables 2-4. Serial correlation was also tested and the A1 term was statistically significant to less than the .001 level, indicating that the variables are not homoscedastic. The sampling design is nonrandom. Unfortunately data are missing for a few variables in some state/year combinations. This limits the total sample used in each model. The number of cases used for each model is noted in the tables below.

Variables

The dependent variable is the total number of convicted criminals at any level in the system per 1,000 people. This number is a total of all those in state, county and city prisons, jails,

and work programs as long as they were under the care of the state. Parolees were not included as that information was not collected for the census records until after the time period proposed for the analysis. Disaggregated crime rates at the various levels of incarceration are important for other theories regarding sex ratios and crime where sex ratios have been used to predict violent crime. This level of detail, however, is not necessary in this conceptual framework and analysis as skewed sex ratios are conceived as a potential risk for all types of crime. This level of aggregation removed one critical concern in data comparability. Criminal procedures and punishment varied from one time period to the next. For example, in 1850, a judge may have only been able to sentence a person to the county jail whereas in 1890 a penitentiary may have been available. If the data were disaggregated and compared over time this would be a significant concern, however, by aggregating all conviction levels the risk of mis-specifying the variable is reduced.

There is little indication that over the frontier period the total number of sentences changed relative to actual levels of crime (Ellis 1999 and 2005; Udall et al 2000). The major difference in sentencing during the frontier period is where the criminals served their sentences. In order to control for known changes in the level of sentencing, all criminals recorded within the system at the time of the census have been counted together and used as a proxy for the crime rate. This variable does not indicate the number of actual crimes committed nor the incarceration rate. It is a measure of the total number of individuals in prison, jail, work detail or house arrest at the time of the census.

Crime measures fall into four categories: crime rate, reported crime, conviction rate, and incarceration rate. For various reasons not all crimes are reported to the police. The crime rate is the actual number of crimes committed within a specific time period and population. The crime

rate, in modern times, is most often assessed based on victimization surveys. Reported crimes are those crimes reported and investigated by the police and are therefore recorded in the official statistics as an actual crime. The conviction rate measures the total number reported crimes that are prosecuted and result in a criminal conviction. Not all convictions result in some form of jail sentencing. The incarceration rate measures the actual number of convicted criminals that are placed in some form of corrective institution.

Crime data during the frontier period do not fall neatly into any of these categories. Census records record the total number of incarcerated individuals at the time of the survey. Thus it includes all of the criminals incarcerated during the year at the time the census data were collected and all of the convicted individuals still in the criminal system from prior years as well. However, historic crime data represents a facet of the crime rate. Because convictions and incarcerations during the frontier period were relatively stable the census data collected offer a rough indication of the level of criminality experienced during the frontier era. For purposes of this paper it is taken as a proxy for the crime rate, and for simplicity the collected crime statistic will be referred to as the crime rate while recognizing the actual data collected represents a more complicated understanding of crime during the frontier.

[Table 1 about here]

The primary independent variable is the state level sex ratio. This variable is calculated by dividing the male population by the female population and rounding to the second decimal place. A perfectly equal sex ratio would be recorded as 1. One extra male per one hundred women would be recoded as 1.01. Conversely one extra woman would be recorded as .99. That is for every 100 women, there are only 99 men. The skewed sex ratio of those of childbearing age (15-44) is the primary concern (Hudson and den Boer 2004).

21

While it would be preferable to distinguish between birth sex ratios and sex ratios of adults of childbearing age, census data are not this refined for the whole sample. This is more a concern in the non-frontier states than those on the frontier. Due to the relatively small number of children present on the frontier between 1850-1920 the overall sex ratio is a closer approximation of the sex ratio of persons during childbearing years than in the non-frontier states. In the non-frontier states this is potentially more problematic.

The overall sex ratio is an imperfect measure because it is not possible to accurately predict how many children will survive into adulthood. The mortality rates of boys and girls are different. More boys are born than girls naturally, and over the course of childhood more boys will die than girls. Thus, by the time people reach their childbearing years the ratios should be roughly equal. At birth sex ratios are considered abnormal if they rise above 1.07 (Hudson and den Boer 2004). The normal over all sex ratio then should be somewhat lower than this, although one should not expect that it reach 1.00 to be considered normal. Slave numbers were included in the 1850 and 1860 sex ratios for consistency before and after the Civil War.

In addition to testing the association between sex ratios and crime this paper also seeks to demonstrate when skewed sex ratio begins to matter and to determine how skewed the ratio must be to produce an effect on crime. To address when sex ratios begin to matter, a 10-year lagged variable for the sex ratios has been created. This variable will allow, for instance, a comparison between 1850 sex ratios and 1860 crime rates. This lagged effect will help determine how quickly significant population adjustments impact outcomes such as crime. A dummy variable has been created for each year of the sample to control for the macroeconomic environment.

Models

Several models are required to account for the other macro level variables we know impact crime from the criminological literature. Model 1 assesses variables I have classified as institutional, and Model 2 assesses aggregate individual characteristics. Models 3 and 4 include the key variables identified in the first three models as well as their interactions with the frontier variable and sex ratio variables. Because of data availability the sample sizes change among the models. This does not allow the models to be compared directly, however, it allows each model to use the maximum number of data points available, increasing the overall explanatory power of each model. A description of each model follows.

Model 1: Level of Institutional Development

We know that crime is affected in part by the degree of institutional development (Felson and Cohen 1984; Messner & Rosenfeld 1994). Although census data are limited in the information collected to account for the level of institutional development, several variables could still be created from the available data. Table 2 presents these variables and descriptive statistics.

The number of teachers, schools and literacy are straightforward. The other four variables require some explanation. The variables Years Settled and Years Since Statehood are meant to measure the amount of time a state would have been building the political infrastructure required for admission to the Union. Territories had to demonstrate a certain level of self-governance prior to entry into the Union. The number of years since a state had been settled and the number of years since statehood are used as proxy measures of government institutional development. As noted above, some authors have suggested that the type of primary economic production of a state indicates a certain level of legal and governmental infrastructure (Ellis 1999 and 2005).

Another key institution is the economy. As noted above, the breakdown of society due to economic disadvantage poses a threat to social stability. Census data are exceptionally detailed on the level of economic output from every imaginable product produced during the frontier era. The relationship between output and economic strength is not as clear. Growing numbers do not necessarily indicate a positive economy if the prices for the goods had crashed. Further, growth alone would not indicate a positive economy if the growth did not keep pace with the growing immigrant, natural born, and aging populations. Further complicating the economic variables is inflation over the 70-year period. To avoid these difficulties one variable was available that would provide a simple consistent measure of economic performance through the frontier period, namely company failures.

The number of company failures that occurred during the year prior to the census is recorded in the historic records. While far from a perfect indicator of overall economic performance it does provide a state-level assessment of the business climate. Some confusion over what this indicator may actually measure should be noted. A greater number of company failures could mean contradictory conditions in the economy. A greater number of failures could indicate that the economy was doing poorly and, therefore, more companies failed. However, it is also possible that the number of company failures would be higher in a growth era as more businesses were started to meet rising demand – but not all were successful. Company failures then could reasonably indicate either a positive or negative association with the overall economy.

Some economists measure large-scale economic trends using a concept known as the Kondratieff wave. The Kondratieff wave models measure long-wave economic trends contemporaneously and historically by looking at trends in wholesale prices. Comparing the company failures to the positive and negative business cycles indicated in the Kondratieff wave,

it is clear that fewer companies failed during positive economic growth periods and that more

fail during periods of poor economic performance[9].

<center>[Table 2 about here]</center>

Model 2: Aggregated Individual Characteristics

We know that race relations often complicate the occurrence of crime (Rawley 1969;

Etcheson 2004). Race during the frontier era was no less complicated. Census data are not very

refined when addressing race. The only two consistent variables that could be created were the

percent black population and percent foreign born.

The level of illiteracy is also included here. Illiteracy is potentially a complicated

variable. In the modern day illiteracy is an indication of education and employability. In a

service economy literacy may matter a good deal more than in the past. A survey of the 300-plus

jobs listed in the census records during the frontier era confirms that most of them would not

have required a high degree of literacy. However, even with lower literacy requirements it may

be reasonable to conclude that a certain amount of technical literacy would be required at any

job, and an employer considering two individuals for employment would favor one who was

literate, all else being equal. If this assumption holds it is reasonable then to expect the illiteracy

rate to be associated with crime.

The final aggregate condition considered is the level of pauperism. Poverty and crime are

clearly connected (Sampson, Raudenbush and Earls 1997; Jarjoura, Triplett and Brinker 2002). It

would have been preferable to measure the unemployment rate through the frontier period, or the

number of people living at or near the poverty line. However these data are not available at the

---

[9] There was a sizable downward market peaking in 1890. The largest company failures happen between 1880 and

1910, during this large-scale downward trend and recovery period.

<center>25</center>

state level. The closest variable traced through this era is the number of paupers listed in poor houses.

[Table 3 about here]

Model 3: Frontier Interaction

Frontier is coded as a dummy variable with the non-frontier states as the reference category. Variables representing the interactions of frontier status with the key variables from the previous models are used explore the different effects that might be present in one region but not in another. This model includes interactions of frontier status with the normal sex ratio, the squared sex ratios, and the lagged sex ratio variables. Number of years since settlement, illiteracy, the number of schools, and percent Black are included as additional control variables.

The primary purpose of this model is to test differences in associations between sex ratio on the frontier and non-frontier states. A key distinction between these two regions is the sex ratios. Higher sex ratios favoring males are characteristic of frontier states whereas lower sex ratios favoring women are common in the non-frontier states. If the theory is correct that any deviation from a normalized sex ratio will result in higher crime rates, then both lower and higher ratios should be related to crime, but in opposite directions. Lower sex ratio states would have to increase towards and equal 1 to 1 ratio to experience a reduction in crime whereas a higher sex ratio state would have to reduce the ratio towards 1 to 1 to see the same impact on crime.

Model 4: Sex Ratio Interaction

Sex ratios are likely to have both direct and indirect effects on crime. Consistent with Messner and Sampson's original model the proposed model tests whether at the macro level sex ratios will moderate the effect of other macro level variables. To assess the potential indirect

26

effect of sex ratios on the various societal and individual characteristics, sex ratios are interacted

with the number of years since settlement, illiteracy, the number of schools, and percent Black

are included as additional control variables[10]. The interaction is measured two different ways.

First, a dummy variable was created based on skewed sex ratios. Any deviation from a

perfect 1 to 1 relationship during the childbearing years is considered an abnormal sex ratio

(Hudson and den Boer 2004). The reference category was coded 0 if the sex ratio was normal.

Normal here is defined as a sex ratio less than 1.01 and greater than .99. Knowing that the sex

ratio data gathered from the US Census record is the overall sex ratio, not the childbearing sex

ratio, this relationship was tested at greater degrees of skewness as well (up to 1.08). The second

interaction was measured by multiplying the sex ratio by each control variable.

RESULTS

After controlling for several societal level characteristics Model 1 results clearly

demonstrate an independent effect of skewed sex ratios on crime. A normalizing sex ratio is

strongly associated with decreasing crime. The lagged results are half as powerful as the initial

effect. Curiously the number of teachers is associated with an increase in crime. Company

failures are positively associated with increased crime. The number of years settled, which was

used as a proxy for the strength of institutional development, was not significant. The number of

families was not statistically associated with the crime rate. Overall the macro level effects

measured in the institutional development model account for approximately 11% of the variance

in crime.

[Table 4 about here]

---

[10] These variables were identified in models 1-2 as having the most significant statistical impact.

Model 2 controlled for aggregated individual characteristics such as race, illiteracy and pauperism. Only normalizing sex ratios was statistically significant. This result is somewhat counter intuitive and will be addressed in the conclusions. Here again the lagged sex ratios, while still statistically significant, declined in influence. While the aggregate individual characteristics were not statistically significant this model does account for 33% of the variation in crime.

[Table 5 about here]

Model 3 tested for differences between the frontier and non-frontier states on several key variables. Of particular significance is the change in relationship between sex ratios and crime. On the frontier, normalizing sex ratios (i.e., as the skew becomes less pronounced) are associated with a reduction in crime. In non-frontier states, where there were more women relative to men, a normalizing sex ratio (i.e., increasing the number of men) is positively correlated with a reduction in crime. It is also significant to note that the lagged effect of sex ratios on crime (not shown) was not associated with increased crime. While the interaction of frontier status with each variable confirms an expected difference between the frontier and non-frontier states, it is significant that the differences are actually quite small. Consistent with revisionist histories that more accurately document the frontier as a whole, frontier status is only associated with slightly higher rates of crime per variable.

[Table 6 about here]

Model 4 tested the moderating effect of sex ratios on several variables. Model results were not statistically significant. Regardless of how a "normal" sex ratio was defined the model did not produce statistically significant results. Even when the raw sex ratio was interacted with each variable directly no significant results occurred. The importance of this finding will be addressed in the discussion section below.

Models 1-3 address two of the three questions posed for this study. Specifically, these models demonstrate that as a macro-level effect skewed sex ratios at the state level are directly related to the level of crime, and as sex ratios normalize the crime rate declines. These models also answer the question of how quickly the skew begins to matter. The results indicate that the impact of a skewed sex ratio is felt primarily within that same decade recorded and that its residual effect declines in subsequent decades. The third question sought to understand at what level the skew began to matter. That is, at what level of skewness do sex ratios have the greatest impact on crime? Predicted crime values were plotted by sex ratio and the inflection point was calculated. As the sex ratios depart from equality, crime rapidly increases. However, its effect begins to diminish towards the extreme end of the sample. Sex ratios' impact on crime increases at a decreasing rate. The inflection point is beyond the range of the data indicating a consistent trend of increased crime compared to unbalanced sex ratios.

[Figure 4 about here]

DISCUSSION

In this paper evidence is presented demonstrating a connection between sex ratios and crime – both as a direct effect and through indirect pressure on other variables. In an assessment of a longitudinal fixed effects model the connection between sex ratios and crime is affirmed. Further, this connection to crime is observed within the same decade as the recorded sex ratios, indicating that changes in sex ratios produce a relatively immediate impact on crime. And finally, this study concludes that skewed sex ratios produce an immediate and significant effect in the lower ranges with a diminishing return the larger the sex ratio skew becomes. In addition to these key findings several other effects are noted.

Some caution is in order regarding the impact of any skewed ratio on crime. The reader

should remember that the sex ratio data available was for the whole population, not just persons in their childbearing years. Because of early childhood mortality that especially affects male children, it is not possible to accurately predict exactly how many children at birth will still be alive to both bear children and commit crime. While the extremely skewed sex ratios for the majority of measured periods demonstrated the association between crime and sex ratios, these more extreme values and the fuzziness of the sex ratio measures likely mean that some degree of skewed sex ratio near the norm will not result in crime.

An additional analysis (not shown) was performed with an ordinal measure of sex ratios including 5 unit increments: 91-95, 96-100, 101-105, 106-110 etc. Using this ordinal scale, statistically significant results were only observed below 100 and above 110. While there were not enough observations to conclusively state that only skewed ratios above and below these numbers mattered this analysis suggests that the primary model used in the analysis may mask the actual tipping point by the more extreme observations.

This does not suggest that lower order unbalanced ratios do not matter, only that these lower values may produce less of an impact and may possibly be more susceptible to the influence of other control variables. For instance, a more autocratic state mechanism may be able to effectively control individual behavior when the observed sex ratio is only minimally skewed. Likewise, a lower order skew may be less statically important than other variables such as race or the economy under a more normalized sex ratio distribution.

Settlement time is an indication of both population density and increased institutionalization. There is a very slight but positive relationship between years settled and crime, both on the frontier and in non-frontier states. This is consistent with a logical perception that as populations increase crime should also increase. Additional institutionalization should

also be associated with more crime due to an increased capacity to prosecute. However, normalizing sex ratios moderates this positive association. Even though crime rates should have logically increased they actually diminish as the sex ratio normalizes. A balance between men and women proves to have a powerful impact on the stability of society – beyond that of other macro level institutional factors.

The effect of sex ratio normalization on crime is independent of family formation. The percentage of families compared to the overall population was not significantly related to crime. This does not suggest that they have no impact, only that in this model they were not significantly associated with a reduction in crime. Families during this period were not as stable, due to the mass migrations, as they would become in future decades. A significant number of families were disrupted due to death and migration during this period. Noting the difference in significance during this period, however, is an important finding as it suggests that it is not just family formation that helps moderate crime rates. Rather something more fundamental about society shifts as sex ratios normalize.

This finding is consistent with revisionist feminist histories of the frontier suggesting that the impact of women within society extends far beyond family formation (Jensen and Miller 1980; Irwin and Brooks 2004). It is important to remember that it is not just women in families that matter, but that there is a significant qualitative effect on society produced as the sex ratios normalize from either female or male dominated rates. This finding is consistent with other research showing that higher rates of female-headed households are associated with higher crime rates (Sampson and Raudenbush 1997).

When the frontier variable was interacted with sex ratios the direction of association changed. This finding is not anomalous when one considers the difference between the sex ratios

in the east and west. Referring to Figure1, one can see that on the frontier sex ratios were skewed in favor of men. In non-frontier states the sex ratios favor women. While it may be counter intuitive that sex ratios favoring women would be associated with higher crime this is also consistent with previous studies (Ellis and Walsh 1997; Sampson and Raudenbush 1997; Walsh 2006). Although the mechanisms are different depending on the type of skew, the relationship is the same. As sex ratios deviate from normal they are associated with increased crime.

In these models, race, illiteracy, and schools were not statistically related with crime. While not significant in these models this lack of association is far more indicative of the rough categorization/data available in the census records. And while not significant, these variables did have an impact on the overall crime rate in ways that were consistent with the current literature. Thus, it is reasonable to conclude that they operated as effective controls to tease out the strength and direction of the primary relationship tested between sex ratios and crime. Although these variables were not of primary interest a few interesting patterns should be noted. There is a small but positive association between increases in the Black population and crime (this relationship become statistically significant in the lagged model as the impact of the sex ratios declines). The literature does not suggest that non-whites were committing more crimes; rather this finding is consistent with racial threat theory that increased numbers of a racial minority will be associated with a reaction from the dominant racial group against the minority. During this period racial minorities tended to live in enclaves separate from the white population, and while this did not reduce all conflict between the races (Rawley 1969, McKanna 1994), it may explain why the impact of race may have been less a factor during this era than it became during the civil rights era.

Unlike race, illiteracy may have been non-significant for other reasons consistent with results. As suggested in the variable section, illiteracy may not have the same effect on the economic prospects of individuals during the frontier era as they do today. According to the census records the vast majority of jobs were in agriculture, tradesmen positions, and the growing manufacturing industries. A significant number of manual labor jobs available in these industries had very little, to no, educational requirements. While literacy certainly would have some impact it is reasonable to conclude that during this era its influence would have been weaker than the present day.

Limitations

This study has a few limitations that should be noted when comparing results from this unique historical record to the modern day. Notably the direction of normalization is the opposite of what most countries are experiencing today. On the frontier sex ratio skews started high and began to normalize. In the modern day countries previously having normal sex ratios are now experiencing skewed ratios due to structural changes, such as the one child policy in China. A key assumption then in applying these findings to the modern era is that the same relationship between skewed sex ratios and crime exists, as rates of skew increase as well as decrease. Although evidence suggests that this is the case, more research would need to be conducted to clarify and support this pattern.

Additionally, modern applications will be limited by culture. While this study confirms a strong association between skewed sex ratios and crime it is possible that a strong culture of conformity or an authoritarian government might mediate the impact on actual crime rates. This limitation, however, only affects the degree of change in crime as sex ratios become skewed. However, it would not necessarily eliminate the association. A severely authoritarian regime may

be capable of locking up enough people to ensure compliance in the short term.

Additionally, other circumstances such as a large frontier, or war, wherein large numbers of excess men may be exported from highly skewed regions, may mitigate the actual risk posed by as skewed sex ratio. However, this may only delay its impact in the short term. The underlying structural risk will not have been removed. And exportation of excess males does not take into consideration that any skew, positive or negative in favor of men, will impact social stability and crime. In these findings there is a word of caution to future researchers in this area. Consistent with Messner and Sampson this study confirms that cross sectional analysis within certain cultures or governmental regimes might determine that there is no connection between sex ratios and crime. This finding would have to be interpreted as a cultural or temporal injunction against the connection, instead of a lack of a structural risk. However, this study goes beyond this caution as well by suggesting that at the structural level unbalanced sex ratios represent an independent threat to social stability, and that over time this effect will be realized, even if it is deferred for a time.

Due to the lack of variables available in the historic census records several important variables could not be used as controls. Strain theory predicts an increased level of crime as the gap between societal goals and an individual's means to achieve them increases (Rossenfeld and Messner 1995; Maume and Lee 2003; Bjerregaard and Chochran 2008). Other demographic pressures such as health/mortality (Rodgers 1979; Waldmann 1992) and fertility (as it relates to youth bulges) were not addressed in these models (Urdal 2006 and Fox 2010).

CONCLUSION

While there are a great many differences in culture, technology and circumstances that may moderate or mediate the overall impact of sex ratios, the application of historical

relationships to the modern day should not be in doubt. The historical example of the frontier is especially poignant. While the frontier did not lack sufficient infrastructure to keep the peace, the role of government on the frontier was much more limited than has developed in the modern day. The lack of significant government intervention on the frontier allows a more accurate assessment of the actual impact of sex ratios on crime, as there are fewer mediating variables to account for.

This study goes beyond previous studies by testing the connection between sex ratios and crime longitudinally against other macro-level factors and finds that unbalanced sex ratios constitute a unique systemic risk to stability. The fixed effects models presented here provide strong evidence that systemic population pressures do indeed impact social outcomes such as crime. This research demonstrates the need for future studies to include the ratio of men to women as an additional control variable with other macro-level effects.

This study also raises questions regarding our perception of the role of women in improving social conditions. Essentializing the role of women as the cultural nurturers distorts the fact that it is the balance of men and women and their more equal participation in society that appears to have a far greater impact on social improvement than the presence of women alone. Isolating men or women (men at work or women in the home) is not a solution either, as this essentializes their roles and narrows their influence to only one sphere and limits the power both potentially bring to these separate spheres. One of the key reasons that increased numbers of women appear to have mattered on the frontier was that they were more likely to be involved in all other aspects of the community. They were more likely to have the right to vote and to be involved in the political process, and they were more likely to have influence on the business climate at the time. As families formed they had more say in the development of the community.

While further research is necessary, this study indicates clearly that balanced sex ratios, within a

context of greater equality, produced rapid reductions in crime and social stability.

REFERENCES

Adams, James Truslaw. 1928. "Our Lawless Heritage." *Atlantic Monthly* 142(December):732-
40.

Anderson, Elijah. 1994. "The Code of the Street." *The Atlantic Monthly* 273(5):80-94.

Andrist, Ralph K. 2001. *The Long Death: The Last Days of the Plains Indian*. University of
Oklahoma Press. Norman, Oklahoma.

Bancroft, Hubert Howe and Henry Lebbeus Oak. 1889. *History of Arizona and New Mexico:
1530-1888.* San Francisco, CA: The Historic Company, Publishers.

Baruch, Elaine Hoffman. 2003. "Psychoanalysis and Terrorism: The Need for a Global 'Talking
Cure'." *Psychoanalytic Psychology* 20(4):698-700.

Bellair, Paul E. and Thomas L McNulty. 2010. "Cognitive Skills, Adolescent Violence, and the
Moderating Role of Neighborhood Disadvantage." *Justice Quarterly* 47(4):538-559.

Bellesiles, Michael A. 1996. "The Origins of Gun Culture in the United States, 1760-1865."
Journal of American History 83(2):425-455.

------. 1999. *Lethal Immigration: Violence Brutality in American History*. New York University
Press, NY.

------. 2003. *Arming America: The Origins of a National Gun Culture*. Brooklyn, NY: Soft Skull
Press.

Billington, Ray Allen and Martin Ridge. 2001. *Westward Expansion: A History of the Frontier
6th Edition, abridged*. Macmillian Press. New York, NY.

Bjerregaard, Beth and John K. Cochran. 2008. "A Cross-National Test of Institutional Anomie
Theory: Do the Strength of Other Social Institutions Mediate or Moderate the Effects of
the Economy on the Rate of Crime?" *Western Criminology Review* 9(1):31-48.

Boessenecker, Joe. *Badge and Buckshot: Lawlessness in Old California*. 1988. Norman, OK: University of Oklahoma Press.

Browning, Christopher R., Seth L. Feinberg, Robert D. Dietz . 2004. "The Paradox of Social Organization: Networks, Collective Efficacy, and Violent Crime in Urban Neighborhoods." *Social Forces* 83(2):503-534.

Brynjar, Lia and Skjølberg Katja H-W. 2000. *Why Terrorism Occurs: A Survey of Theories and Hypotheses on the Causes of Terrorism.* Norwegian Defence Research Establishment (FORSVARETS FORSKNINGSINSTITUTT). Kjeller, Norway

Budig, Michelle J. and Paula England. 2001. "The Wage Penalty for Motherhood." *American Sociological Review* 66(2):204-225.

Bursik, Robert J., Jr. and Harold G. Grasmick. 1993. "The Criminal Behavior of Neighborhood Residents." Pp. 24-59 in *Neighborhoods and Crime: The Dimensions of Effective Community Control*. San Francisco: Jossey-Bass.

Busch, Tor and Hogskolen i Sor Trondelag. 1996. "Gender, Group Composition, Cooperation and Self-Efficacy in Computer Studies." *Journal of Educational Computing Research* 15(2):124-135.

Butler, Judith. 1999. *Gender Trouble: Feminism and the Subversion of Identity*. Second Edition. New York: Routledge.

Buvinić Mayra, Andrew R. Morrison, A. Waafas Ofosu-amaah, Mirja Sjöblom. 2008. *Equality for Women: Where Do We Stand on Millennium Development Goal 3?* The International Bank for Reconstruction and Development. The World Bank.

Carr, Patrick J. "The New Parochialism: The Implications of the Beltway Case for Arguments Concerning Informal Social Control." *American Journal of Sociology* 108(6):1249-1291.

Carrigan, William D. and Clive Webb. 2003. "The Lynching of Persons of Mexican Origin or
Descent in the United States, 1848 to 1928." *Journal of Social History* 37(2):411-438.

Clayton, Claudia, Bonnie Ballif-Spanvill, and Melanie D. Hunsaker. 2001. "Preventing Violence
and Teaching Peace: A Review of Promising and Effective Antiviolence, Conflict-
resolution, and Peace Programs for Elementary School Children." *Applied Preventative
Psychology* 10:1-35.

Corbett, Christopher. 2010. *The Poker Bride: The First Chinese in the Wild West*. Atlantic
Monthly Press. New York, NY.

Courtwright, David T. 2008. Gender Imbalances in History: Causes, Consequences and Social
Adjustment. *Reproductive BioMedicine Online* 16(Suppl. 1):32-40
(www.rbmonline.com/Article/3169)

Courtwright, David T. 1996. *Violent Land*. Boston, MA: Harvard University Press.

Cronon, William, Howard R. Lamar, Katherine G. Morrissey, and Jay Gitlin. "Women and the
West: Rethinking the Western History Survey Course." *The Western Historical Quarterly*
17(3):269-290.

Debo, Angie. 1970. *A History of the Indians of the United States*. Norman, OK: University of
Oklahoma Press.

DeBow, J.D.B. 1854. *Statistical View of the United States: Embracing Its Territory, Population
– White, Free, Colored and Slave – Moral and Social Condition, Industry, Property, and
Revenue; Detailed Statistics of Cities, Towns, and Counties; Being a Compendium of the
Seventh Census*. Washington: Beverley Tucker. Accessed March 15, 2001
(http://purl.access.gpo.gov/GPO/LPS48470).

DiBerardinis, James, Kathy Ramage and Steve Levitt. 1984. "Risky Shift and Gender of the

    Advocate: Information Theory versus Normative Theory." *Group Organization*

    Management 9(2): 189-200.

Dimsdale, Thomas Josiah and Alva Josiah Noyes. 1915. *The Vigilantes of Montana: Or, Popular*

    Justices in the Rocky Mountains. 3rd ed. Helena, Montana: State Publishing Company.

Domosh, Mona. 1991. "Toward a Feminist Historiography of Geography." *Transactions of the*

    Institute of British Geographers 16(1):95-104.

Drago, Harry Sinclair. 1985. *The Great Range Wars: Violence on the Grasslands*. Lincoln, NE:

    University of Nebraska Press.

Ellis, Mark R. *Law and Order in Buffalo Bill Country: Crime and Criminal Justice in Lincoln*

    County Nebraska: 1868-1910. Dissertation. University of Nebraska at Lincoln. 1999.

Ellis, Mark R. 2005. "Legal Culture and Community on the Great Plains: State of Nebraska v.

    John Burley." *The Western Historical Quarterly* 36(2):179-199.

Ellis, Lee and Anthony Walsh. 1997. "Gene-based Evolutionary Theories in Criminology."

    Criminology 35(2):229-276.

Earle, Carville. 2003. *The American Way: A Geographical History of Crisis and Recovery*.

    Oxford, UK: Rowman and Littlefield Publishers Ltd.

Felson, Marcus and Lawrence E. Cohen. 1984. Human Ecology and Crime: A Routine Activity

    Approach. *Human Ecology* 8(4):389-406.

Firmage, Edwin Brown and Richard Collin Mangrum. 1988. *Zion in the Courts: A legal history*

    of the Church of Jesus Christ of Latter-day Saints 1830-1900. University of Illinois Press.

Fox, Sean and Kristian Hoelscher. 2010. *The Political Economy of Social Violence: Theory and*

    Evidence from a Cross-Country Study. Crisis States Research Centre working papers

series 2, 72. Crisis States Research Centre, London School of Economics and Political

Science, London, UK. Accessed March 15, 2011 (http://eprints.lse.ac.uk/28469/).

Frantz, Joe B. 1969. "The Frontier Tradition: An Invitation to Violence." Pp. 127-154 in
Violence in America: Historical and Comparative Perspectives, edited by H. D. Graham
and T. R. Gurr. NY: Bantam Books.

Fuse, Kana and Edward Crenshaw. 2006. Explaining Variations in Sex-Differentialism Infant
Mortality: A Cross-National Study. *Social Science and Medicine* 62: 360-74.

Gard, Wayne. 1949. *Frontier Justice*. Norman, OK: University of Oklahoma Press.

Gibbons, Stephen and Stephen Machin. 2008. "Valuing School Quality, Better Transport, and
Lower Crime: Evidence from House Prices." *Oxford Review of Economic Policy*
24(1):99-119.

Gluek, S. and E. Glueck. 1968. *Delinquents and Nondeliquents in Perspective.* Cambridge, MA.
Harvard University Press.

Goldstein, Joshua S. 2001. *War and Gender: How Gender Shapes the War System and Vice
Versa*. UK: Cambridge University Press.

Gonzoles-Day, Ken. 2006. *Lynching in the West, 1850-1935*. Duke University Press. Durham,
North Carolina.

Gottdiener, Mark and Ray Hutchinson. 2006. *The New Urban Sociology*, 3rd ed. Boulder, CO:
Westview Press.

Hackney, Sheldon. 1969. "Southern Violence." *The American Historical Review* 74(3):906-925.

Haines, Valerie A. 2007. "Evolutionary Explanations." Pp. 249-311 in *Philosophy of
Anthropology and Sociology*, edited by S. P. Turner and M. W. Risjord. North-Holland,
The Netherlands.

Harris, Alexes, Heather Evans, and Katherine Beckett. 2010. "Drawing Blood from Stones: Legal Debt and Social Inequality in the Contemporary United States." *American Journal of Sociology* 115(6):1753–99.

Hayes, Carlton J. H. 1949. "The American Frontier-Frontier of What." *American Historical Review* January:199-216.

Hollon, W. Eugene. *Frontier Violence: Another Look*. New York: Oxford University Press. 1974.

Harding, Sandra G. 2004. *The Feminist Standpoint Reader: Intellectual and Political Controversies*. New York: Routledge.

Hudson, Valerie M. and Andrea den Boer. 2004. *Bare Branches: The Security Implications of Asia's Surplus Male Population*. Cambridge, MA: MIT Press.

Jacobs, David, Jason T. Carmichael and Stephanie L. Kent. 2005. "Vigilantism, Current Racial Threat, and Death Sentences." *American Sociological Review* 70(4): 656-677.

Jarjoura, G. Roger, Ruth A Triplett and Gregory P. Brinker. "Growing Up Poor: Examining the Link Between Persistent Childhood Poverty and Delinquency." *Journal of Quantitative Criminology* 18(2):159-187.

Jewel, Lucille A. 2008. "Bourdieu and American Legal Education: How Law Schools Reproduce Social Stratification and Class Hierarchy." *Buffalo Law Review* 56:1155-1224.

Jones, Nikki. 2010. *Between Good and Ghetto: African American Girls and Inner-City Violence*. New Brunswick, NJ: Rutgers University Press.

Kimmel, Michael S. 2003. *The Gendered Society*. New York, NY: Oxford University Press.

Koren, John. 1907. "Prisoners and juvenile delinquents in institutions 1904 [microform]." Washington, DC: U.S. G.P.O., 1907.

Krivo, Lauren J and Ruth D. Perterson. 1996. "Extremely Disadvantaged Neighborhoods and Urban Crime." *Social Forces* 75(2):619-650.

Kubrin, Charis E. and Ronald Wietzer. "New Directions in Social Disorganization Theory." *Journal of Research in Crime and Delinquency* 40(4):374-402.

Lackman, Ronald W. 1997. *Women on the Western Frontier in Fact, Fiction and Film*. North Carolina: McFarland and Company, Inc. Publishers.

Lenski, Gerhard and Patric D. Nolan. 1984. "Trajectories of Development: A Test of Ecological-evolutionary Theory." *Social Forces* 63(1):1-23.

Lenski, Gerhard. 2005. *Ecological-Evolutionary Theory: Principles and Applications*. Boulder, CO: Paradigm Publishers.

Liska, Allen and Steven F. Messner. 1999. *The Conflict Perspective*. Pp. 179-209 in *Perspectives on Crime and Deviance*. Upper Saddle River, NJ: Prentice Hall.

Macinko, James and Barbara Startfield. 2001. The Utility of Social Capital in Research on Health Determinants. *The Milbank Quarterly* 79(3):387-427.

Martinez, Ramiro Jr, Richard Rosenfeld and Dennis Mares. 2008. "Social Disorganization, Drug Market Activity, and Neighborhood Violent Crime." *Urban Affairs Review* 43(6):846–874.

Matsueda, Ross L. and Karen Heimer. 1987. "Race, Family Structure and Delinquency: A Test of Differential Association and Social Control Theories." *American Sociological Review* 52(6):826-840.

Maume, Michael O. and Matthew R. Lee. 2003. "Social Institutions and Violence: A Sub-National Test of Institutional Anomie Theory." *Criminology* 41(4):1137-72.

McLure, Helen. 2000. "The Wild, Wild Web: The Mythic American West and the Electronic Frontier." *The Western Historical Quarterly* 31(4):457-476

McGrath, Roger. 1984. *Gunfighters, Highwaymen and Vigilantes*. Berkeley: University of California Press.

McKanna, Clare V., Jr. 1994. "Seeds of Destruction: Homicide, Race, and Justice in Omaha, 1880-1920." *Journal of American Ethnic History* 14(1):65-90.

------. 1995. "Alcohol, Handguns and Homicide in the American West: A Tale of Three Counties, 1880-1920." *The Western Historical Quarterly* 26(4):455-482.

------. 2004. "Enclaves of Violence in Nineteenth-Century California." *The Pacific Historical Review* 73(3):391-423.

McMillen, Christian. 1994. "Proceedings of the 78th Annual Meeting - Student Essay Contest Winners. Border State Terror and The Genesis of the African-American Community in Deer Lodge and Choteau Counties, Montana, 1870-1890." *The Journal of Negro History* 79(2):212-247. Accessed October 2004 (http://links.jstor.org/sici?sici=0022-2992%28199421%2979%3A2%3C212%3ABSTATG%3E2.0.CO%3B2-N).

Mednick, Sarnoff A., William F. Gabrielli, Jr., and Barry Hutchings. 1984. "Genetic Influences in Criminal Convictions: Evidence from an Adoption Cohort." *Science* 224(4651):891-894

Merton, Robert K. 1938. "Social Structure and Anomie." *American Sociological Review* 3:672-82.

Messner, S. F. and R. Rosenfeld. 1994. *Crime and the American Dream*. Belmont, CA. Wadsworth Publishing, Co.

Miller, Jody and Norman A. White. 2003. "Gender and Adolescent Relationship Violence: A Contextual Examination." *Criminology* 41(4):1207-48.

Montana.gov. 2011. *Brief History of the Montana Judicial Branch*. Accessed July 8, 2011 (http://courts.mt.gov/supreme/history.mcpx).

Moretti, Enrico. 2004. "Estimating the Social Return to Higher Education: Evidence from Longitudinal and Repeated Cross-sectional Data." *Journal of Econometrics* 121(1-2):175-212.

Murray Melbin. 1978. "Night as Frontier." *American Sociological Review* 43(1):3-22.

Peterson, Ruth D. and Lauren J. Krivo. 2010. *Divergent Social Worlds: Neighborhood Crime and the Racial-Spatial Divide*. New York: Russell Sage Foundation.

Pratt, Travis C. and Francis T. Cullen. 2005. Assessing Macro-Level Predictors and Theories of Crime: A Meta-Analysis. *Crime and Justice* 32:373-450.

Putnam, Robert. 1995. Bowling Alone. *Journal of Democracy* 6(1):65-78.

Rephann, Terance. 2002. The Importance of Geographical Attributes in the Decision to Attend College. *Socio-economic Planning Sciences* 36(4):291-307.

Rodgers, G. 1979. "Income and Inequality as Determinants of Mortality: An International Cross-Section Analysis." *Population Studies* 33:343-351.

Roeder, Richard B. 1982. "Crossing the Gender Line: Ella L. Knowles, Montana's First Woman Lawyer." *The Magazine of Western History* 32(3):64-75.

Rose, Gillian. 1993. *Feminism and Geography: The Limits of Geographical Knowledge*. Minneapolis, MN. University of Minnesota Press.

Rosenbaum, H. Jon and Peter C Sederber. 1974. "Vigilantism: An Analysis of Establishment Violence." *Comparative Politics* 6(4):541-570

Rosenfeld, Richard and Steven F. Messner. 1995. "Crime and the American Dream: An Institutional Analysis." Pp. 159-81 in *The Legacy of Anomie Theory: Advances in Criminological Theory, Volume 6*, edited by F. Adler and W. S. Laufer. New Brunswick, NJ: Transaction Publishers.

Rotolo, Thomas and Charles R Tittle. "Population Size, Change, and Crime in U.S. Cities." *Journal of Quantitative Criminology* 22(4):341-367.

Sampson, Robert J. and John H. Laub. 1997. "A Life Course Theory of Cumulative Disadvantage and the Stability of Delinquency." Pp. 1-29 in *Development Theories of Crime and Delinquency*, edited by T. Thornberry. New Brunswick, NJ. Transaction Publishers.

Sampson, Robert J., Stephen W. Raudenbush, and Felton Earls. 1997. "Neighborhoods and Violent Crime: A Multilevel Study of Collective Efficacy." *Science Magazine* 277:918-924.

Samuel M. Otterstrom and Carville Earle. 2002. "The Settlement of the United States from 1790 to 1990: Divergent Rates of Growth and the End of the Frontier." *Journal of Interdisciplinary History* 33(1):59–85.

Saunders, Myra K. 1996. "California Legal History: The Legal System under the United States Military Government, 1846-1849." *Law Journal Library*.

Shaw, Clifford R. and Henry D. McKay. 1972. *Juvenile Delinquency and Urban Areas – A Study of Rates of Delinquency in Relation to Different Characteristics of Local Communities in American Cities.* Chicago, IL: University of Chicago Press.

Slaughter, Byran Lorenzo. 2002. *Horse Thieves, Hoodlums, and Hanging Judges: Crime and Punishment on the Nevada Frontier, 1859-1878*. Dissertation University of California, Riverside.

Smurr, J. W. and K. Ross Toole. 1957. *Historical Essays on Montana and the Northwest*. Helena, Montana: Western Press.

South, Scott J. and Steven F. Messner. 2000. "Crime and Demography: Multiple Linkages, Reciprocal Relations." *Annual Review of Sociology* 26:83-106.

Steffensmeier, Darrell J. 1983. "Organization Properties and Sex-Segregation in the Underworld: Building a Sociological Theory of Sex Differences in Crime." *Social Forces* 61(4):1010-1032.

Steffensmeier, Darrell and Emilie Allan. 1996. "Gender and Crime: Toward a Gendered Theory of Female Offending." *Annual Review of Sociology* 22:459-487.

Stolzenberg, Lisa, J. D'Alessio and David Eitle. 2004. "A Multilevel Test of Racial Threat Theory." *Criminology* 42(3):673-698.

Stoner, James A. F. 1968. "Risky and Cautious Shifts in Group Decisions: The Influence of Widely Held Values." *Journal of Experimental Social Psychology* 4:442–459.

Turner, Frederick Jackson. 1983. *The Frontier in American History*. New York: Holt, Rinehart and Winston.

Udall, Stewart L. 1999. "The 'Wild' Old West: A Different View." *Montana: The Magazine of Western History* 49(4):64-71.

United States Bureau of the Census. *Abstract of 11th Census [microform]: 1890*. Washington, DC: US GPO, 1896.

------. *Compendium of the Tenth Census (June 1, 1880), Compiled Pursuant to an Act of Congress Approved August 6, 1882. United States. Census Office. 10th census, 1880.* Washington, Govt. print. off., 1883.

------. *Statistics of U.S. (including Mortality, Property, etc.) in 1860; Compiled from Original Returns and Being Final Exhibit of 8th Census, Under Direction of Secretary of Interior. [microform].* Washington, D.C.: US GPO, 1866

Urdal, Henrik. 2006. A Clash of Generations? Youth Bulges and Political Violence. *International Studies Quarterly* 50(3):607-629.

Vandello, Joseph A. 2007. "Sex Ratios and Homicide Across the U.S." *International Journal of Psychology Research* 1(1):59-80.

Vartanian, Thomas P. and Phillip M. Gleason. 1999. "Do Neighborhood Conditions Affect High School Dropout and College Graduations Rates?" *Journal of Socio-Economics* 28(1):21-41.

Waldmann, Robert J. 1992. "Income Distribution and Infant Mortality." *The Quarterly Journal of Economics* 107: 1283-1302.

Walsh, Anthony. 2006. "Evolutionary Psychology and Criminal Behavior." Pp. 225-268 in *Missing the Revolution: Darwinism and social scientist*, edited by J. H. Barlow. Oxford University Press.

Wang, Xia and Daniel P. Mears. 2010. "A Multilevel Test of Minority Threat Effects on Sentencing." *Journal of Quantitative Criminology* 26:191–215.

Weatherford, Jack. 1995. *Savages and Civilization: Who Will Survive?* New York: Crown Publishers.

Weis, Lois, ed. 1988. *Class, Race and Gender in American Education.* State University of New
York Press. Albany, NY.

Wilkinson, Richard G. 1994. "The Epidemiological Transition: From Material Scarcity to Social
Disadvantage?" *Daedalus* 123(4):61-77.

Wilson, John Long. 1999. *Stanford University School of Medicine and the Predecessor Schools:
An Historical Perspective*. Accessed July 7, 2011
(http://elane.stanford.edu/wilson/index.html).

Wilson, William Julius. 2009. "Structural and Cultural Forces that Contribute to Racial
Inequality." Pp. 1-24 (plus 143-155) in *More than Just Race*: *Being Black and Poor in
the Inner City*. New York: W. W. Norton.

Wong, Marie Rose. 2004. *Sweet Cakes, Long Journey: The China Towns of Portland, Oregon*.
The University of Washington Press. Seattle, Washington.

Wrangham, Richard and Dale Peterson. 1996. *Demonic Males: Apes and the Origins of Human
Violence*. New York: Houghton Miffin.

Yardi, Sarita and Danah Boyd. 2010. "Dynamic Debates: An Analysis of Group Polarization
Over Time on Twitter." *Bulletin of Science, Technology and Society* 30(5):316-327.

Zillmer, Raymond T. 1916. "The Lawyer on the Frontier." *American Law Review* 50(1):27-42.

Table 1. Descriptive Statistics of the Crime and Sex Ratio

	Frontier					Non-Frontier				
	Min	*Max*	*Mean*	*Count*	*Std. Dev.*	*Min*	*Max*	*Mean*	*Count*	*Std. Dev.*
Crime	0.026	4.19	1.152	154	0.863	0.474	2.604	0.917	198	0.49
Sex Ratio	1.012	4.3	1.03	153	1.028	0.927	1.13	1.01	198	0.039

Table 2: Institutional Development Control Variables

Name	Description	Min	Max	Mean	Std. Dev.	Count
Mining/Ranching Status	This is scaled as a dummy variable. Non-mining/ranching is the reference category.					
Years since Settlement	Census year minus settlement year.	3	355	166	81	355
Year of Statehood	Census year minus year of statehood.	0	133	65	37	322
Families	Total number of families as a percentage of the overall population.	0.079	0.484	0.205	0.038	318
Schools per population/1000	Total number of schools per 1000 population.	0.026	131.7	6.73	10.63	223
Teachers per population/1000	Total number of teachers per 1000 population.	0.02	46.3	0.4	2.82	269
Company Failures	Variable recorded as the percentage of business that failed during the year the census was taken. Data is logged for analysis.	0.9	4.5	0.79	0.52	144

Table 3: Aggregated Individual Characteristics

Name	Description	Min	Max	Mean	Std. Dev.	Count
Black	Percentage black of total populations. Data is logged for analysis.	0.00	1.19	0.11	0.17	354
Foreign Born	Percentage foreign born of total population	0.00	0.6	0.11	0.12	354
Total Literacy	Percent literate population	0.946	45.8	9.45	9.67	225
Pauperism	Variable recorded as the number of paupers per 100,000 population during the year the census was taken. The square root of data has been taken for the analysis.	0	403.9	86.9	67.7	141

Table 4: Model 1 Institutional Development, Fixed Effects Regression of State Crime Rates between 1850 and 1920.

	Dependent Variable: Crime Rate (per 100,000 population)			
Observations	139		136	
Groups	48		48	
	Normal sex ratio		Lagged sex ratio	
Independent Variables				
Sex Ratio	1.002**	(0.3617)	0.5222***	(0.1107)
Years Settled	-0.0008	(0.0022)	-0.0005	(0.0024)
Families	-2.90E-07	(0.0000)	3.73E-07	(0.0000)
Schools per 1,000 pop	-0.0073	(0.0044)	-0.0061	(0.0046)
Teachers per 1,000 pop	0.1313**	(0.0407)	0.1034*	(0.0423)
Company Failures	0.0818*	(0.0344)	0.0759*	(0.0390)
R-Squared				
Within	0.3886		0.3832	
Between	0.842		0.758	
Overall	0.1089		0.1149	

Note: Standard errors are in parenthesis. Some states contain missing data.

*$p = <0.05$, **$p = <0.01$, ***$p < 0.001$.

Table 5: Model 2 Aggregate Individual Characteristics, Fixed Effects Regression of State Crime Rates between 1850 and 1920.

Dependent Variable: Crime Rate (per 100,000 population)				
Observations	141		139	
Groups	48		48	
	Normal sex ratio		Lagged sex ratio	
Independent Variables				
Sex Ratio	0.8768**	(0.3246)	0.1342	(0.723)
Percent Black	-0.1315	(0.0679)	-0.1812**	(0.709)
Percent Foreign Born	0.2441	(0.3071)	0.4525	(0.3429)
Percent Illiterate	0.0052	(0.0047)	0.00047	(0.0048)
Paupers per 100,000	9.00E-04	(0.0005)	5.00E-04	(0.0004)
R-Squared				
Within	0.3042		0.2481	
Between	0.3503		0.3413	
Overall	0.3326		0.2896	

Note: Standard errors are in parenthesis. Some states contain missing data.

*$p = <0.05$, **$p = <0.01$, ***$p < 0.001$.

Table 6: Model 3 Frontier Effect, Fixed Effects Regression of State Crime Rates between 1850 and 1920.

Dependent Variable: Crime Rate (per 100,000 population)		
Observations	216	
Groups	48	
Independent Variables		
Frontier*Sex Ratio		
Non-Frontier	-79.02***	(17.8831)
Frontier	4.4749*	(1.8202)
Frontier*Sex Ratio Squared		
Non-Frontier	38.30***	(8.5029)
Frontier	-1.2071*	(0.6175)
Frontier*Sex Ratio Lagged		
Non-Frontier	-0.0987	(0.1526)
Frontier	0.0105	(0.0844)
Other Control Variables		
Year settled	0.0079***	(0.0009)
Schools per 1,000 population	-0.0076***	(0.0008)
Teachers per 1,000 population	-0.0605	(0.0644)
Illiterate percentage	0.0019	(0.0031)
Black percentage	0.2750	(0.2019)
Foreign born percentage	0.0570	(0.1681)
R-Squared		
Within	0.7254	
Between	0.0426	
Overall	0.0286	

Note: Standard errors are in parenthesis. Some states contain missing data.
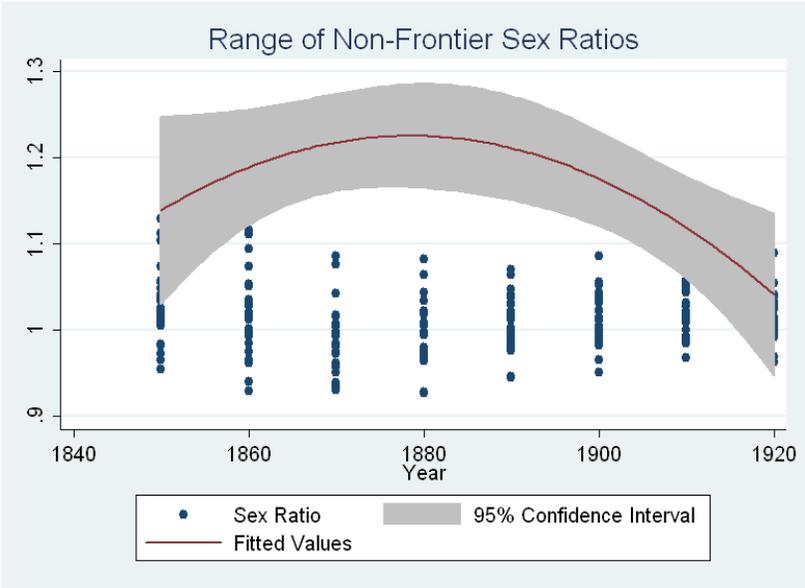
*p= <0.05, **p= <0.01, ***p< 0.001.

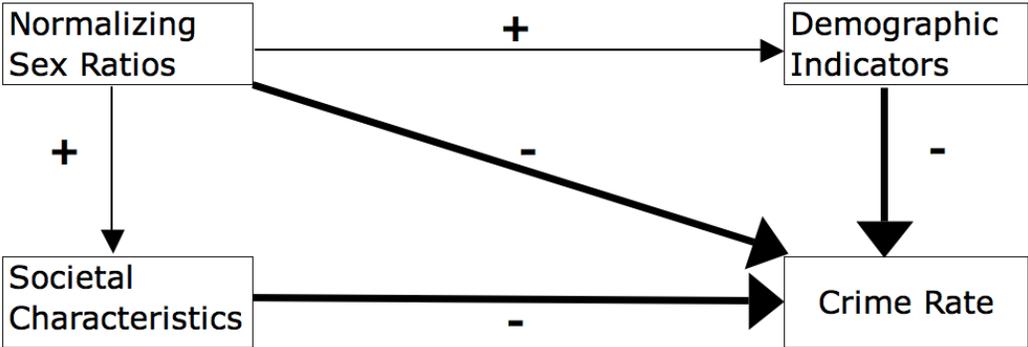**Figure 1. Range of Frontier State Sex Ratios between 1850 and 1920.***
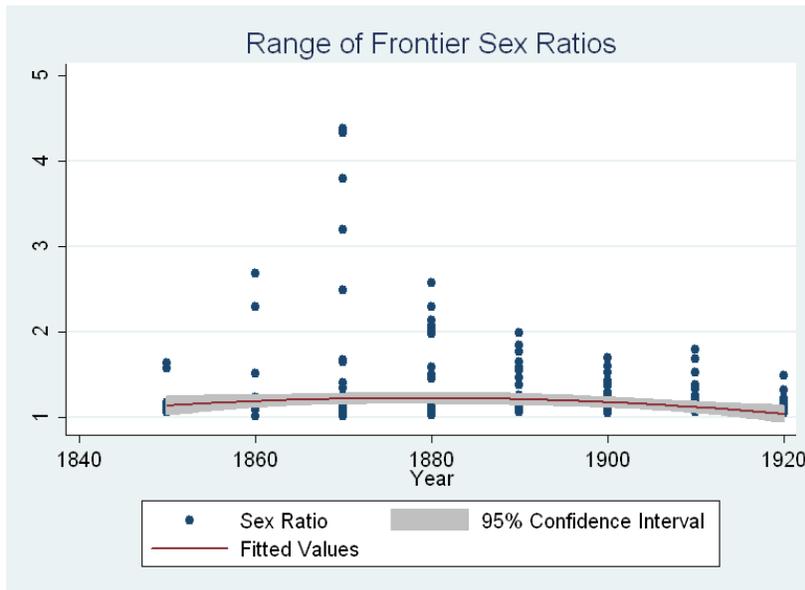
Note: Scale range 1 to 5.

Figure 2. Range of Non-Frontier State Sex Ratios between 1850 and 1920.

Note: Scale range 0.9 to 1.3.

Figure 3. Sex Ratio Impact Model.*

Note: Bold arrows indicate direct impact. Light arrow indicates indirect effects. Negative signs

indicate reductions in crime rates. Plus signs indicate positive improvement in other indicators.

Figure 4. Predicted Crime Rates Based on Population Sex Ratios