

Women's Liberation as a Financial Innovation*

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Abstract

Property rights are at the heart of capitalism's ability to efficiently allocate resources. Historically, married women have been one of the groups with the greatest legal disabilities in this regard, to the benefit of their husbands. Starting in the second half of the 19th century, common law countries, which were entirely dominated by men, gave married women property rights. Before this "women's liberation," married women were subject to the laws of coverture. Coverture had detailed laws as to which spouse had ownership and control over various aspects of property both before and after marriage. These laws created a strong disincentive for women to invest in financial assets, such as stocks, bonds, and even bank deposits. This paper develops a general equilibrium model with endogenous determination of women's rights in which these laws affect portfolio choices, leading to inefficient allocations. We show how technological advancement eventually leads to men granting rights, and in turn how these rights affect development. Exploiting cross-state variation in the timing of rights, we show that increases in non-agricultural TFP predict the granting of rights. The granting of rights in turn leads to a dynamic labor reallocation towards the non-agricultural sector, representing further development. Finally, we show that women's rights are associated with lower interest rates and greater financial intermediation, consistent with an increase in the supply of credit.

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I. INTRODUCTION

Property rights are at the heart of capitalism's ability to efficiently allocate resources. Historically, married women have been one of the groups with the greatest legal disabilities in this regard, to the benefit of their husbands. Starting in the second half of the 19th century, states in the United States, which were then politically entirely dominated by men, granted married women property rights, while England granted similar rights in 1870. Before this "women's liberation," married women were subject to the laws of coverture.¹ The system of coverture had detailed regulations as to which spouse had ownership and control over various aspects of property both before and after marriage. Coverture's demise represented a historic expansion of property rights, to the advantage of women and at a cost to men. By studying the details of the laws of coverture, this paper develops a theory as to why men chose to give married women rights, and explores the economic ramifications thereof. We argue that this revolution in property rights affected capital allocations, and exploit cross-state variation in the timing of women's liberation in the US to provide empirical support for our theory.

Under coverture, property was divided into multiple types. Moveable property, including money, stocks, bonds, furniture, and livestock, became the husband's property entirely upon marriage. He could sell or give the property away, and even bequeath it to others.² Real assets, such as land and structures, be-

¹Coverture was an inherent aspect of British common law, and as such applied both in England and her colonies, including those that formed the United States, Canada, and Australia.

²There was a limitation on this freedom for "paraphernalia", which was moveable property such as clothing and jewelry. Husbands could sell or give away paraphernalia, but not bequeath it.

came under the husband's partial control while remaining in the wife's name. He could manage the assets as he saw fit, including the income generated by the assets, but he could not sell or bequeath the property without his wife's consent.³

We argue that these laws influenced the investment portfolio choices made by women.⁴ Parents wishing to bequeath or gift assets to daughters faced the same considerations.⁵ This in turn had the effect of distorting capital markets, and thus allocations. Women investing predominantly in real assets, such as land, rather than moveable assets, such as capital, led to a misallocation between the associated sectors of the economy. As the productivity of capital-intensive industries grew the effects of this factor misallocation worsened. Eventually, these distortions were significant enough for men to want to give women rights.

We develop a general equilibrium model with endogenous determination of married women's economic rights in order to study men's incentive to give women property rights in the context of financial market efficiency.⁶ In the model, men have utility defined over their own consumption and the bequests they leave to their children. These in turn are determined by overall household income and the relative spousal bargaining power in the household. Bargaining power is equal to the relative income each spouse controls both from the labor market and from assets. Before marrying, individuals make their portfolio choice, taking

³See Blackstone (1896) for the laws of coverture. For a summary of the general responsibilities husbands and wives had to one another under coverture, see Basch (1982) Tables 1 and 2.

⁴As discussed in Section II, women had substantial wealth through inter vivos transfers and inheritances.

⁵Consider a father who wants to bequeath his estate to his daughter upon death. He would face an incentive to hold his wealth in real assets. Uncertainty over the timing of death, along with portfolio adjustment costs, amplifies this concern.

⁶The notions that coverture affected portfolio choices, that capital markets were of increasing importance during this time period, and that men were aware of the tradeoff we emphasize in this paper, are supported by historical evidence we provide in Section II.

into account how their choices affect both total household income and their individual bargaining weight. Under coverture, women potentially underinvest in capital, as these assets will become their husbands' upon marriage, and thus decrease their own bargaining power. Therefore, when deciding whether to grant women property rights, men face a tradeoff. On one hand, granting rights may increase overall output and thus overall household income, while on the other hand, granting rights reduces men's bargaining power within the household, thus reducing their share of household income.⁷

We model two different sectors: the agricultural sector, which uses labor and land, and the non-agricultural sector, which uses labor, capital, and structures.⁸ As technology in the non-agricultural sector increases, the demand for capital grows, and the effect of coverture on factor misallocation worsens. This reduces labor productivity in the sector, and implies that too much labor is allocated to agriculture relative to the first-best. Eventually, as technology in the non-agricultural sector continues to grow, the economic distortion from coverture outweighs the benefit men receive from greater bargaining power, leading men to grant women economic rights.

After solving the model, we present a numerical example in order to illustrate how the model works. This exercise shows the tradeoff men face when considering granting rights. On one hand, if they grant rights, total household income goes up. On the other hand, granting women rights reduces men's bar-

⁷This paper connects with a growing economics literature seeking to explain why certain rights were granted, or taken away, from population groups. For instance, Acemoglu and Robinson (2000) and Aidt and Franck (2015) study endogenous enfranchisement in Western societies as a way of deferring social unrest. Doepke and Zilibotti (2005) explain the prohibition of child labor in Britain through the competition of child labor with unskilled adult workers.

⁸In accordance with the legal classification of assets under coverture, land and structures are considered "real" assets in the model, while capital is considered a "moveable" asset.

gaining power within the household. We discuss how men's incentive to give women property rights evolves over the course of economic development, and how these rights in turn affect development. This paper is thus connected to a growing literature on both how development affects women's empowerment and how women's empowerment affects development.⁹

Next, we empirically validate the predictions of the model. Accordingly, we perform three sets of exercises, all exploiting cross-state variation in the timing of women's economic rights in the US. The first set is consistent with the prediction that men granted rights when distortions grew large. Specifically, using state-level total factor productivity (TFP) data in both the agricultural and non-agricultural sectors by state and year, we show that non-agricultural TFP predicts the granting of economic rights. To address omitted variable bias, we control for a host of other determinants of women's rights that have been suggested in the literature, such as being part of a territory, the fraction of women in school, and the fraction of the population that is female (Geddes and Lueck 2002), as well as fertility (Fernández 2014). The literature on American economic history finds substantial interregional interest rate and price variation during the 19th and early 20th centuries (Breckenridge 1898, Landon-Lane and Rockoff 2007, Coelho and Shepherd 1974, Haines 1989). Accordingly, we include region-year fixed effects. We also control for the fraction of neighboring states that have already granted rights to explore the possibility of learning from adjacent states. Finally, we address the notion that general trends in feminism were responsible for women's liberation.

In our second set of exercises, we use US census data to look at the fraction of

⁹For more on this topic, see Duflo (2012) and Doepke and Tertilt (2014).

male employment in the non-agricultural sector, a measure of development. Before rights are granted, there is no trend in development relative to other controls. That is, given state and year fixed effects, and other controls, development did not deviate substantially from what would have been expected. Once rights are given, there is a statistically significant increase in the fraction of the labor force working in the non-agricultural sector. The relationship is dynamic, increasing with respect to the amount of time since rights were granted, as predicted by the model. We show that this result is robust to the same demanding list of controls as in the first exercise. In our third and final set of exercises, we use state-year level data on interest rates, National Bank loans, and deposits, in order to show that the granting of women's economic rights is associated with lower interest rates and greater financial intermediation. These empirical results are consistent with an increase in the supply of loanable funds, as predicted by the model.

To show that the actual dates of women's economic rights contain economic significance, we conduct a falsification exercise. We assign random dates to granting rights and evaluate the probability of obtaining estimates that are at least as large as our "true" estimates. This procedure shows that it is highly unlikely that our empirical results were random in nature, confirming the importance of the dates of women's rights in explaining economic development.

Our empirical analysis goes a long way towards addressing omitted variable bias and randomness in the timing of granting women's economic rights. Nevertheless, one might still be worried about reverse causality, as our model makes clear that women's rights increase efficiency of financial markets and thus allocations, which in turn presents a reason to grant rights. However, this is only a concern if one already believes the basic tenet of our hypothesis. Neverthe-

less, we err on the side of caution in making causal inferences, and instead interpret the empirical evidence as being highly consistent with the predictions of the model.¹⁰

There is a growing literature on why men gave married women economic rights in the 19th century. What is common in the literature, including this paper, is that men did not want their own wives to have any power. Doepke and Tertilt (2009) argue that men wanted to grant rights in order to give *other* men's wives power, which in turn would increase investment in the human capital of their children. Fernández (2014) argues that men's incentive to give rights came from a desire to be able to leave a bequest for their daughters. This paper adds to this literature in two ways. First, we propose a novel complementary mechanism through which men choose to give women rights, which is based on the details of the property rights given and how the legal regime that existed prior to these rights distorted capital markets. Second, our hypothesis is consistent with several facts in the data, including the dramatic change in portfolio choices and the dynamics of industrialization as discussed above.

In a set of influential papers, La Porta, Lopez-de Silanes, Shleifer and Vishny (1997) and La Porta, Lopez-de Silanes, Shleifer and Vishny (1998), find large variation in investor protection across legal systems, with poorer protection resulting in smaller and narrower capital markets. Coverture represents a legal system that

¹⁰Our study contributes to a number of facts documented in the literature. Geddes and Lueck (2002) show that states with a greater fraction of the population in cities, higher wealth, and more educated women were more likely to enact married women's property rights laws. States that were more urbanized, and thus likely to be more industrialized with greater wealth, likely experienced greater distortions due to misallocation of assets under coverture; this also goes along with our hypothesis. Khan (1996) shows that granting women property rights led to increased involvement of women in commercial activity, as measured by patent records. While we argue that property rights increased efficiency in the financial markets, the notion that rights also increased research and development is clearly complementary to the ideas we present in this paper.

affords little protection to married female investors, serving as a natural laboratory for the study of the economic effects of investor rights. We argue that undoing coverture led to capital market deepening, with subsequent development. Hence, our paper is also related to Levine (1997), Acemoglu and Zilibotti (1997), and Rajan and Zingales (1998), all of which find that financial innovations lead to development.

We proceed as follows. Section II describes the historical context of time period during which women were liberated. Section III develops and solves the model. We include a numerical example that illustrates the mechanisms at work and empirically testable predictions of the model. Section IV presents the cross-state empirical evidence on the relationship between development, women's economic rights, and finance. We conclude in Section V.

II. HISTORICAL CONTEXT

In this section, we provide historical evidence to support the case that men granted women rights in order to undo financial distortions despite the effects these rights had on bargaining power at home. Specifically, we make three points. First, coverture affected portfolio allocations. Second, coverture was undone during a time of increasing importance and democratization of capital markets. Finally, people were aware of the tradeoff associated with granting women rights.

We begin by showing that women's property laws affected portfolio choices. Combs (2005) finds that coverture induced women to hold their wealth strategically, and that portfolios changed after rights were granted in 1870. Combs uses the Death Duty and Succession Duty Registers for England and Wales of women who died between 1901 and 1903, with a complete sample of shopkeepers wives.

She is able to distinguish between assets that the women accumulated versus those bequeathed to them by deceased husbands or fathers. Exploiting the fact that rights were not given retroactively, Combs finds that women under cover-
ture had half the moveable assets and twice the real assets as liberated women, while overall portfolio sizes were almost identical.

Similarly, Baskerville (2008) studies the effects of women's property rights in Canada, and argues that there was a "silent revolution" of women becoming active in capital markets. In particular, he concludes from his study that, after rights were granted, "If one were to take away the very rich and obviously powerful, then women's activities and profiles in those areas [wealth holdings/portfolio choices] were often undistinguishable from those of most of their male counterparts" (p. 237).

Next, we argue that it was no coincidence that property rights were given in England in the middle of a period of massive capital market development. For instance, Michie (2011) argues that there was "an enormous expansion in the volume and variety of securities available to the investing public, especially from the 1860s onwards. Between 1870 and 1913, new issues on the London capital market, for example, totaled 5.7 billion pounds and among them were an increasing number of shares from the likes of British industrial and commercial companies and foreign mines and plantations" (p. 161).

Michie (2011) also notes two interesting facts about railroads in England, a capital-intensive industry. First, between 1853 and 1914, railroad stocks rose dramatically to represent roughly 40% of dividend and interest paying assets traded in London, representing the national portfolio (pp. 161-162). Furthermore, there was a great democratization of the stock market over this time period, as "In the

years between the 1840s and 1914, there was a transformation of the composition of both investments and the investing public. No longer were investors confined to a wealthy elite largely located in London, for they were increasingly found throughout the country and among the middle classes” (p. 156). In particular, it is estimated that between 150,000 and 300,000 people held stock in British railways by 1886 (p. 163). It is hard to imagine that the railroad industry would have been as successful without the overall deepening of financial markets over this time period.¹¹

One possible criticism of the idea that women’s property rights were important for aggregate outcomes is the notion that perhaps women didn’t have much in the way of assets. However, as long as bequests and inter vivos transfers are an important factor in national wealth, women ought to have substantial portfolios. Focusing on France due to data availability, Piketty (2014) shows evidence that wealth in bequests accounted for approximately 80-90% of all wealth in this time period (Figure 11.7 on p. 402). DeLong (2003) also argues that bequests were an important factor in US national wealth. Furthermore, Koudijs and Salisbury (2016) show direct evidence that husbands and wives began marriages with almost identical amounts of wealth in the mid 19th century American South. Indeed, after the War of Independence, primogeniture was abandoned and the default became to split inheritances equally among children, including girls (Shammas, Salmon and Dahlin 1987).

Finally, we turn to the issue of whether men were aware of the implications of married women’s economic rights. This notion has been strongly supported by the legal literature. Chused (1985) argues that “It is now generally agreed

¹¹For much more about the democratization of finance in this time period, see Maltby, Rutherford, Green, Ainscough and van Mourik (2011).

that the first wave of married women's acts were adopted in part because of the dislocations caused by the Panic of 1837," implying that the financial market implications of women's rights were a cause of reform.¹² Indeed, the politician Thomas Herrtell, of the New York Legislature, argued that women's property rights "would open appropriate segments of the economy to women, reduce pauperism, and thereby save the public considerable expense" Basch (1982) (p. 115).

More specifically to our mechanism, VanBurkleo (2001) states that "These [married women's property] acts were inspired, however, mainly by two unsentimental policy goals: First, a desire to liberate capital and put it into circulation ... Not coincidentally, talk about expanding wives' economic autonomy coincided with the financial emergencies of 1819 (when legislators in Kentucky, for example, discussed reform without acting) and 1837 (after which, statutes began to appear across the nation)" (p. 126). She continues to state that these acts "also advanced commerce by shoring up bank vaults that had been seriously depleted" (p. 126). Notably, she argues that "Invitations to affirm or expand women's competence that did not clearly advance economic interests [were] usually met with indifference or hostility" (p. 126).

Men perceived the cost of granting women rights to be a reduction in bargaining power at home. Griffin (2003) argues that politicians feared the new law "would reduce their domestic authority and create discord in their homes" (p. 86). Indeed, one need only go to historical sources to see this concern first-hand. British Member of Parliament Alexander Hope was opposed to the passage of the Married Women's Property Act of 1870, as he "thought it wantonly interfered

¹²This notion is further reflected in Basch (1982): "It is worth noting that the two major statutes of 1848 and 1860 followed the depressions of 1839-43 and 1857" (p. 122).

with the relations of married life" (*The Morning Post*, 1869).¹³ John Robinson, a politician in British Columbia opposed to granting married women property rights, argued that these laws were "calculated to revolutionize the whole household system" (Baskerville 2008) (p. 6). So great were these fears that the House of Commons records in its debates testimonies from American experts brought in to discuss how the changes in the US affected marital relations (Hansard 1870).

The literature has also discussed a related mechanism through which women's economic rights affected financial markets. Combs (2013) argues that trusts established for women during coverture allowed for women to protect their husbands' assets during bankruptcy, effectively committing sophisticated fraud, and shows that people were mindful of these realities during the debate over granting property rights.¹⁴ Notice that this notion of property rights reducing fraud is a complementary mechanism to our own regarding how granting married women property rights would act as a financial innovation that improves capital markets.

The evidence clearly show that coverture affected portfolio choices during a time of growing importance and democratization of financial markets, and that people were well aware of both the financial and intrahousehold implications of married women's rights.

¹³Indeed, Mr. Hope is cited in the House of Commons debate from April 14th 1869 as arguing that "Old-fashioned people like himself were not ashamed to declare that it was written in nature and in Scripture that the husband was and ought to be lord of his household, the regulator of its concerns, and the protector of its inmates, which, if this Bill passed, he would no longer be" (Hansard 1869)

¹⁴Chused (1985) argues the same occurred in Oregon, and Baskerville (2008) discusses this phenomenon in Canada, showing that these issues with coverture were not limited to England. VanBurkleo (2001) also discusses fraud as a reason why men gave women property rights in the US.

III. MODEL

The economy consists of overlapping generations of a unit measure of men and women who live for two periods. In every period the economy produces a single homogeneous final good that can be used for consumption and investment. Production uses labor, L , and three different physical inputs: Land, T , capital, K , and structures, S . The final good is produced by two intermediate goods: agriculture, A , and non-agricultural goods, NA . While agriculture uses labor and land, non-agriculture utilizes labor, capital, and structures as factors of production. We assume the structures and capital fully depreciate within a period.¹⁵ By contrast, land is assumed to be in fixed supply.¹⁶

In accordance with the doctrine of coverture, we assume that land and structures correspond to the “real” assets over which married women always had partial rights, while capital represents the “moveable” assets that immediately and forever became the husband’s property upon marriage under coverture.

III.A. Production

Production takes place in three different sectors: the agricultural intermediate sector, the non-agricultural intermediate sector, and the final good sector, which simply aggregates the intermediate goods.

¹⁵The assumption of full depreciation is not necessary for our analytic results. Rather, it simplifies the solution by allowing us to abstract from the relative changes of asset prices over time and the corresponding implication for the portfolio choice of households.

¹⁶This is most likely a reasonable assumption for England, but perhaps less so for the US. Vandenbroucke (2008) discusses the US westward expansion and includes details of the marginal cost of clearing forests and prairies, expanding the supply of land for agriculture. The qualitative results shown here are maintained in a similar model with producible land.

1. *The Final Good*

The output of the final good in the economy in period t , Y_t , is given by aggregating the agricultural intermediate good, Y_t^A , and the non-agricultural intermediate good, Y_t^{NA} , according to the following constant returns to scale (CRS) constant elasticity of substitution (CES) production technology:

$$(1) \quad Y_t = \left[(Y_t^A)^\rho + (Y_t^{NA})^\rho \right]^{(1/\rho)},$$

where $\rho \in (0, 1]$ controls the elasticity of substitution between agricultural and non-agricultural goods.¹⁷

2. *The Agricultural Intermediate Good*

Production of the agricultural intermediate good occurs within a period according to a Cobb-Douglas production technology, using labor and land. The output produced at time t , Y_t^A , is

$$(2) \quad Y_t^A = A_t^A (T)^\alpha (L_t^A)^{(1-\alpha)},$$

where A_t^A , normalized to 1, is the level of Total Factor Productivity (TFP) in the agricultural sector, T and L_t^A are the land and number of workers, respectively, employed by the agricultural sector in period t , and $\alpha \in (0, 1)$ is the elasticity of output with respect to land.

¹⁷In order for TFP growth in the non-agricultural sector to result in labor shifting towards that sector, with well-behaved asymptotics, Zeira and Zoabi (2015) show that the two intermediate sectors must be substitutes.

3. *The Non-Agricultural Intermediate Good*

Production of the non-agricultural intermediate good occurs within a period according to a CRS production technology using labor, structures, and capital. The output produced at time t , Y_t^{NA} , is

$$(3) \quad Y_t^{NA} = \left[A_t^{NA} (K_t)^\sigma + (S_t)^\sigma \right]^{\frac{\alpha}{\sigma}} (L_t^{NA})^{(1-\alpha)},$$

where $\sigma \in (0, 1)$ controls the elasticity of substitution between capital and structures; A_t^{NA} is the level of TFP in the non-agricultural sector; and K_t , S_t , and L_t^{NA} respectively are the capital stock, structures, and number of workers employed by the non-agricultural sector in period t .¹⁸ We think of structures as representing the buildings used by small shops, such as on the main street of a town, which women could own as part of their real assets portfolio. In contrast, the capital represents factories. Accordingly, technology, A^{NA} , augments capital, rather than structures.¹⁹ Notice that we use the same elasticity of production with respect to labor, α , in the non-agricultural and agricultural sectors, which simplifies our analysis but is not crucial for our results.

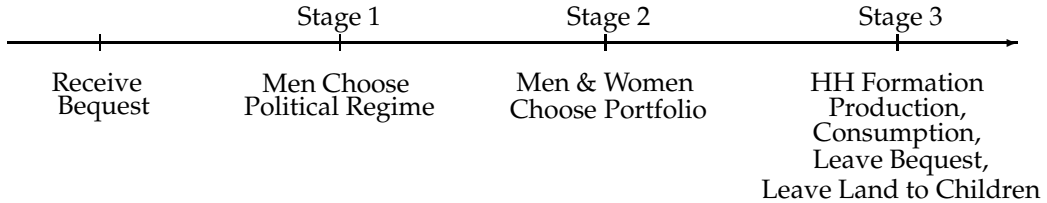


FIGURE I: Timeline

III.B. *Individuals*

In every period a generation, consisting of unit measures of men and of women, is born. Individuals live for two periods, childhood and adulthood. Children make no decisions, and receive half of their parents' land and a bequest, b_{t-1} , at the end of their childhood.²⁰ The timing of adulthood is split into three stages as shown in the timeline shown in Figure I. In stage 1, men decide whether to grant women property rights. In stage 2, unmarried men and women then invest their bequest in structures and capital.²¹ In stage 3, after the investment decision, they form households and decide on consumption for each spouse, along with a bequest for the next generation. We assume that the man supplies his one unit of time inelastically while the woman does not work.²² Since there is no hetero-

¹⁸With a Cobb-Douglas production function between structures and capital there is either always an economic distortion from coverture or never a distortion. When the distortion exists, the size of the distortion depends on the level of technology, A^{NA} . The result that technological progress leads to men granting women rights stands.

¹⁹This is similar to the literature on investment-specific technological change, such as Greenwood, Hercowitz and Krusell (1997), which break structures and capital apart in their production function. What is important for our theory is that there is technological change related to the type of asset over which women have a legal disability.

²⁰Galor, Moav and Vollrath (2009) also assume that children inherit land directly from their parents. We follow them for simplicity.

²¹An alternative interpretation could be that parents are investing on their children's behalf, taking coverture into account.

²²This captures the reality of the late 19th and early 20th centuries, when the labor force participation rate of married women in the US was below 5%.

geneity within genders, we analyze the representative agent problem of married households along with the investment decisions of a representative single man and woman.

Preferences of individual $i \in \{m, f\}$, for male and female, who becomes an adult in period t are defined over consumption, c_t^i , and a transfer to both offsprings, $2b_t$. They are represented by a log-linear utility function:

$$(4) \quad u^i(c_t^i, b_t) = \log(c_t^i) + \gamma \log(2b_t),$$

where γ is the weight put on children. As will become clear below, the bequest is a public good between a husband and wife.

Singles take the bequest they receive from their parents, b_{t-1} , and invest in capital, K_t^i , and structures, S_t^i . Therefore the budget constraint in stage 2 is:

$$(5) \quad K_t^i + S_t^i = b_{t-1}.$$

After forming a household in stage 3, each family has a son and daughter. Using income from their assets and the man's wage, households allocate their resources between the husband's consumption, c_t^m , the wife's consumption, c_t^f , and equal bequests to each of their progeny, b_t .

The couple's budget constraint is thus

$$(6) \quad c_t^m + c_t^f + 2b_t = I_t,$$

where I_t is household's income. Household income is given by

$$(7) \quad I_t = r_t^K K_t + r_t^T T + r_t^S S_t + w_t.$$

Here r_t^K , r_t^S , and r_t^T are the returns of capital, structures, and land, respectively, and w_t is the wage earned by the husband. The household budget constraint includes both the man's and woman's assets. That is, $K_t = K_t^m + K_t^f$, $S_t = S_t^m + S_t^f$, and $T = T^m + T^f$.

Economic choices are determined by solving the following Pareto problem:

$$(8) \quad \{c_t^f, c_t^m, b_t\} = \operatorname{argmax}\{\theta_t \log(c_t^f) + (1 - \theta_t) \log(c_t^m) + \gamma \log(2b_t)\},$$

where θ_t and $(1 - \theta_t)$ are the wife's and husband's weights in household decision making, respectively, as described below. This maximization is subject to the constraint (6).²³

1. *The Coverture Regime (C)*

Under coverture, which we call the C regime, the law was such that men gained control over all of their wives' moveable assets (capital), and partial control over their real assets (land and structures).²⁴ To capture this reality in a parsimonious manner, we assume that the husband extracts $\lambda \in (0, 1)$ of the returns on land and structures that the wife brings to the household. We thus think of λ as captur-

²³For an excellent analysis of the importance of cooperative household decision making, see Browning, Chiappori and Weiss (2014).

²⁴Recall that the legal reality was then that a man controlled the income from his wife's real assets, but could not sell or bequeath said assets without his wife's permission, and that these assets would return to her upon dissolution of the marriage. All of the moveable assets became the man's property immediately and forever upon marriage.

ing the rental flow of the real assets over the course of the marriage. Accordingly, the wife's weight in the household's decision-making is given by the share $1 - \lambda$ of the returns on wife's land and structures out of the total household's resources.

That is, the wife's Pareto weight is given by:

$$(9) \quad \theta_t = \frac{(1 - \lambda)(r_t^T T^f + r_t^S S_t^f)}{I_t}.$$

2. *The Women's Liberation Regime (WL)*

When women have economic rights, which we call the *WL* regime, each member of the household owns, manages, and controls her (his) assets. Thus, the wife controls all the returns of all the assets she brings to the household. In this case, the wife's Pareto weight is given by:

$$(10) \quad \theta_t = \frac{r_t^T T^f + r_t^K K_t^f + r_t^S S_t^f}{I_t}.$$

When describing the legal environment in which coverture has been undone, we use "women's liberation" and "rights" interchangeably.

3. *Determination of the Legal Regime*

The legal regime is determined by a vote among the male population in stage 1 before singles invest. Individuals' portfolios depend upon the outcome of the men's decision, as described above. Under the assumption that men will vote for *C* when both regimes yield the same utility, granting rights will occur if and only

if

$$(11) \quad (U_t^m)^{WL} > (U_t^m)^C.$$

Notice that there is no heterogeneity among men in the model; all men agree on whether or not to give women rights.

III.C. Model Solution

We begin by solving for the production side of the economy, taking as given factor prices. The rest of the individuals' side of the model is solved by backwards induction. Given a legal regime and each spouse's investment portfolio from before marriage, we calculate the consumption allocation and bequest for the children in the married household. We then solve for choices that these people made when they were single, showing how singles take into account how their investments affect subsequent household allocation after marriage. In the last step of our backwards induction, men choose a legal regime, taking into account how their choice affects both the investment decision singles make and the subsequent consumption and bequest allocation during marriage.

Notice that when solving for portfolio choices, individuals take as given the returns on assets. Firms also take these returns as given when making production decisions, as they represent factor prices of production. The capital, structures, land, and labor that firms purchase must be equal to those supplied by the individuals in the economy. We therefore have a general equilibrium problem in choosing the market-clearing prices for these factor inputs.

1. Production and Factor Prices

The final good producers take as given the prices of intermediate goods, P^A and P^{NA} , and maximize their profits:

$$(12) \quad \{Y_t^A, Y_t^{NA}\} = \operatorname{argmax} \left\{ \left[(Y_t^A)^\rho + (Y_t^{NA})^\rho \right]^{\frac{1}{\rho}} - P_t^{NA} Y_t^{NA} - P_t^A Y_t^A \right\}.$$

This gives rise to the following inverse demand functions for the intermediate goods:

$$(13) \quad \begin{aligned} P_t^{NA} &= (Y_t^{NA})^{\rho-1} (Y_t)^{1-\rho} \\ P_t^A &= (Y_t^A)^{\rho-1} (Y_t)^{1-\rho}. \end{aligned}$$

The intermediate agricultural good producers maximize profits as follows:

$$(14) \quad \{T_t, L_t^A\} = \operatorname{argmax} \left\{ P_t^A (T_t)^\alpha (L_t^A)^{1-\alpha} - r_t^T T_t - w_t L_t^A \right\}.$$

The intermediate non-agricultural good producers maximize profits as follows:

$$(15) \quad \{K_t, S_t, L_t^{NA}\} = \operatorname{argmax} \left\{ P_t^{NA} \left[A_t^{NA} (K_t)^\sigma + (S_t)^\sigma \right]^{\frac{\alpha}{\sigma}} (L_t^{NA})^{(1-\alpha)} - r_t^K K_t - r_t^S S_t - w_t L_t^{NA} \right\}$$

These maximization problems give the following first order conditions:

$$(16) \quad r_t^T = \alpha P_t^A \left(\frac{L_t^A}{T_t} \right)^{1-\alpha},$$

$$(17) \quad r_t^K = \alpha P_t^{NA} \left[A_t^{NA} (K_t)^\sigma + (S_t)^\sigma \right]^{\frac{\alpha}{\sigma} - 1} (L_t^{NA})^{(1-\alpha)} A^{NA} (K_t)^{(\sigma-1)},$$

$$(18) \quad r_t^S = \alpha P_t^{NA} \left[A_t^{NA} (K_t)^\sigma + (S_t)^\sigma \right]^{\frac{\alpha}{\sigma} - 1} (L_t^{NA})^{(1-\alpha)} (S_t)^{(\sigma-1)},$$

$$w_t^A = (1 - \alpha) P_t^A \left(\frac{T}{L_t^A} \right)^\alpha,$$

$$(19) \quad w_t^{NA} = (1 - \alpha) P_t^{NA} \left(\frac{[A_t^{NA} (K_t)^\sigma + (S_t)^\sigma]^{\frac{1}{\sigma}}}{L_t^{NA}} \right)^\alpha.$$

2. Household Optimal Choice: Stage 3

We begin by analyzing the household choice given a portfolio and legal regime.

Maximizing (8) subject to (6) gives the following optimal choices

$$(20) \quad c_t^f = \frac{\theta_t I_t}{1 + \gamma},$$

$$(21) \quad c_t^m = \frac{(1 - \theta_t) I_t}{1 + \gamma},$$

and

$$(22) \quad b_t = \frac{\gamma I_t}{2(1 + \gamma)}.$$

Notice that this formulation is general. That is, the legal regime will affect both I_t and θ_t , but once they have been determined, these equations dictate the solution to the household problem.

3. *Individual Portfolio Optimal Choice: Stage 2*

Single individuals' portfolio choices depend on the legal regime, as it determines the assets over which men and women have control.

4. *The Coverture Regime (C)*

Single individuals make their investment decision between structures and capital in order to maximize their own utility. They take into account how their choice influences both household income and bargaining weight, and thus the household bargaining problem. Mathematically, the solution involves substituting the household's optimal choices, (20), (21), and (22); the individual's budget constraint, (5); and the individual's share in the household decision under the C regime, (9), into the individual's utility function, (4). Optimal behavior is therefore derived from maximizing the following problem for the representative woman is as follows:

$$(23) \quad S_t^f = \operatorname{argmax} \left\{ \log[S_t^f r_t^S + r_t^T T / 2] + \gamma \log[S_t^f (r_t^S - r_t^K) + S_t^m r_t^S + (K_t^m + b_{t-1}) r_t^K + r_t^T T + w] \right\}.$$

Notice that the bargaining weights and household income are implicitly put in the above equations as a function of the woman's choice over her asset allocation.

The corresponding problem for the representative man is as follows:

(24)

$$S_t^m = \operatorname{argmax} \left\{ \log[S_t^m(r_t^S - r_t^K) + \lambda S_t^f r_t^S + (1 + \lambda)r_t^T T/2 + (K_t^f + b_{t-1})r_t^K + w] \right. \\ \left. + \gamma \log[S_t^m(r_t^S - r_t^K) + S_t^f r_t^S + (K_t^f + b_{t-1})r_t^K + r_t^T T + w] \right\}.$$

The solutions to the woman's maximization problem, (23), and the man's maximization problem, (24), depend on returns on structures, r_t^S , the returns on capital, r_t^K , and the budget constraint, (5). This optimal choice is summarized in the following lemma.

LEMMA 1 *In the Coverture regime:*

1. *Women's optimal investment is given by*

$$S_t^f = \begin{cases} b_{t-1} & \text{if } r_t^S \geq r_t^K \\ \min \left\{ b_{t-1}, \frac{r_t^S S^m + (b_{t-1} + K^m)r_t^K + r_t^T T \left[1 - \frac{\gamma}{2} \left(\frac{r_t^K - r_t^S}{r_t^S} \right) \right] + w}{(1 + \gamma)(r_t^K - r_t^S)} \right\} & \text{if } r_t^S < r_t^K \end{cases}.$$

2. *Men's optimal investment is given by*

$$S_t^m \begin{cases} = b_{t-1} & \text{if } r_t^S > r_t^K \\ = 0 & \text{if } r_t^S < r_t^K \\ \in [0, b_{t-1}] & \text{if } r_t^S = r_t^K \end{cases}.$$

PROOF: Follows directly from the first order conditions of (23) and (24) and the budget constraint given in (5). \square

5. *The Women's Liberation Regime (WL)*

As before, single individuals take as given what the consumption and bequest allocations will be as functions of household income and bargaining weights. Substituting the household's optimal choices, (20), (21), and (22); the individual's budget constraint, (5); and the individual's share in the household decision under the *WL* regime, (10), into the individual's utility function, (4), optimal behavior can be derived from maximizing the following problem for the woman:

$$(25) \quad S_t^f = \operatorname{argmax} \left\{ \log[S_t^f (r_t^S - r_t^K) + b_{t-1} r_t^K + r_t^T T / 2] \right. \\ \left. + \gamma \log[S_t^f (r_t^S - r_t^K) + S_t^m r_t^S + (K_t^m + b_{t-1}) r_t^K + r_t^T T + w] \right\},$$

and the corresponding problem for the man:

$$(26) \quad S_t^m = \operatorname{argmax} \left\{ \log[S_t^m (r_t^S - r_t^K) + b_{t-1} r_t^K + r_t^T T / 2 + w] \right. \\ \left. + \gamma \log[S_t^m (r_t^S - r_t^K) + S_t^f r_t^S + (K_t^f + b_{t-1}) r_t^K + r_t^T T + w] \right\}.$$

The solutions to the woman's maximization problem, (25), and the man's maximization problem, (26), depend on returns to land, r_t^T , returns to capital,

r_t^K , returns to structures, r_t^S , and the budget constraint, (5). This optimal choice is summarized in the following lemma.

LEMMA 2 *In the WL regime:*

Individual i 's $\in \{f, m\}$ optimal investment is given by

$$S_t^i \begin{cases} = b_{t-1} & \text{if } r_t^S > r_t^K \\ = 0 & \text{if } r_t^S < r_t^K \\ \in [0, b_{t-1}] & \text{if } r_t^S = r_t^K \end{cases}.$$

PROOF: Follows directly from the first order conditions of (25) and (26) and the constraint given in (5). □

6. Market Clearing

Markets clear when the labor, structure, capital, and land supplied by the household are equal to those demanded by the firms.

Specifically, the goods market clearing requires production to be equal to consumption, as shown by:

$$(27) \quad Y_t = c_t^m + c_t^f + 2b_t.$$

The structure market clears, as shown by:

$$(28) \quad S_t = S_t^m + S_t^f,$$

where S_t is the demand for structures used by the non-agricultural sector, as in

(15), and S_t^m and S_t^f are the structure choices by the man and woman, respectively, as in Lemma 1 under coverture and Lemma 2 when there are rights.

The capital market clears, as shown by:

$$(29) \quad K_t = K_t^m + K_t^f,$$

where K_t is the demand for capital used by the non-agricultural sector, as in (15), and K_t^m and K_t^f are the capital choices by the man and woman, respectively. Note that the capital choice for an individual is simply $K_t^i = b_{t-1} - S_t^i$.

The land market clears, as shown by:

$$(30) \quad T_t = T^m + T^f,$$

where T_t is the demand for land used by the agricultural sector, as in (14), and T^m and T^f are the land endowments of the man and woman, respectively.

The last equilibrium condition is labor market clearing:

$$(31) \quad L_t^M + L_t^A = 1.$$

7. General Equilibrium

We now define the general equilibrium of the economy.

DEFINITION 1 *General equilibrium in the economy is a set of prices $\{P_t^A, P_t^{NA}, w_t, r_t^K, r_t^S, r_t^T\}$, allocations in the production side $\{Y_t, Y_t^{NA}, Y_t^A, T, K_t, S_t, L_t^A, L_t^{NA}\}$, portfolio choices of the household $\{S_t^f, S_t^m, K_t^f, K_t^m\}$, household allocation $\{c_t^f, c_t^m, b_t\}$, and a series of legal regimes for each date t , such that:*

1. *Given prices and a legal regime, output and firm's use of resources, $\{Y_t, Y_t^{NA}, Y_t^A, T, K_t, S_t, L_t^A, L_t^{NA}\}$, solve (12),(14), and (15). The consumption allocation, $\{c_t^f, c_t^m, b_t\}$, solves (8), with bargaining weight θ determined by (9) when the legal regime is coverture and (10) when women have been liberated. The portfolio choices, $\{S_t^f, S_t^m, K_t^f, K_t^m\}$, solve (23) and (24) when there is coverture, and (25) and (26) when women have been liberated.*
2. *Markets clear, as described by (27), (28), (29), (30), and (31).*
3. *The legal regime at each time t is determined by solving (11).*

Before showing a numerical example in the following section we describe intuitively the various phases of development of the economy.

We study development by exogenously increasing the productivity of the non-agricultural sector. The economy experiences three phases along its development path.

1. For A^{NA} sufficiently low, the non-agricultural sector is small enough that returns between structures and capital can be equalized under the NR regime. That is, the capital supplied by men is sufficient to overcome the underinvestment in capital by women, and thus equalize returns. Accordingly, men maintain coverture as there is no distortion in the economy.
2. When A^{NA} is large but not too large, a wedge opens between the returns to capital and the returns to structures. The economy operates below its potential, but not so much so that men are willing to grant women rights.
3. Finally, after A^{NA} grows high enough, the distortion in the economy becomes great enough that men liberate women by ending coverture.

III.D. *A Numerical Example*

We now solve a numerical example of the model in order to illustrate how the mechanisms in the model work.²⁵ As mentioned above, there are three phases of development. First, as A^{NA} is low, there is no distortion caused by coverture. After a certain point, there is insufficient capital provided to the non-agricultural sector due to the lack of female investment, causing an increasing degree of inefficiency. When the inefficiency grows, men eventually give women rights by ending coverture, further aiding development. Appendix A provides the details of the numerical solution and parameter values.

We solve the model three different ways. First we solve the model under the assumption that coverture is always in effect. Then we resolve the model under the assumption that women were never subject to coverture. Finally, we do the exercise that begins with coverture in effect and then men optimally choose when to give women rights.

1. *Dynamics of Development and Women's Liberation*

We now graphically show the results of the numerical exercise and discuss the economic intuition behind the model. For all graphs, unless otherwise specified, the line "Coverture" shows the evolution of these variables if women are never given rights, the line "Rights" shows these variables if women always have rights, and the line "Optimal Rights" shows the evolution of various variables if men optimally choose to switch legal regimes.

In Figure II we show the evolution of women's bargaining power, θ , as well

²⁵Explicit analytic solutions exist to the model when there are no distortions, such as when A^{NA} is sufficiently small or women have economic rights.

as log income. The figure clearly shows the tradeoff men face. Liberated women always have higher bargaining power than women under coverture. As such, at the moment of women’s liberation, women’s bargaining power increases. On the other hand, the case of women’s liberation implies no distortion in the asset markets, and thus higher income. Accordingly, when rights are granted, income rises. Notice also that at the beginning, the income levels are the same, as there is no distortion. It is only as A^{NA} grows large enough that the distortion develops, and eventually men decide to give rights, as explained in Section 7. Additionally, notice that while women’s bargaining power jumps immediately to the new level, income takes time to adjust. This is due to the fact that people are poorer under coverture than they would be otherwise, and convergence to the new steady-state growth path takes time. The mechanism for convergence, made clear below, works through the growth of the bequests.

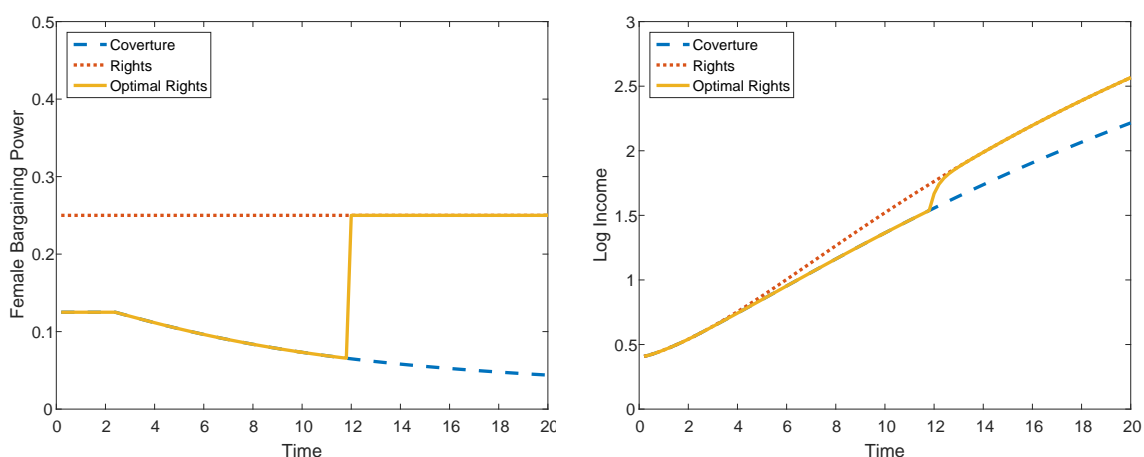


FIGURE II: Women’s Bargaining Power (Left) and Log Income (Right)

In Figure III, we show men’s utility over the course of development. This formalizes the intuition behind our first set of empirical exercises: as development progresses, men eventually choose to liberate women by ending coverture. The

curve labeled “Coverture” is men’s utility when women do not have rights. The curve labeled “E.C.N,” for “End Coverture Now,” is men’s utility if they decide to end coverture in any given period for the first time. The difference between this curve and a hypothetical curve (not shown) where coverture never existed is that this curve has men take into account that, due to underaccumulation of capital under coverture, the level of income will be smaller immediately upon

w01

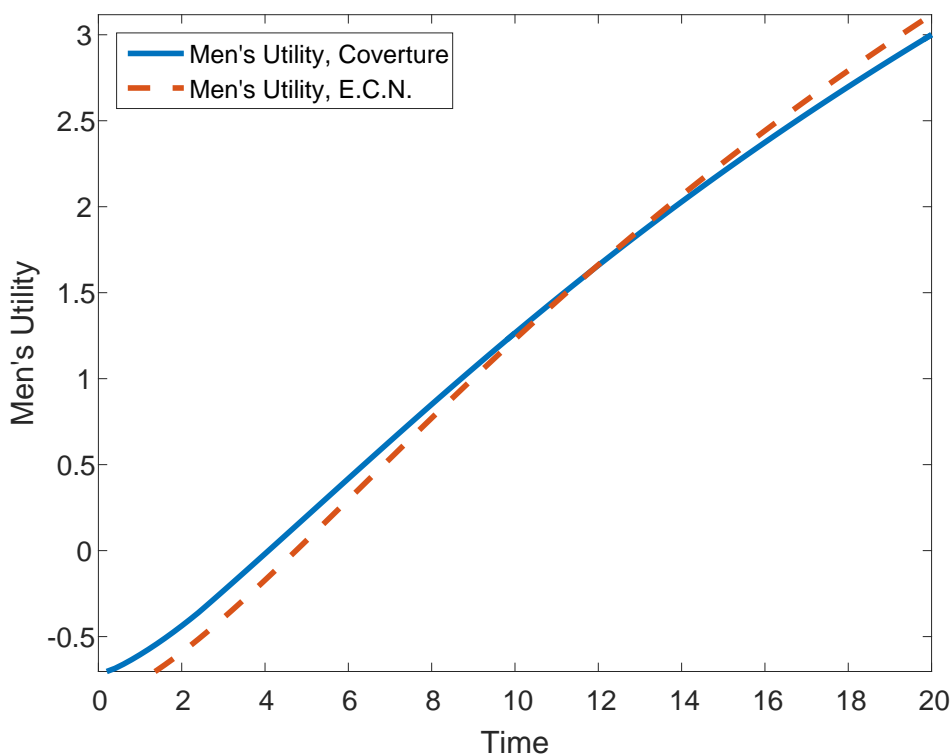


FIGURE III: Men’s Utility

Figure IV shows the dynamics of labor in the non-agricultural sector. Under coverture, there is an inefficiently low amount of capital, which slows industrialization, resulting in less labor in non-agriculture than there would have been otherwise. Upon granting married women rights, the fraction of workers em-

ployed in non-agriculture grows immediately and dynamically, converging to a higher level on the growth path. This formalizes the intuition behind our second set of empirical exercises.

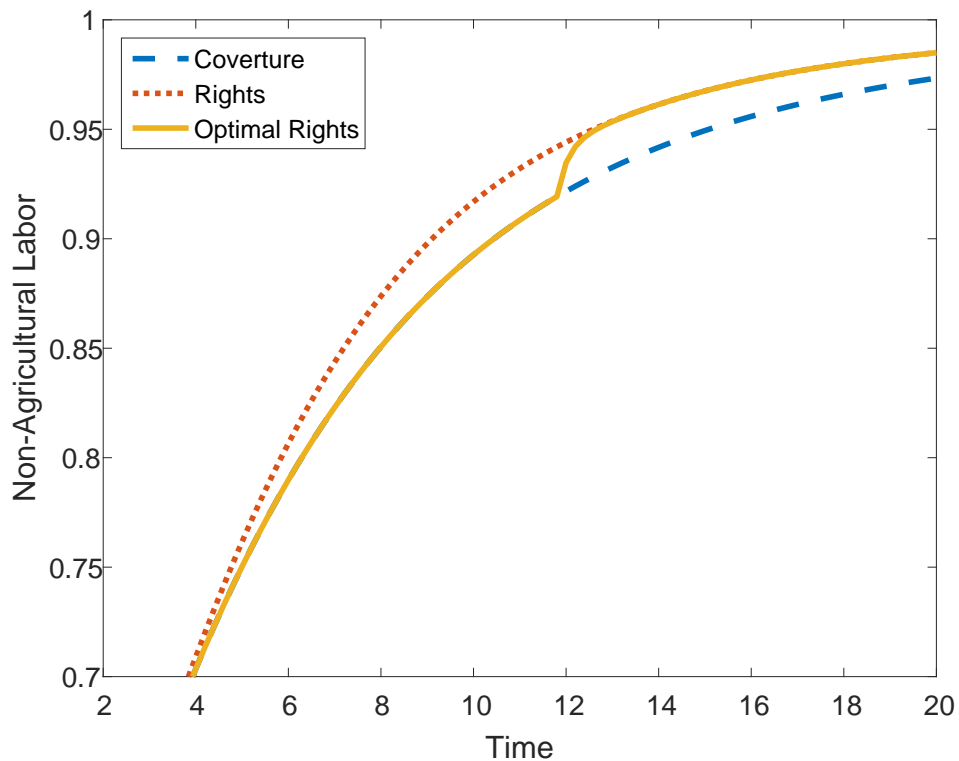


FIGURE IV: Labor in Non-Agriculture

Figure V shows the dynamics of the log of the bequest in the model. Notice that bequest levels, which are proportional to income, are higher when women have rights, due to the lack of distortion. The higher bequest is not due to women's bargaining power leading to a greater allocation towards children, as women and men value their children the same amount. After rights are granted, the bequest grows and converges to the case of women always having rights. Convergence takes time as the bequest of one generation is the source of investment funds for the next generation. Once women have rights, this bequest is

allocated efficiently, leading to higher income, and thus a higher level of bequest to the next generation.

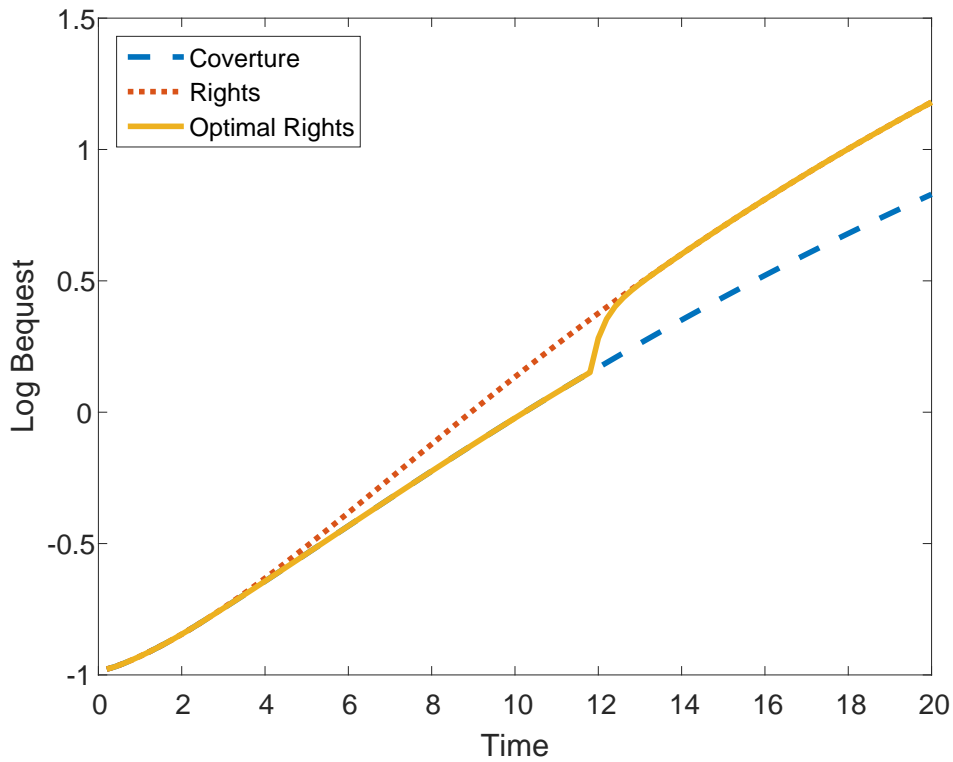


FIGURE V: Log Bequest Level

Figure VI shows the dynamics of log capital and log structure stocks in the model. When rights are granted, there is a greater allocation of resources towards capital, and the stock converges dynamically towards the steady state growth path. On the other hand, there is less investment in structures, and so the stock of structures drops immediately. This stock then converges towards its steady state path. Notice that the simplifying assumption of full depreciation in capital and structures is important for both the speed of the transition of capital, and the fact that the stock of structures drops below the long run trend when rights are given.

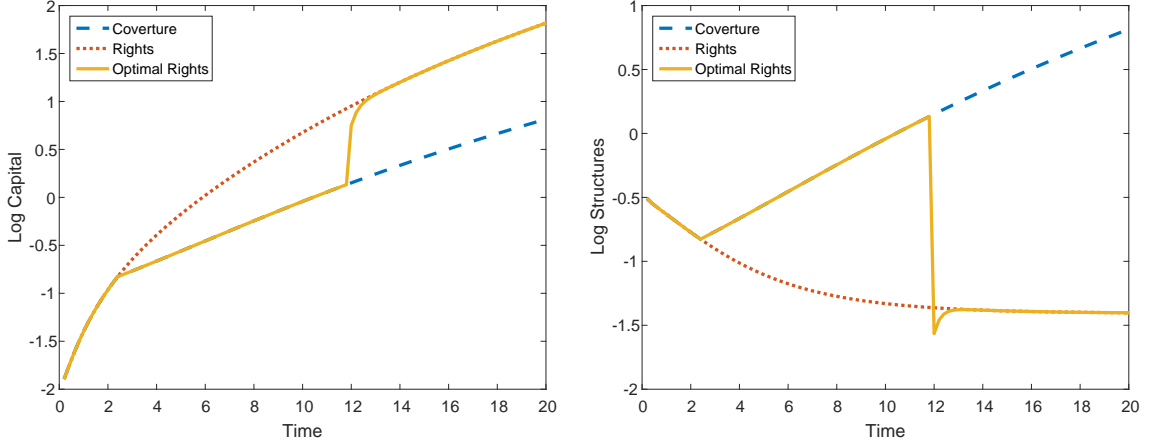


FIGURE VI: Log Capital (Left) and Structures (Right)

Figure VII shows the dynamics of the returns to capital and structures. At low levels of A^{NA} there is no economic distortion, and thus the returns are equalized. When there is a distortion, at higher levels of A^{NA} , the returns to capital exceed the returns to structures due to underinvestment in capital. As soon as rights are granted, the returns are equalized. As the economy accumulates more wealth after rights are granted, these returns fall even more. This formalizes the third and final set of empirical exercises; when coverture is ended, there is an increase in the supply of capital, yielding lower interest rates and greater financial intermediation.

IV. EMPIRICAL EVIDENCE

In this section, we exploit cross-state variation in the timing of women's rights in the US in order to provide empirical evidence to validate the model predictions studied in Section III.D. Specifically, the model exhibits a bidirectional relationship between development and women's rights, with the mechanism for further development being financial deepening.

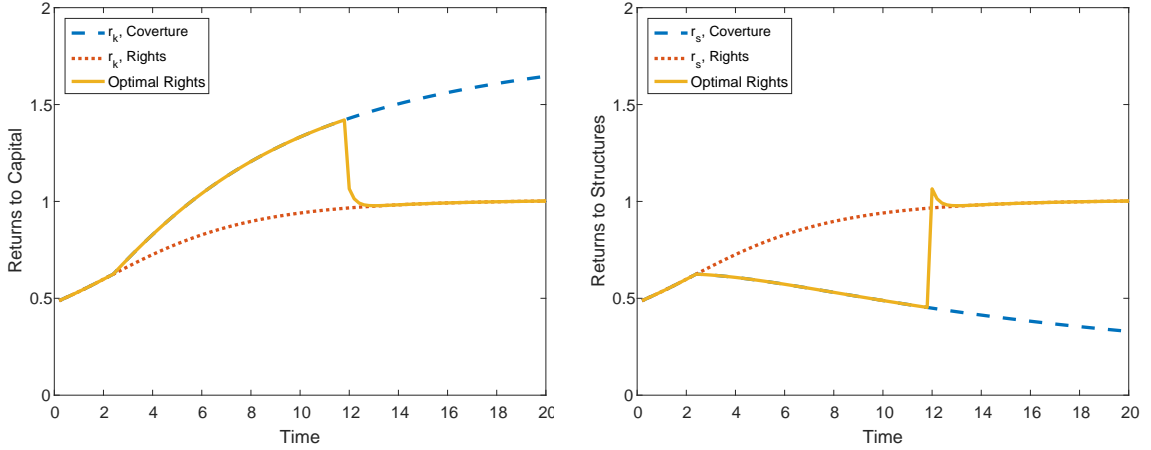


FIGURE VII: Returns to Capital (Left) and Structures (Right)

We begin with the link between development and women’s rights. We show that greater levels of TFP in the non-agricultural sectors predict the men’s granting of women’s economic rights, as predicted by the model in Figure III. We continue by showing that women’s rights lead to development. Thus, consistent with Figure IV, our second exercise shows that granting rights predicts an immediate and dynamic increase in the fraction of the labor force allocated towards the non-agricultural sectors. Finally, we provide evidence that women’s economic rights were associated with financial deepening. Accordingly, we show that rights are associated with both an increase in deposits and bank loans per capita as well as a decrease in interest rates, as predicted in Figures VI and VII.

Our empirical analysis is based on the implicit assumption that states are closed economies with respect to financial markets. This assumption is consistent with the realities of the time. It is well known that banking was highly regulated at the state level during the 19th century.²⁶ Empirically, there were large variations in interest rates. For instance, Breckenridge (1898) documents regional

²⁶For an thorough history of US banking, see Calomiris (2000).

dispersion in interest rates of first class double-name commercial paper in the 1890s. We present a snapshot of his findings in Figure VIII. The figure shows that interest rates varied from about 4% in Boston to more than 9% in Denver. While we do not take a particular stand, there is a large literature on the source of these regional variations in interest rates and why capital did not flow to correct imbalances.²⁷ Considering these realities, we continue with our analysis under the assumption that states are closed economies.

In addition to the financial dispersion discussed above, it has been noted in the literature that there was regional price variation in the US during the 19th century (Coelho and Shepherd 1974, Haines 1989). The available regional price indices, however, do not cover the entire time period we use in our sample, so we cannot use them in our analysis. It is reasonable to think that regional prices matter for each of our exercises; TFP calculations depend on prices, sectoral labor allocations depend on relative prices, and real financial variables depend on the method of accounting for inflation. Accordingly, in all sets of exercises we include specifications with region-year fixed effects.

As described below, we do our best to control for omitted variable bias and perform falsification exercises in order to show that the dates women were granted rights do indeed have economic significance. Nevertheless, one might still be worried about reverse causality, as our model makes clear that women's rights increase efficiency of financial markets and thus allocations, which in turn was a reason to grant rights. Our empirical exercise supports this claim; we show that TFP predicts women's rights, with rights as a dependent variable, as in Geddes and Lueck (2002) and Fernández (2014). We then turn around and use women's

²⁷For a summary and contribution to this literature, see Landon-Lane and Rockoff (2007).

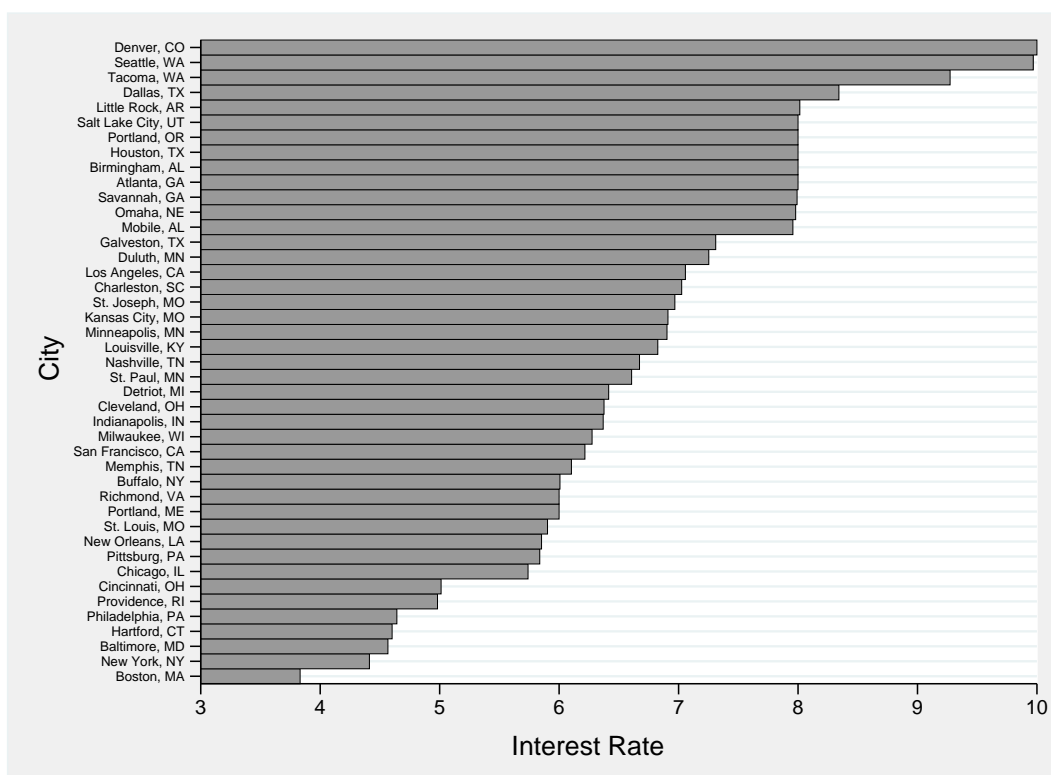


FIGURE VIII: Dispersion of Interest Rates, 1893-1897. Source: Breckenridge (1898).

rights as an explanatory variable, along with Khan (1996) and Geddes, Lueck and Tennyson (2012). Similar work on the effects of women’s suffrage has also taken this approach, such as Miller (2008) and Lott and Kenny (1999). The fact that we are claiming women’s rights to be endogenous makes their use as an explanatory variable unorthodox, as it is suggestive of reverse causality. However, this is only a concern if one already believes the basic tenet of our hypothesis. Nevertheless, we err on the side of caution in making causal inferences, and instead interpret the empirical evidence as being highly consistent with the predictions of the model.

IV.A. *Data Sources and Sample Selection*

Data on the timing of women's liberation comes from Geddes and Lueck (2002).²⁸ They coded the first year in which states granted women property rights and earnings rights. This variable is called *rights*.²⁹

Figure IX shows the date that each state granted women rights. Massachusetts was the first state to grant rights, in 1846. Ideally, we would start our analysis in 1840. However, Ruggles, Alexander, Genadek, Goeken, Schroeder and Sobek (2010) has US census data beginning only in 1850 that is comparable over time. Accordingly, our analysis begins in 1850. By 1920 rights were granted in all states except Florida (1943), Arizona (1973), New Mexico (1973), and Louisiana (1980). However, we end in 1920 to preclude influence from the Great Depression and World War II.³⁰

Except for the dates of rights being granted and TFP levels, all of our data for the exercises predicting the timing of rights and the subsequent reallocation of labor comes from the US census, conducted once per decade. Thus, we have to take a stand on how to round a state's granting of women's rights to the decennial census year. For example, California gave rights in 1872. When is the first decennial census year in which we assume California granted women rights? In all of our exercises, we will round to the nearest decade, and then do a robustness exercise where we round up. Accordingly, in our baseline exercises, California will be coded as having granted rights in 1870, and we will subsequently do an

²⁸We thank the authors for making their data available to us.

²⁹For more on the evolution of married women's property rights, see VanBurkleo (2001), pp. 125-138.

³⁰Our results are virtually identical when excluding these four states that did not give rights before 1920, but for brevity this robustness exercise is omitted below.

calculated from the original census files.³² We have 356 state-year observations from 1850 to 1920.³³ Following the literature we impute values for the missing 1890 census, and do a robustness exercise in order to show that our results do not depend on these imputations.

For our analysis of how rights affected bank deposits and loans, we use the Annual Report of the Comptroller of the Currency 1920, published by the Office of the Comptroller in 1920, which contains state-year level data on loans and deposits in national banks from 1865–1920.³⁴ Interest rate data is from Bodenhorn (1995), and has state-year level data from 1878–1920.³⁵ We calculate real interest rates, loans, and deposits by using a deflator from Burgess (1920).

For details of the various variables used in our empirical analysis, see Appendix A.

³²We thank Michael Haines for making this data available to us. For more about these data, please see his work, (Haines 1994) and (Haines 2008). We thank Raquel Fernández for sharing with us her calculation of this variable as well.

³³Due to 7 missing observations of TFP, we only have 349 observations in the first set of regressions.

³⁴As discussed in Benmelech and Moskowitz (2010), ideally we would like to use data on both national and state banks, but it does not seem that data on state banks exist. The Comptroller of the Currency only supervised national banks, though it seems reasonable to assume that loan and deposit data at national and state banks would be highly correlated. See footnote 11 in their paper for more.

³⁵These interest rates are widely used and have been developed over the years through a series of important works. As explained in the Appendix of Landon-Lane and Rockoff (2007), p. 11, “Bodenhorn (1995), followed Smiley (1975) and James (1976a,b), and purged the data originally compiled by Davis (1965) of various revenues and losses in order to arrive at something closer to contractual loan rates. Davis had attributed all bank earnings to loans, and divided that figure by total loans to get a proxy for the rate of interest. Smiley and James removed earnings on bonds and other non-loan earnings from the numerator and various non-loan assets from the denominator. Bodenhorn (1995) extended these estimates to 1960.”

IV.B. *Development Leads to Rights*

Here we demonstrate that development leads to women’s rights by using sectoral TFP as our proxy for development. Table I reports summary statistics for TFP in the non-agricultural and agricultural sectors, as well as the other controls described below.

We estimate regressions of the following structure:

$$(32) \quad Rights_{st} = \beta_1 TFP_{st}^{NA} + \beta_2 TFP_{st}^A + d_{it} + \lambda_s + X_{st}'\gamma + \epsilon_{st},$$

where TFP_{st}^{NA} is non-agricultural TFP in state s , year t , while TFP_{st}^A is the equivalent for agriculture. d_{it} are either year fixed effects or region-year fixed effects for each region $i \in \{\text{Northeast, South, Midwest, West}\}$, depending on the regression. λ_s are state fixed effects.³⁶ X_{st} is a vector of controls that includes the fraction of neighboring states which have granted rights by year t , a dummy for a state being in the South interacted with the years 1870 and 1880, the fraction of the state’s population that is female, the fraction of women in school, the fraction of the population that is non-white, a dummy variable that a state was a territory in a given year, the fraction of the population under age 35, and fertility.³⁷

³⁶The state fixed effects are based on US political borders in 1850. For instance, at that time Washington, Idaho, and Oregon were part of the same territory. We take this approach for two reasons. First, the 1850 political borders are the borders at the beginning of our study. This approach allows us to control for initial conditions in political regimes around the country. Second, this is the approach taken by similar works in the literature, such as Fernández (2014). We perform robustness exercises where we use modern-day borders as the state fixed effect as well, in order to control for any difference in areas that became one state rather than another (for example, Washington versus Idaho).

³⁷Note that there are some control variables used by Geddes and Lueck (2002) that we omit. Specifically, they use dummies for equity courts and community property laws. Our use of state fixed effects negates the importance of these variables; no state in our sample switches regimes. It is still possible to estimate the importance of these variables using the fixed effects based on the

Observing the fraction of neighboring states which have granted rights by year t , as in Geddes and Lueck (2002), allows us to check if a state grants rights simply because it observes that its neighbors have granted rights. This hypothesis of regional learning would predict a positive coefficient on this variable.³⁸ Dummies for being in the South after the Civil War allow us to control for the differential effect the war had on the South, which may have affected both TFP and the propensity to give rights. We also control for the fraction of a state's population that is female, women's schooling, and a state being a territory in a given year, following Geddes and Lueck (2002).³⁹ The fraction of the adult population under 35 allows us to control for the differential incentives of different age groups to grant rights.⁴⁰ Fertility is defined as the ratio of white children aged 10–19 over white women aged 20–39.⁴¹

As mentioned above, we include a specification with region-year fixed effects. Notice that the region-year fixed effects imply three times as many dummy variables as the year fixed effects, since there are four regions.

political borders of 1850, given that some states from the same initial territory adopted different laws. We do not find that these variables are important for our quantitative or qualitative results, and are perfectly captured by the regressions whenever we use modern border state fixed effects. Accordingly, we do not include them in our analysis.

³⁸ For this variable, we use modern political borders rather than the 1850 political borders. The reason to do so is that we care about geographic proximity. Consider that, in 1850, the area that became the modern-day states of Idaho, Oregon, and Washington was all part of the same territory. Using the 1850 borders would have these areas bordering modern-day Oklahoma, as Washington was part of Oregon Territory, which bordered the Unorganized Territory, which in turn included Oklahoma.

³⁹It has been argued that states with relatively few women grant rights to women earlier (Geddes and Lueck 2002). This may have been to attract women to areas with an unbalanced gender ratio, such as the West.

⁴⁰It is conceivable that young men have more to gain than older men from financial development, since such development can take years to be realized.

⁴¹See Fernández (2014). In that paper, the author argues that this ratio predicts rights due to a mechanism revolving around bequest motives. We control for this variable to show that our results are robust to including her mechanism.

Table II shows the results of these regressions, with the point estimates for the effects of TFP and the fraction of neighboring states with rights on the probability that a state has given rights. We report two sets of standard errors. Standard errors clustered at the state level are given in parentheses, while standard errors corrected for spatial autocorrelation are given in brackets.⁴² The first column shows the regression of *Rights* on TFP in the non-agricultural sector, with state and year fixed effects. The second column shows the same regression using TFP in the agricultural sector. Column 3 shows both types of TFP together. Column 4 adds a control for being a territory. Column 5 adds the fraction of bordering states with women’s economic rights. Column 6 adds the other controls. Column 7 repeats 6 but replaces the year fixed effects with year-region fixed effects. All the columns show a positive and significant correlation between TFP in the non-agricultural sector and the propensity to grant rights, while TFP in the agricultural sector is never significant. Notice that adding extra controls increases both the magnitude and precision of the estimate on TFP in the non-agricultural sector. Only the model with year-region fixed effects yields a somewhat smaller estimate, though it is still precisely estimated. Using the estimates in Columns 6 and 7, we find that a one-standard deviation higher level of TFP^{NA} increases the propensity to grant rights by 6–8 percentage points. Table II also shows that the fraction of neighboring states with rights is negative, which is inconsistent with the hypothesis that states grant rights after learning from their neighbors.

Our baseline exercise is to round the date that rights were granted to the near-

⁴²The latter standard error allows us a second way to control for regional learning, in addition to the fraction of bordering states that have granted rights. Accordingly, these standard errors are adjusted to reflect spatial dependence as modelled in Conley (1999). Spatial autocorrelation is assumed to linearly decrease in distance up to a cutoff of 1,000 km. Distances are computed from the state capitals. For more, see Hsiang (2010) and Fetzer (2014). We thank these authors for making their codes available online.

est decennial census. This makes particular sense for this exercise; we are trying to predict the timing of women's economic rights. We therefore want to code each state as having given rights in the census year closest to the year in which rights were actually given. For robustness, however, we show in Table III the same analysis as in Table II, simply changing the coding of rights to "rounding up" as described above. The results are essentially the same as in Table II.

Table IV takes Column 7 from Table II and performs three additional robustness exercises. In Column 1, we drop the observations from 1890, as these were imputed. Column 2 drops states that gave rights between 1870 and 1880. We perform this exercise because about one-third of states gave rights in this time period. Our econometric approach is based on comparing states that gave rights in a given year to those that did not. Given the necessity of rounding the date in which rights were given, the method of rounding during this time period can have a large impact on the results, especially if many states give rights around the same time. Column 3 uses modern borders of states, rather than the 1850 political borders, for the state fixed effects. The results are qualitatively and quantitatively similar to those presented in Tables II and III, suggesting that the results are not driven by imputation of data for 1890, by the cluster of states granting rights between 1870 and 1880, or by which type of state fixed effects we employ.

The evolution of feminism is often discussed as a reason why married women were given property rights. Under the assumption that feminism developed regionally, our empirical findings presumably implicitly control for the influence of feminism by the use of year-region fixed effects. Additionally, we note that in his reading of the English parliamentary debate on the Married Women's Property Acts, Griffin (2003) argues that "even some of those who supported the most

radical reform did so in the belief that the gender hierarchy should be left intact" (p. 59). Interestingly, there is seemingly little connection between support for women's economic rights and support for their political rights. Griffin (2003) finds that many of the politicians who sponsored the Married Women's Property Act were opposed to women's suffrage, while ardent supporters of women's suffrage were opposed to their property rights. This was seemingly true in America as well, as shown in Figure X. This figure shows the dates that each state granted women economic rights and political rights, as well as a regression line showing the lack of correlation between these rights. Finally, note that only two states, Utah and Idaho, gave women political rights before economic rights, confirming the claim that men granted women economic rights, rather than women voting for their own economic rights.

To sum up this exercise, we show that higher TFP in the non-agricultural sector is associated with granting women economic rights. This fits our theory: when TFP is high, distortions from coverture are large, and thus men have a strong incentive to grant women economic rights. The lack of connection between TFP in agriculture and women's rights fits well with the notion of the economic distortions being sector-specific.

IV.C. Rights Leads to Development

The hypothesis of this paper is that development led to women's rights, which in turn led to further development. Specifically, women's economic rights undo portfolio distortions and induce investment in moveable assets, or capital. This increases investment in the non-agricultural sector and thus induces a reallocation of labor away from agriculture, as seen in Figure IV. Accordingly, we now

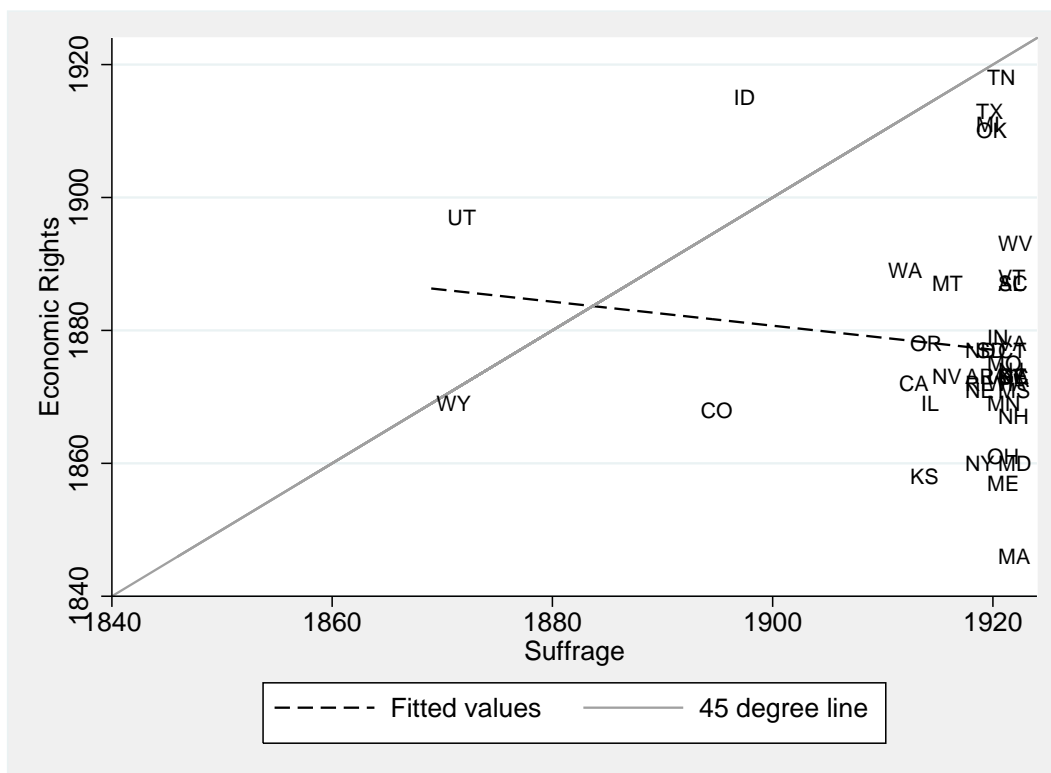


FIGURE X: Timing of Women’s Economic and Political Rights by State. Data for suffrage dates comes from Lott and Kenny (1999).

show the empirical relationship between granting rights and development by studying the dynamics of labor allocation by state.

We begin by reporting summary statistics. Table I reports summary statistics for the percent of a state’s male employment in the non-agricultural sector as well as our control variables described below. Figure XI shows the time series fraction of male employment in the non-agricultural sector. The line denoted “National Average” is the average for the entire country. The line denoted “90th Percentile” is the 90th percentile of states, as ranked separately each year, where the ranking is done by the fraction of workers in the non-agricultural sector in each state. The line denoted “10th Percentile” accordingly represents the 10th percentile of states.

This figure shows the overall trend towards greater non-agricultural labor as the country developed, as well as a fair amount of cross-state variation. In every year, the 90th percentile was roughly 20 percentage points above the mean, while the 10th percentile was 20 percentage points below the mean. Note that the bottom 10 percentile of states decreased their non-agricultural employment dramatically after the Civil War, recovering to their antebellum level only between 1890 and 1900.

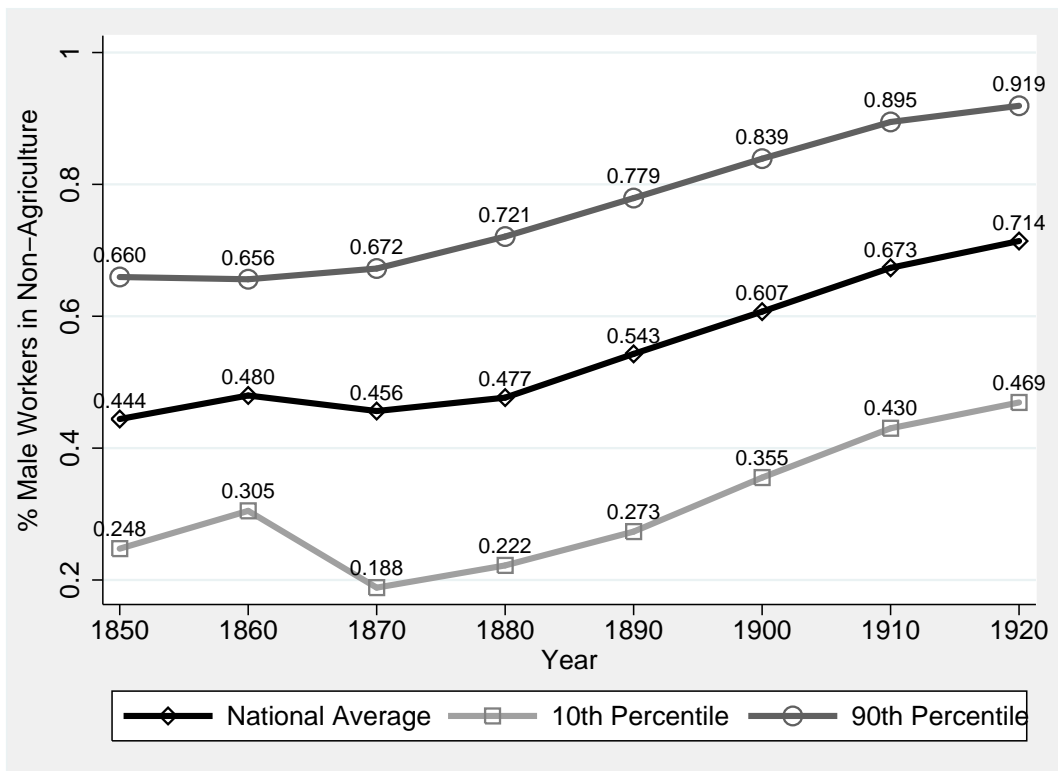


FIGURE XI: Cross State Comparison of Non-Agricultural Employment

Our empirical approach follows Wolfers (2006) in estimating the dynamic relationship between granting women's rights and development. Accordingly, we estimate a regression that takes into account the temporal distance between a

state-year observation and the date of women’s economic rights in that state.

Our specification is of the form:

$$(33) \quad L_{st}^{NA} = \sum_k \alpha_k \cdot rights_{st}^k + \lambda_s + d_{it} + X'_{st}\gamma + \epsilon_{st},$$

where L_{st}^{NA} is the fraction of male workers in non-agricultural sectors in state s in year t , $t \in \{1850, 1860, \dots, 1920\}$, and $rights_{st}^k$ is a series of dummy variables set equal to one if a state had granted rights k years ago, where $k \in \{\leq -30, -20, -10, 0, 10, 20, \geq 30\}$.⁴³ λ_s are state fixed effects.⁴⁴ As defined above, d_{it} are either year fixed effects or region-year fixed effects for each region i , depending on the regression. X_{st} is a vector of controls that includes a dummy variable that the observation is a territory, interactions between the South with 1870 and 1880, the fraction of the population that is female, the fraction of women in school, the fraction of the population that is not white, the fraction of the adult population under age 35, and the fraction of neighboring states which have granted rights by year t . We use census population weights for these regressions, which allows us to estimate the average national relationship between women’s

⁴³ We use increments of 10 as our data is dependent on the decennial census. Recall that for states that granted rights in a non-census year, we round to the nearest decade. Returning to our previous example, California granted rights in 1872. For our purposes, we round to 1870. Thus, the dummy variable $rights_{st}^0$ takes the value of 1 for California in 1870, while the dummy variable $rights_{st}^{10}$ takes the value 1 for California in 1880. In the “round up” exercises, we code 1880 as the first year rights exist in California, rather than 1870, so to avoid the case of assigning rights to California before rights were actually granted.

⁴⁴For our baseline exercises, we use modern day state borders rather than the 1850 political borders for the fixed effect. Studying states before they were states can be done retroactively; census data is divided by county, and counties can be associated with the state they eventually joined. This allows us to control for the fact that, for example, there may have been different initial labor allocations within the area that eventually became Washington compared to the area that became Idaho. We perform robustness exercises below where we use the 1850 borders as a fixed effect.

economic rights and development.⁴⁵

Table V shows the results for these regressions. All estimates are relative to a decade before rights are granted. Column 1 includes year and state dummies, as well as a dummy variable for being a territory. Column 2 adds South interacted with 1870 and 1880, as well as the fraction of the population that is female. Column 3 adds the fraction of women in school. Column 4 adds the fraction of the adult population that is not white. Column 5 adds the fraction of the population under age 35. Column 6 adds the fraction of neighboring states that have given rights. Column 7 replaces the year fixed effects with the region-year fixed effects. All estimates include standard errors clustered at the state level.

Before rights are granted, there is no trend in development relative to other controls. That is, given state and year fixed effects, as well as other controls, development did not deviate substantially from what would have been expected. Once rights are given, there is a statistically significant increase in the fraction of the labor force working in the non-agricultural sector. The relationship is dynamic, increasing with respect to the amount of time since rights were granted, with an estimated total increase of 7–10 percentage points by two decades after rights were given. This shows clearly that granting rights is associated with an increase in non-agricultural employment, a measure of development. Graphically, the results for column 7 are shown in Figure XII.

We now perform two sets of robustness exercises. First, as shown in Table VI, we redo Table V while “rounding up” on the timing of rights, as described above. The results are very similar qualitatively and quantitatively.

⁴⁵This is the approach taken by Wolfers (2006), who in turn is following a large body of empirical literature which studies the economic impact of legal changes by exploiting cross-state variation in the timing of those changes.

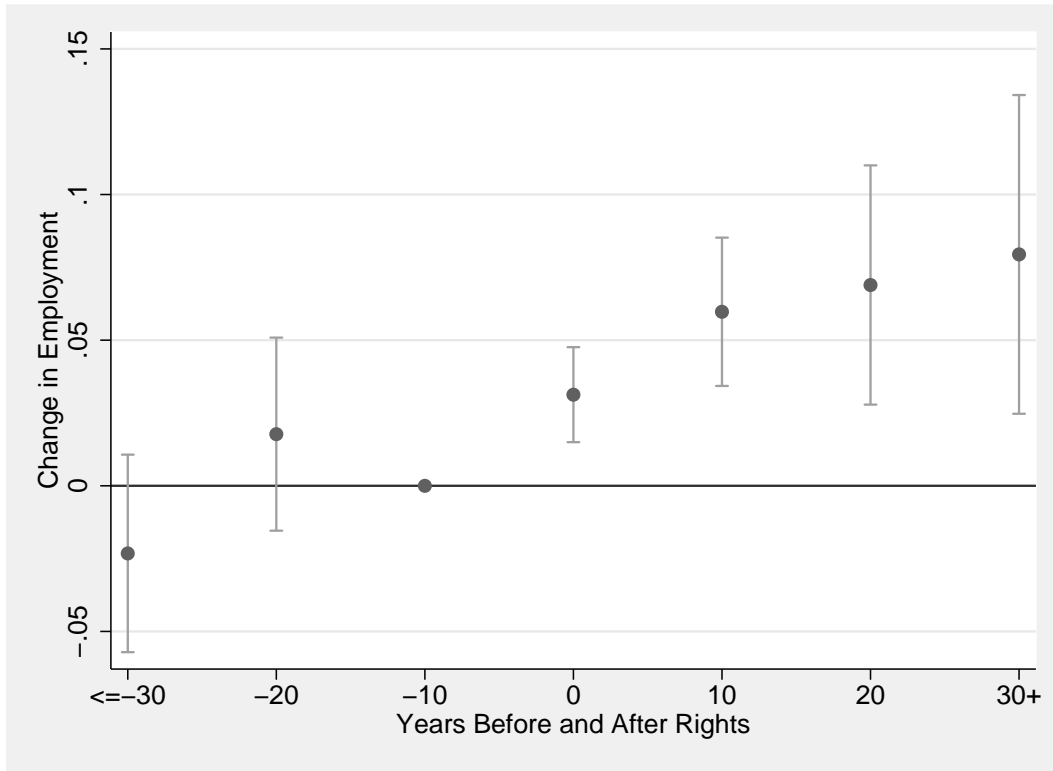


FIGURE XII: Dynamics of Non-Agricultural Employment, Before and After Rights.
Point estimates and 95% confidence intervals

Next, in Table VII, we perform four more robustness exercises, using the specification from Column 7 in Table V. Column 1 uses an alternative definition of the non-agricultural labor variable. Recall that women were allowed to own structures. We consider these as either homes or shops in town. Accordingly, we exclude retail from non-agricultural employment. This follows the intuition that there may not have been a distortion in these parts of the economy, and retail would not have gained workers after women's rights.⁴⁶ Column 2 drops all observations from 1890, as that year was imputed. Column 3 drops all states that gave rights between 1870 and 1880 from the analysis, as explained above. Col-

⁴⁶See Appendix B for details.

umn 4 uses the fixed effects based on the 1850 political borders, as described in Section IV.B. As can be seen, these exercises show that the results are robust to these checks both qualitatively and quantitatively.

Finally, a question may arise as to whether our results are simply a reflection of the fact that labor was moving relatively continuously from the agricultural to non-agricultural sectors, as shown in Figure XI. That is, if there is a trend towards development, then we might see that the fraction of employment in non-agriculture is increasing dynamically relative to any given date. Although our regressions show no trend before rights were granted, we double check this hypothesis by the following falsification test. We repeat our regression from Column 7 in Table V 50,000 times. During each iteration, we randomly assign a date for each state, drawn uniformly between 1850 and 1920, and proceed as if that were the date when women were granted rights in that state.⁴⁷

Figure XIII shows the histograms for the estimates of α_k along with our estimate (reported above) for the regression using the actual dates that states gave rights. The vertical line labeled “p-value” shows the fraction of cases in which the regressions with random dates yielded higher coefficients on α_k for $k \in \{0, 10, 20, 30+\}$ than the regression with the actual dates yielded. Running our regressions on random dates yields estimates centered at zero, indicating that the model in equation (33) is unlikely to produce biased results. The p-value on the figure suggests that our results were extremely unlikely to be a random occurrence.

To sum up, granting women rights is associated with an immediate and dynamic increase in the fraction of the labor force that works in the non-agricultural

⁴⁷Notice that there is no need to do this falsification exercise on the exercises in Section IV.B, as the timing of women’s rights in those exercises is being explained, rather than being used to describe the consequences of granting rights.

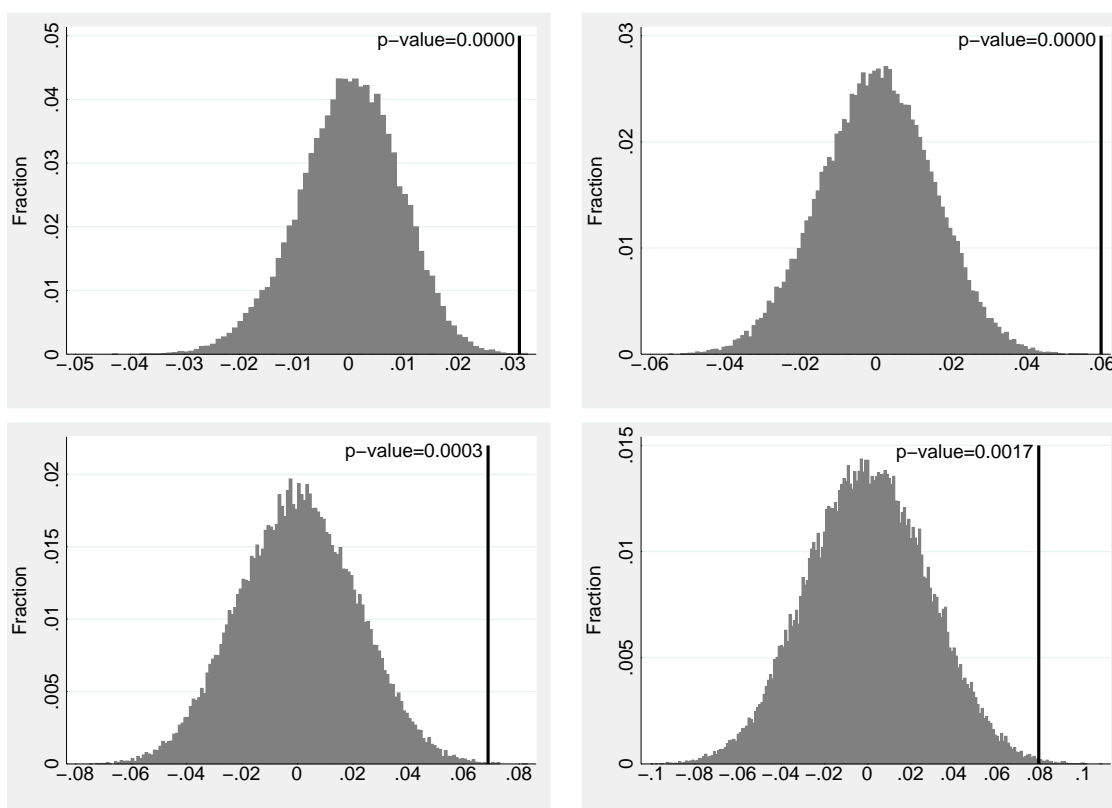


FIGURE XIII: Results of 50,000 simulations of randomly assigned women’s liberation dates. The top left corner shows results for α_0 ; the top right corner shows results for α_{10} ; the bottom left corner shows results for α_{20} ; and the bottom right corner shows results for α_{30+} .

sector, which is consistent with the model, as seen in Figure IV.

IV.D. *Rights Leads to Financial Deepening*

We now show the relationship between granting economic rights to married women and financial markets, providing evidence for the mechanism by which rights leads to development. We find that granting women rights is empirically linked with lower interest rates. We then show that rights are also associated with greater financial intermediation, as measured by bank deposits and loans. These results are consistent with the idea that granting women rights leads to a

positive supply shock in financial markets.

We begin by reporting summary statistics for these regressions. Table I reports summary statistics for the real interest rate, changes in real lending volume (loans) per capita, and changes in real deposits per capita.⁴⁸ Figure XIV displays the evolution of the interest rates over time by region. The figure shows two salient features of the data. First, there is large cross-regional variation in interest rates, supporting our treatment of states as closed economies. Secondly, there is a clear differentiation in the time trend across regions. This further motivates our specifications which control for region-year fixed effects. Figure XV plots state-year interest rate observations by the number of years before or after a state gave rights, net of year fixed effects. The figure shows non-parametric fitted lines for the periods before and after granting rights. As can clearly be seen, in the years leading up to rights being granted, interest rates were around a constant level with no clear trend. In contrast, once rights are granted, the interest rate falls immediately and continues to fall further over time.

In order to confirm that the implications of Figure XV is robust to controls, we continue with a more formal analysis showing the relationship between rights and financial variables. Our regression specification is of the form:

$$(34) \quad Y_{st} = \alpha \cdot rights_{st} + \lambda_s + d_{it} + \epsilon_{st},$$

where Y_{st} is the dependent variable (either the interest rate, the change in real

⁴⁸Changes in lending volume per capita and deposits per capita capture how financial intermediation changes over time within a state. We follow Benmelech and Moskowitz (2010) in our choice of variables. In that paper, the authors use these variables to study the effects of state usury laws in the 19th century on financial intermediation. For more about these variables, see Benmelech and Moskowitz (2010).

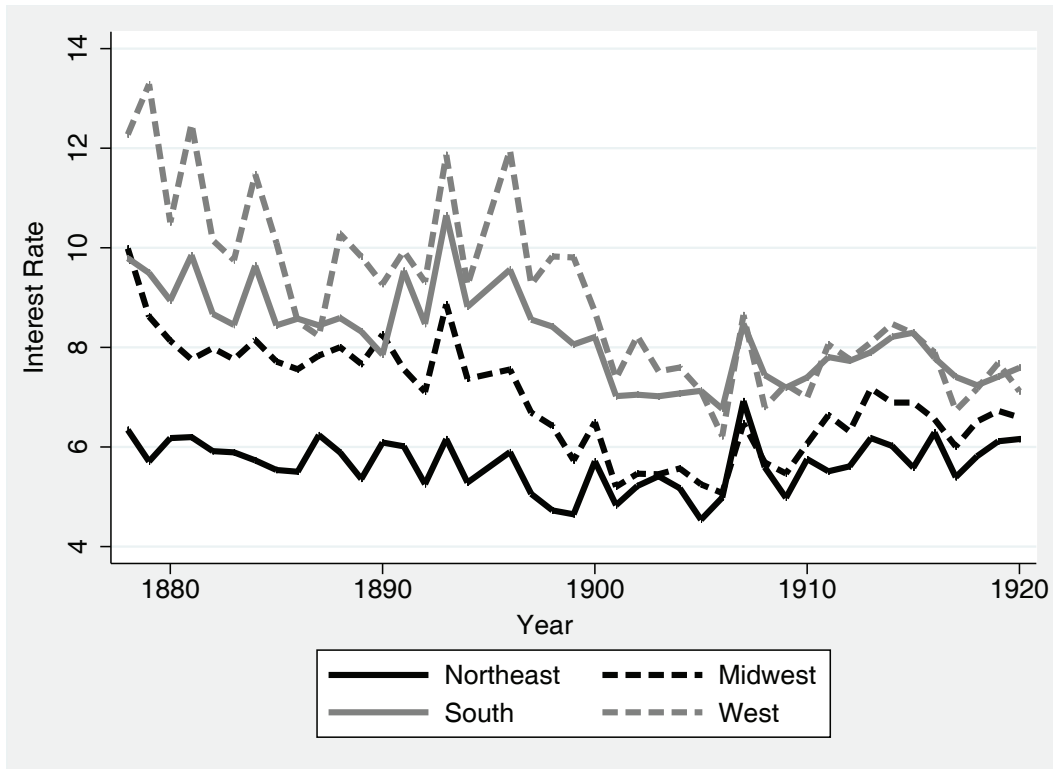


FIGURE XIV: Cross Region Variation in Interest Rates

deposits per capita, or the change in real loans per capita), in state s and year t . $rights_{st}$ is a dummy variable denoting whether or not state s had given rights by year t . λ_s is a set of state fixed effects. Here we use modern state borders for the fixed effects for our main exercise, but report the results using the political borders of 1850 in the robustness exercise below. d_{it} are either year fixed effects or region-year fixed effects for each region i , depending on the specification, as before. Notice that these exercises have many fewer controls than the previous exercises. This is due to the lack of availability of data during this time period for non-census years. As in the labor regressions, we use population weights in these regressions, where the population is linearly interpolated, by state, between

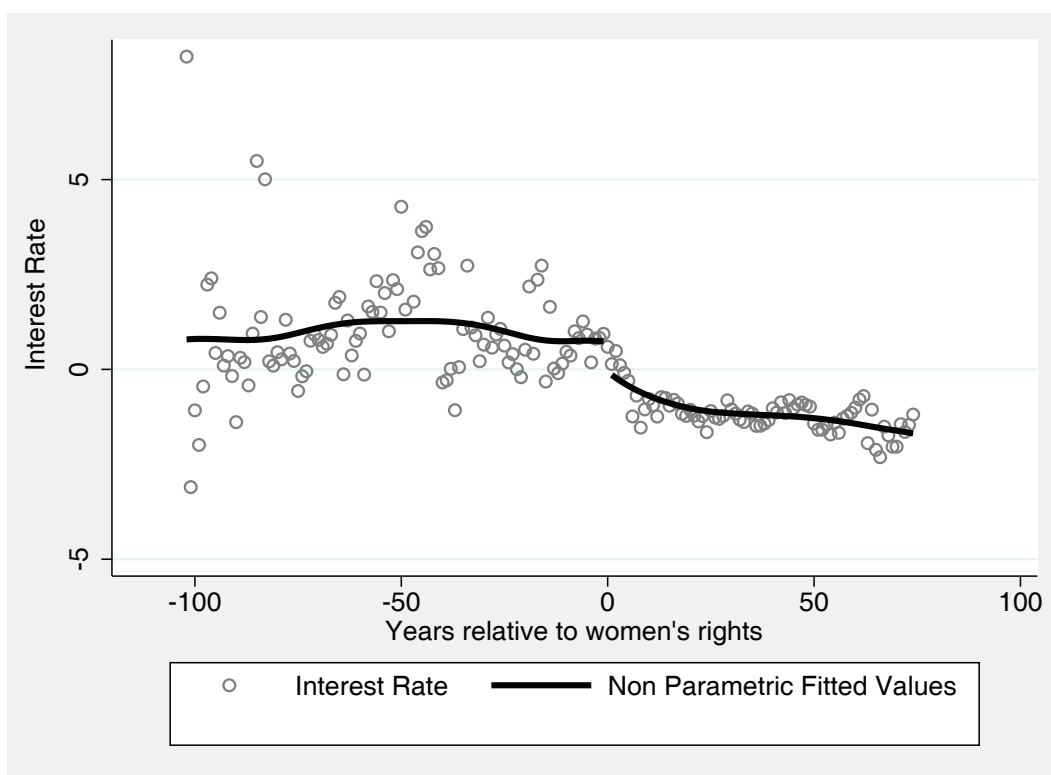


FIGURE XV: Interest Rates Before and After Women's Rights

census years.⁴⁹

We begin by describing the results when the dependent variable is the real interest rate. Table VIII shows the results of these regressions. Column 1 shows the baseline regression of interest rates on rights, with state and year fixed effects. Column 2 replaces year fixed effects with region-year fixed effects. Column 3 continues using region-year fixed effects and replaces the state fixed effects to those based on the 1850 political borders. In all specifications, the correlation of women's property rights with interest rates is negative, statistically significant,

⁴⁹Notice that, unlike the analysis shown in Section IV.C, we are not presenting the dynamic relationship between rights and financial variables. Using that approach, the data still tell the same story. However, the standard errors are sometimes larger, lending somewhat less significance to the results. Accordingly, rather than stress the dynamics of the relationship between rights and financial variables, we focus attention on the change in finance after rights are granted.

and quantitatively meaningful. The coefficients suggest that granting rights to women lowered interest rates by 50–90 basis points, or roughly 7–10% of the median interest rate.

Table VIII continues by showing the results of these specifications when the dependent variable is the change in real loans per capita or the change in real deposits per capita. Columns 4, 5, and 6 follow the same pattern as above, with the dependent variable being the change in real loans per capita; while columns 7, 8, and 9 follow this pattern with the dependent variable being the change in real deposits per capita. When rights are granted, there is an increase in depositing money in banks and consequently in loans from banks, reflecting an increase in financial intermediation. As before, the estimates are somewhat smaller and less precise when including region-year fixed effects rather than simply using year fixed effects. Quantitatively, the point estimates suggest magnitudes equivalent to about 10–20% of a standard deviation, or about 35% of the mean of the dependent variables. Notice that the data here are from national banks only, and do not capture other forms of capital investment, such as the stock market, that may have increased after women’s rights as well.

As before, we now turn to a falsification exercise in order to show that our regressions yield results using the actual dates women were granted rights are not driven by general trends. Accordingly, we repeat our regression from columns 2, 5, and 8 in Table VIII 50,000 times. As before, during each iteration we randomly assign a date that a state gave women economic rights, drawn uniformly between 1850 and 1920.

Figure XVI shows the histograms for the estimates of α along with our estimate (reported above) for the regression using the actual dates that states gave

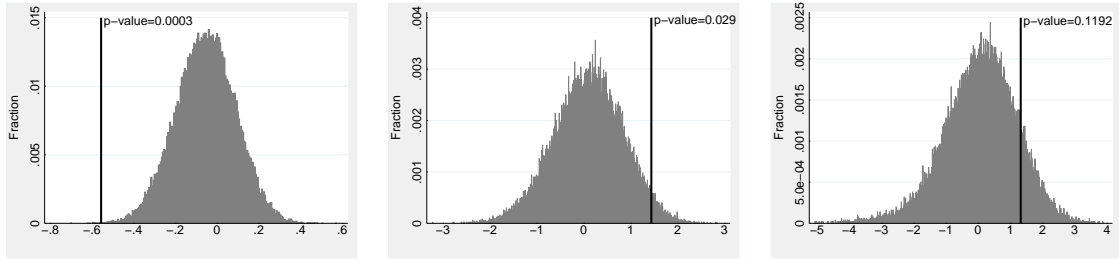


FIGURE XVI: Results of 50,000 simulations of randomly assigned women’s liberation dates. From left to right, the figures show the coefficient α on the regression for the interest rate, deposits, and loans.

rights. The vertical line labeled “p-value” shows the fraction of cases in which the regressions with random dates yielded larger (in absolute terms) coefficients on α , for our exercises with interest rates, deposits, and loans, than the regression with the actual dates yielded. Running our regressions on random dates yields estimates centered at zero, indicating that the model in (34) is unlikely to produce biased results. The p-value on the figures for interest rates and deposits suggest that our results were extremely unlikely to be a random occurrence, while the results for loans are weaker.

To sum up this exercise, we show that granting economic rights to women is associated with both lower interest rates as well as an increase in financial intermediation, which is consistent with an increase in the supply of loanable funds, as predicted in the model.

V. CONCLUDING REMARKS

In this paper, we study one of history’s most dramatic changes in property rights; the demise of coverture. We propose and model a novel mechanism through which men choose to give women rights through a desire to correct capital market imperfections related to women’s portfolio choices, which were influenced

by the lack of investor protection. This hypothesis is consistent with historical evidence on how the laws of coverture affected investment decisions by married women, such as evidence on portfolio allocations, the importance of financial markets, and contemporaneous awareness of the tradeoffs involved in women's rights.

We solve a general equilibrium model with endogenous property rights determination, and study a numerical example which illustrates how technological growth in non-agricultural sector interacts with the laws of coverture to induce inefficiencies. When deciding whether to grant women rights, men face a trade-off. On one hand, granting rights may increase overall output and thus household income; while on the other hand, granting rights reduces men's bargaining power within the household, thus reducing their share of household income. At a certain point of development, the benefits of women's property rights dominate and men grant rights.

Using cross-state variation in the timing of the granting of married women's property rights, we show that the model is consistent with several features of the US data. First, TFP in the non-agricultural sector predicts the timing of granting women rights. Second, the dynamics of the movement of labor from agriculture to non-agriculture are consistent with the model's predictions, showing that women's property rights are associated with a large sectoral reallocation of labor. Finally, we show evidence that granting women economic rights is associated with financial intermediation and reduced interest rates, lending credence to our proposed mechanism.

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Appendices

A: NUMERICAL SOLUTION AND PARAMETERS

We solve the model using the following parameter values: $\gamma = 1, \lambda = 0.5, \rho = 0.9, \sigma = 0.5, \alpha = 0.5$, and $T = 1$. These parameter values are arbitrary and for illustrative purposes only.

For the example, we create an evenly spaced grid of A_M from 0.5 to 5, while holding A_T constant at 1. For each grid point, we first solve the model for the case where women are not given property rights as follows. First, assume that $r_k = r_s$ and solve for the general equilibrium. If indeed there is a solution with $r_k = r_s$, then the economy is operating without any distortions. Otherwise, we solve the model under the assumption that returns are not equalized. To do so, we perform an iterative process as follows:

1. Guess w, r_k, r_s , and r_t , and infer portfolio allocations for men and women using Lemma 1, and thus K and S .
2. Using equations (13), (19), and (31), solve for L_M and L_A .
3. Using K, T, S, L_M , and L_A , infer w, r_k, r_s , and r_t using equations (13), (19), (17), (18), and (16).
4. Update guess and iterate until convergence.

B: VARIABLE DEFINITIONS

We now describe in detail the variables we construct for our empirical analysis.

For the regressions showing the connection between development and growth, as in Section IV.B, our dependent variable of *Rights* comes from Geddes and Lueck (2002), while our main explanatory variable of TFP by sector uses data from Turner et al. (2007), Turner et al. (2011), and Turner et al. (2013). We follow them in using a Cobb-Douglas production function, with the same elasticities, when calculating a combined TFP for the manufacturing and non-manufacturing-non-agricultural sector as well as the TFP for the agricultural sector. Data on

when each state became a state, rather than a territory, is from Geddes and Lueck (2002). The fraction of neighboring states with women's economic rights, by year, is by the authors' calculation using modern state borders, as explained in footnote 38.

We now turn to the other controls for these regressions. All of these variables are calculated by state for each year, and with the exception of *Fertility*, the data come from Ruggles et al. (2010). The *fraction of females in school* is the fraction of females currently in school. *Fraction female* is the fraction of the population that is female. *Fraction of adults under 35* is the number of people who are in the age interval $[20, 34)$ years old divided by number of people in the interval $[20, \infty]$. *Fraction nonwhite* is the fraction of the population that is not of the white race.

The final variable, *Fertility*, is calculated from the original census files. We thank Michael Haines for making this data available to us. For more about these data, please see his work, (Haines 1994) and (Haines 2008). We thank Raquel Fernández for sharing with us her calculation of this variable as well. This variable is the ratio of children aged 10–19 divided by the number of women aged 20–39 in a state in a given year.

Our dependent variable in the set of exercises showing that rights leads to development, as in Section IV.C, is the fraction of men in the labor force, aged 20–60, who are in the non-agricultural sector, as defined by the IND1950 variable. For our baseline exercise, we consider agriculture to be IND1950 taking the value of 105, and count everyone else to be employed in the non-agricultural sector. For our robustness exercise, we exclude from non-agricultural employment a broader set of people. Specifically, we excluded from non-agricultural employment those employed in Forestry (code 116), Fisheries (code 126), and a list of industries classified as "Retail Trade" such as food stores, shoe stores etc (codes 636–699). Finally we excluded personal services (e.g., dressmaking shops) and professional services (e.g., hospitals), codes 826 till the end of the index).

Note that the variables used in the financial deepening exercises in Section IV.D are described in the main body of the paper.

TABLE I
DESCRIPTIVE STATISTICS: 1850-1920 UNITED STATES

Variable	Mean	Median	Standard Deviation	10th Percentile	90th Percentile
	(1)	(2)	(3)	(4)	(5)
<i>Panel A: Economic Outcomes</i>					
% Non-Agri. Employment	54.10	52.65	20.75	28.42	81.86
Real Interest Rate (pp)	8.00	7.36	2.90	5.47	10.99
Δ Real Loans per Capita (1920 dollars)	3.72	2.38	13.76	-4.57	13.28
Δ Real Deposits per Capita (1920 dollars)	3.79	2.31	12.18	-4.75	15.00
<i>Panel B: Explanatory Variables</i>					
TFP Non-Agriculture	0.033	0.033	0.009	0.025	0.040
TFP Agriculture	0.007	0.006	0.004	0.003	0.011
% of Neighboring States with Rights	63.58	75.00	36.33	0.00	100.00
Territory	0.090	0.00	0.286	0.00	0.00
% Female	46.98	48.84	5.94	40.08	50.75
% Female in School	18.60	19.32	6.05	11.18	25.54
% Non-White	10.87	2.58	15.93	0.31	41.17
% Adult Under 35	50.27	49.78	7.19	42.36	58.65
Fertility	1.403	1.414	0.268	1.052	1.741

TABLE II
DETERMINANTS OF WOMEN'S LIBERATION

Dependent Variable: Rights (Date Rounded to the Nearest Decade)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
TFP Non-Agriculture	4.229 (2.175)* [1.973]**		4.469 (1.946)** [1.930]**	6.728 (2.511)** [2.082]**	7.472 (2.184)** [1.972]**	8.908 (1.912)** [1.922]**	6.641 (2.435)** [2.196]**
TFP Agriculture		4.342 (11.286) [6.298]	6.288 (11.223) [6.391]	4.998 (11.003) [7.005]	8.959 (10.195) [7.168]	7.741 (8.160) [6.157]	1.717 (11.342) [6.882]
% of Neighboring States with Rights					-0.525 (0.169)** [0.126]**	-0.556 (0.170)** [0.122]**	-0.769 (0.185)** [0.132]**
1850 Border State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	No
(Year × Region) FE	No	No	No	No	No	No	Yes
Territory	No	No	No	Yes	Yes	Yes	Yes
Other Controls	No	No	No	No	No	Yes	Yes
Obs.	349	349	349	349	349	349	349
R ²	0.690	0.686	0.691	0.707	0.728	0.744	0.766

Notes. Standard errors are clustered at the state level in parentheses. Standard errors, corrected for spatial autocorrelation, are in brackets. + $p < 0.15$, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Other controls include a dummy for the fraction of females in school, the fraction of females, South × 1870 and South × 1880 dummies, the fraction of nonwhites, the fraction of adults under 35, and fertility.

TABLE III
DETERMINANTS OF WOMEN'S LIBERATION

	Dependent Variable: Rights (Date Rounded Up)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
TFP Non-Agriculture	3.985 (2.685) ⁺ [2.118]*		4.024 (2.454) ⁺ [2.128]*	5.529 (2.637)** [2.452]**	6.148 (2.443)** [2.435]**	7.442 (1.308)** [2.209]**	6.042 (2.488)** [2.519]**
TFP Agriculture		-0.726 (11.077) [6.791]	1.026 (10.709) [6.929]	0.168 (10.686) [7.489]	4.492 (10.304) [7.365]	5.029 (8.231) [6.191]	3.331 (10.714) [6.669]
% of Neighboring States with Rights					-0.431 (0.165)** [0.135]**	-0.502 (0.174)** [0.134]**	-0.729 (0.204)** [0.151]**
1850 Border State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	No
(Year × Region) FE	No	No	No	No	No	No	Yes
Territory	No	No	No	Yes	Yes	Yes	Yes
Other Controls	No	No	No	No	No	Yes	Yes
Obs.	349	349	349	349	349	349	349
R ²	0.701	0.697	0.701	0.707	0.722	0.742	0.766

Notes. Standard errors are clustered at the state level in parentheses. Standard errors, corrected for spatial autocorrelation, are in brackets. ⁺ $p < 0.15$, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Other controls include a dummy for the fraction of females in school, the fraction of females, South × 1870 and South × 1880 dummies, the fraction of nonwhites, the fraction of adults under 35, and fertility.

TABLE IV
DETERMINANTS OF WOMEN'S LIBERATION

Dependent Variable: Rights (Date Rounded to the Nearest Decade)			
	(1)	(2)	(3)
	Without 1890	Without Rights btwn. 1870-1880	Modern Border State FE
TFP Non-Agriculture	6.756 (2.325) ^{***} [2.136] ^{***}	7.796 (2.805) ^{**} [2.094] ^{***}	6.478 (3.713) [*] [2.570] ^{**}
TFP Agriculture	3.150 (11.681) [6.971]	-4.222 (22.916) [13.027]	7.710 (11.694) [7.718]
% of Neighboring States with Rights	-0.825 (0.171) ^{***} [0.136] ^{***}	-0.789 (0.260) ^{***} [0.157] ^{***}	-0.726 (0.211) ^{***} [0.144] ^{***}
(Year × Region) FE	Yes	Yes	Yes
1850 Border State FE	Yes	Yes	Yes
Territory	Yes	Yes	Yes
Other Controls	Yes	Yes	Yes
Obs.	304	194	349
R ²	0.769	0.774	0.780

Notes. Standard errors are clustered at the state level in parentheses. Standard errors, corrected for spatial autocorrelation, are in brackets. ⁺ $p < 0.15$, ^{*} $p < 0.10$, ^{**} $p < 0.05$, ^{***} $p < 0.01$. All specifications repeat the specifications of Column (7) in Table II. Other controls include a dummy for the fraction of females in school, the fraction of females, South × 1870 and South × 1880 dummies, the fraction of nonwhites, the fraction of adults under 35, and fertility.

TABLE V
WOMEN'S LIBERATION AND NON-AGRICULTURAL EMPLOYMENT: BASELINE

	Dependent Variable: % Male Workers in Non Agriculture						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
≥ 3 Decades Before Rights	-0.013 (0.032)	-0.019 (0.031)	-0.033 (0.026)	-0.039* (0.023)	-0.030 (0.022)	-0.032 (0.022)	-0.023 (0.017)
2 Decades Before Rights	0.021 (0.021)	0.022 (0.022)	0.011 (0.022)	0.008 (0.019)	0.008 (0.017)	0.008 (0.017)	0.018 (0.016)
1 Decade Before Rights	0	0	0	0	0	0	0
Rights Given	0.035*** (0.011)	0.036*** (0.010)	0.038*** (0.011)	0.036*** (0.010)	0.035*** (0.010)	0.038*** (0.010)	0.031*** (0.008)
1 Decade After Rights	0.072*** (0.018)	0.074*** (0.016)	0.077*** (0.016)	0.070*** (0.016)	0.069*** (0.016)	0.074*** (0.015)	0.060*** (0.013)
2 Decades After Rights	0.088*** (0.028)	0.092*** (0.027)	0.101*** (0.027)	0.086*** (0.027)	0.084*** (0.025)	0.090*** (0.025)	0.069*** (0.020)
≥3 Decades After Rights	0.106*** (0.039)	0.115*** (0.037)	0.124*** (0.035)	0.104*** (0.036)	0.100*** (0.033)	0.105*** (0.033)	0.079*** (0.027)
Modern Border State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	No
(Year × Region) FE	No	No	No	No	No	No	Yes
South × 1870 & South × 1880 FE	No	Yes	Yes	Yes	Yes	Yes	Yes
% Female	No	Yes	Yes	Yes	Yes	Yes	Yes
% Female in School	No	No	Yes	Yes	Yes	Yes	Yes
% Non-White	No	No	No	Yes	Yes	Yes	Yes
% Under Age 35	No	No	No	No	Yes	Yes	Yes
% Neighboring States with Rights	No	No	No	No	No	Yes	Yes
Obs.	356	356	356	356	356	356	356
R ²	0.958	0.965	0.968	0.973	0.975	0.975	0.981

Notes. Standard errors are clustered at the state level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. All specifications include a dummy for territory. Rights are rounded to the nearest decade. Regressions are weighted by state population.

TABLE VI
WOMEN'S LIBERATION AND NON-AGRICULTURAL EMPLOYMENT: ROUNDING UP

Dependent Variable: % Male Workers in Non Agriculture							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
≥ 3 Decades Before Rights	-0.004 (0.030)	-0.010 (0.030)	-0.030 (0.026)	-0.038 (0.023)	-0.030 (0.022)	-0.028 (0.023)	-0.014 (0.021)
2 Decades Before Rights	0.009 (0.021)	0.008 (0.021)	0.000 (0.022)	-0.002 (0.019)	-0.003 (0.017)	-0.001 (0.017)	0.014 (0.019)
1 Decade Before Rights	0	0	0	0	0	0	0
Rights Given	0.032*** (0.010)	0.030*** (0.009)	0.030*** (0.010)	0.027** (0.010)	0.027** (0.011)	0.036*** (0.012)	0.028*** (0.010)
1 Decade After Rights	0.045** (0.018)	0.042** (0.018)	0.045** (0.018)	0.040** (0.019)	0.037** (0.018)	0.046** (0.018)	0.036** (0.016)
2 Decades After Rights	0.062** (0.028)	0.061** (0.028)	0.068** (0.027)	0.056** (0.027)	0.052** (0.026)	0.060** (0.025)	0.043* (0.023)
≥ 3 Decades After Rights	0.066* (0.036)	0.070* (0.036)	0.077** (0.036)	0.061* (0.035)	0.054 (0.033)	0.060* (0.032)	0.038 (0.028)
Modern Border State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	No
(Year \times Region) FE	No	No	No	No	No	No	Yes
South \times 1870 & South \times 1880 FE	No	Yes	Yes	Yes	Yes	Yes	Yes
% Female	No	Yes	Yes	Yes	Yes	Yes	Yes
% Female in School	No	No	Yes	Yes	Yes	Yes	Yes
% Non-White	No	No	No	Yes	Yes	Yes	Yes
% Under Age 35	No	No	No	No	Yes	Yes	Yes
% Neighboring States with Rights	No	No	No	No	No	Yes	Yes
Obs.	356	356	356	356	356	356	356
R^2	0.956	0.962	0.965	0.971	0.973	0.973	0.980

Notes. Standard errors are clustered at the state level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. All specifications include a dummy for territory. Rights are "rounded up". Regressions are weighted by state population.

TABLE VII
WOMEN'S LIBERATION AND NON-AGRICULTURAL EMPLOYMENT: ROBUSTNESS

Dependent Variable: % Male Workers in Non Agriculture				
	(1)	(2)	(3)	(4)
	Alternative Definition: L^M	Without 1890	Without Rights btwn. 1870-1880	1850 Border State FE
≥ 3 Decades Before	-0.023 (0.015)	-0.038** (0.018)	-0.039* (0.020)	-0.029* (0.016)
2 Decades Before	0.015 (0.015)	-0.002 (0.008)	0.026 (0.025)	0.013 (0.016)
1 Decade Before	0	0	0	0
Rights Given	0.025*** (0.008)	0.034*** (0.009)	0.028** (0.012)	0.030*** (0.008)
1 Decade After	0.051*** (0.014)	0.057*** (0.012)	0.071*** (0.017)	0.060*** (0.013)
2 Decades After	0.058*** (0.020)	0.075*** (0.022)	0.108*** (0.026)	0.076*** (0.021)
≥ 3 Decades After	0.065** (0.027)	0.090*** (0.029)	0.126*** (0.034)	0.092*** (0.026)
Obs.	356	308	197	356
R^2	0.977	0.986	0.978	0.972

Notes. Standard errors are clustered at the state level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. All specifications repeat the specification of Column (7) in Table V and include fixed effects for (Year \times Region), Modern Border States, being a territory, and South interacted with 1870 and 1880 as well as the fractions of the population that are female, under 35, and non-white, and the fraction of women in school. Columns (1)-(3) also include the fraction of neighboring states with rights. Rights are rounded to the nearest decade. Regressions are weighted by state population.

TABLE VIII
WOMEN'S LIBERATION, INTEREST RATES & CREDIT

Dependent Variable:	Real Interest Rate			Change in Real Loans Per Capita			Change in Real Deposits Per Capita		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Rights	-0.846** (0.362)	-0.556* (0.305)	-0.709** (0.297)	2.389** (1.004)	1.443+ (0.941)	1.364+ (0.894)	2.018** (0.801)	1.325* (0.672)	1.308** (0.633)
Modern Border State FE	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
1850 Border State FE	No	No	Yes	No	No	Yes	No	No	Yes
Year FE	Yes	No	No	Yes	No	No	Yes	No	No
(Year × Region) FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Obs.	1,971	1,971	1,971	2,508	2,508	2,508	2,506	2,506	2,506
R ²	0.737	0.800	0.776	0.224	0.397	0.397	0.351	0.617	0.617

Notes. Standard errors are clustered at the state level in parentheses. + $p < 0.15$, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Regressions are weighted by state population.