

Women's Liberation as a Financial Innovation

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Introduction

- Common law included ‘Coverture’: limited legal economic status of married women.
- Men gave women economic rights, even before granting political rights.
- The question is: Why?
- Our view: Coverture caused economic distortions, specifically through capital allocation.
 - Build model to show that development → men giving rights → further development.
 - Test hypotheses with cross-state variation in timing of rights.

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Coverture

- Property Laws:
 - “Moveable” assets, such as money, stocks, bonds, became the husbands’.
 - “Real” assets, such as land & structures, remained in the wife’s name, but under the husbands’ control.
- Earning laws: Wive’s income went to husband.

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Considerations of Coverture

- Strong disincentive for women to invest in anything but land & structures.
- Leads to under-investment in capital.
- As states industrialize, this distortion becomes worse.
- Men's considerations – Giving rights:
 - Lose bargaining power at home.
 - Higher income.

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Historical Context

1 Coverture's Effect on Portfolio Choices:

- Combs (2005) studies the portfolio allocation of women married before and after the 1870 Property Act in England. [▶ Portfolio](#)
- Baskerville (2008) studies the “Silent Revolution” in Canada after rights.
 - Shows portfolios begin to resemble male portfolios.
 - Shows the effects on the bequest left to daughters.

2 Growing importance & democratization of financial markets. (Michie 2011)

3 Awareness of Tradeoff:

- Alexander Hope (British MP): “...would completely revolutionise the whole system of credit in the retail trade of this country.” (Morning Post, 1869)
- Also: “...wantonly interfered with the relations of married life.”

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1 Build/analyze Model.

- When technology is low in manufacturing (non-agriculture), no distortion.
- As technology develops, distortion gets stronger.
- When rights are granted, there is a structural shift towards manufacturing. ▶ TFP

2 Using cross-state variation in US data, we find that:

- 1 Higher TFP in non-agriculture predicts granting rights.
- 2 Rights →

1. An increase in the fraction of workers in non-agriculture

2. a decrease in farm-level income/total per capita and rural population

3. The effects were dynamic and lasted for decades

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- Doepke & Tertilt (2009), Fernandez (2014), Gueddes & Lueck (2002), Combs (2005, 2006, 2013), Khan (1996).

2 Finance and Development:

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Production

- Production of a final good, Y is CES in two input goods:

$$Y_t = [(Y_t^A)^\rho + (Y_t^M)^\rho]^{(1/\rho)}, \quad \rho \in (0, 1]$$

- Agriculture, A , which uses land, T , & labor L^A :

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

- Manufacturing, M , which uses capital, K , structures, S , & labor L^M :

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⇒ In equilibrium, all factors of production: capital, structures, land and labor receive their marginal product.

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Individuals

- Unit measure of men and women are born, and live for 2 periods.
- Children do nothing.
- Adults have one son and one daughter, make all economic choices.

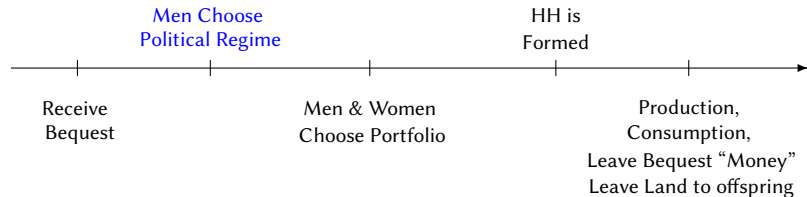
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Model: Sequence of Events at Adulthood



Decision Making: Married Households

- Individual i utility is given by:

$$U(c_t^i, b_t) = \log(c_t^i) + \gamma \log(2b_t),$$

where $i \in \{m, f\}$.

- Households choose consumption of adults and bequest to children. Decision making is assumed to follow a Pareto Problem:

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

subject to their budget constraint:

$$c_t^m + c_t^f + 2b_t = r_t^K K_t + r_t^S S_t + r_t^T T + w_t \equiv I_t.$$

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- The Pareto weight of the female, θ_t , is determined by her relative wealth.
- When there are rights:

$$\theta_t = \frac{r_t^K K_t^f + r_t^S S_t^f + r_t^T T/2}{I_t},$$

- When there are no rights:

$$\theta_t = \frac{(1 - \lambda)(r_t^S S_t^f + r_t^T T/2)}{I_t}.$$

- $1 - \lambda$ captures the fraction of a woman's real assets she controls.
 - Under coverture, real assets remain in the woman's name.
 - Husband gets rental income from the wife's real assets, cannot sell.
 - λ is a reduced form way of capturing the woman's partial control.

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Solution to Household Problem

Given I and θ , the solution to the married household problem is given by:

$$c_t^f = \frac{\theta_t I_t}{1 + \gamma},$$

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

and

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

Portfolio Choice Before Marriage

- Singles receive a bequest.
- Divide money between structures and capital: $b_{t-1} = S_t^i + K_t^i$
- Men always invest in the asset with highest return, as do women when they have rights.
- Women under coverture face tradeoff. Investing in capital:
 - Increases *total* household income (when $r_t^K > r_t^S$).
 - Decreases *relative* household income, as money goes to husband.
- Formally:

$$S_t^f = \operatorname{argmax} \left\{ \log \left(\frac{\theta(S_t^f)I(S_t^f)}{1 + \gamma} \right) + \gamma \log \left(2 \frac{\gamma I(S_t^f)}{1 + \gamma} \right) \right\},$$

where S_t^f is the amount of the woman's wealth she invests in structures.

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where S_t^f is the amount of the woman's wealth she invests in structures.

Portfolio Choice Before Marriage

- Singles receive a bequest.
- Divide money between structures and capital: $b_{t-1} = S_t^i + K_t^i$
- Men always invest in the asset with highest return, as do women when they have rights.
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- Under coverture, women's optimal investment in structures, S_t^f , is given by:

$$(i) \quad b_{t-1} \quad \text{if } r_t^S \geq r_t^K.$$

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Decision Making: Rights?

- Men give women rights if their utility is higher under the rights regime:

$$(U_t^m)^R > (U_t^m)^{NR}.$$

General Equilibrium

General equilibrium in the economy is a set of prices

$\{P_t^A, P_t^M, w_t, r_t^K, r_t^S, r_t^T\}$, *allocations in the production side*

$\{Y_t, Y_t^M, Y_t^A, T, K_t, S_t, L_t^A, L_t^M\}$, *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 political regimes for each date t , such that:*

1. *Given prices and a rights regime, $\{Y_t, Y_t^M, Y_t^A, T, K_t, S_t, L_t^A, L_t^M\}$ solve the production side and $\{c_t^f, c_t^m, b_t\}$ solve the household problem.*
2. *Markets clear.*
3. *The political regime at each time t is determined by $(U_t^m)^R$ compared to $(U_t^m)^{NR}$.*

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- 2 Markets clear.
- 3 The political regime at each time t is determined by $(U_t^m)^R$ compared to $(U_t^m)^{NR}$.

Model Predictions

Economic development goes through 3 phases:

- Low A_t^M , s.t. even with coverture $r_t^S = r_t^K$.
- Medium A_t^M , s.t. with coverture $r_t^S < r_t^K$ (distortions), but still not worth giving rights.
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Numerical Example

- Fix $A_t^A = 1 \forall t$, and let A_t^M grow exogenously.
- Take some parameters.
- Solve for:
 - Women never have rights.
 - Women always have rights.
 - Men choose when to give rights.

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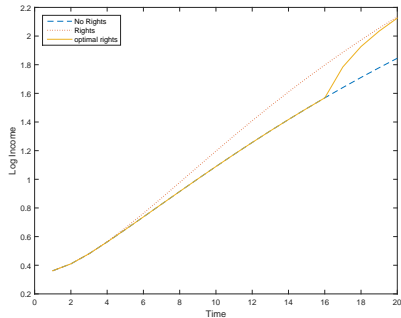
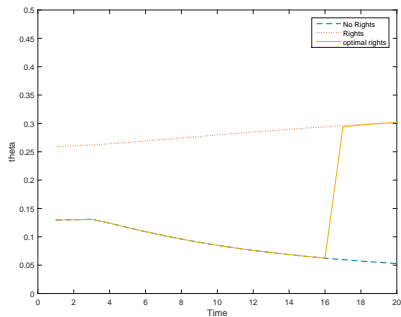
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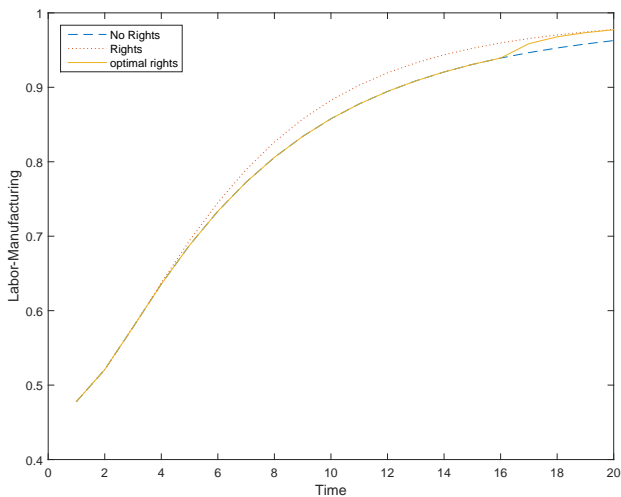
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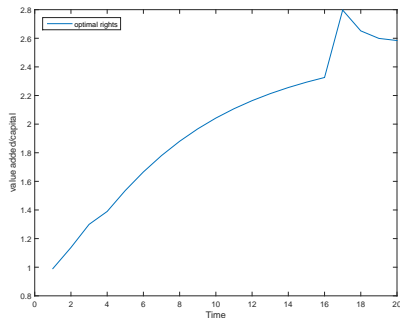
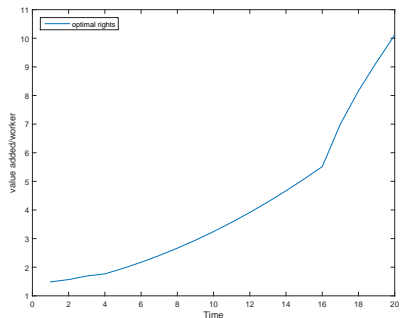
Women's bargaining power (left) and Household Income (right)



Fraction of Labor in Manufacturing (L_t^M)



Value Added per Worker (left) & per Capital (right)


[▶ Back to Data](#)
[▶ More- Bequest](#)
[▶ More- Capital & Structures](#)
[▶ More- Rents K, S](#)
[▶ More- Rents T](#)
[▶ More- \$U_M\$](#)

Testing Model Predictions

Exploit cross-state variation in timing of women's economic rights.

1 Development → Rights

- TFP in non-agriculture predicts rights being granted.

2 Rights → Development

- US Population Census:
 - Rights → Labor force growth (non-agriculture)
- US Census of Manufactures (firm level data):
 - Rights → Greater value added per worker & per capita

▶ Regional Interest Rates

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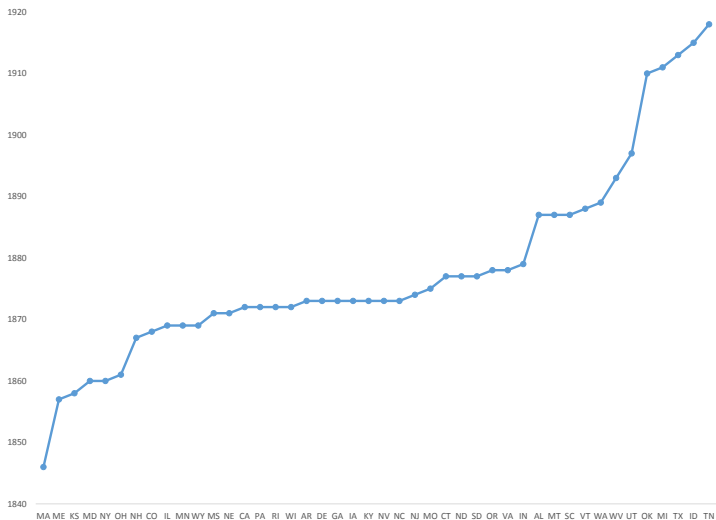
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Timing of Women's Rights by State: (Geddes & Lueck 2002)



TFP Predicts Rights

$$Rights_{st} = \beta_1 A_{st}^M + \beta_2 A_{st}^A + d_t + \lambda_s + \lambda_s \times t + controls_{st} + \epsilon_{st}$$

- A_{st} is TFP in state s , year t , in non-agriculture (M) or agriculture (A).
- d_t is year fixed effects, λ_s is state fixed effects, & $\lambda_s \times t$ is state specific linear time trend.
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TFP Predicts Rights:

Dependent Variable: Rights

	(1) Rights	(2) Rights Probit	(3) Rights	(4) Rights	(5) Rights	(6) Rights Round Up
A^M	9.528*** (2.909)	14.833*** (5.019)	9.332*** (2.847)	8.175*** (2.212)	9.158*** (2.134)	8.459*** (1.635)
A^A	10.168 (6.682)	19.690 (16.275)	12.265* (6.287)	3.853 (9.462)	-5.726 (7.545)	-8.339 (4.993)
FERT 10	No	No	Yes	Yes	Yes	Yes
State dummies	No	No	No	Yes	Yes	Yes
State Time Trend	No	No	No	No	Yes	Yes
N	349	349	349	349	349	349

NOTE. Standard errors, clustered at the state level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. All regressions include year dummies, dummy for being a territory, having community property, equity courts, fraction of female in school, fraction female, South \times 1870 and South \times 1880 dummies, fraction non-white, and fraction of adults under 35.

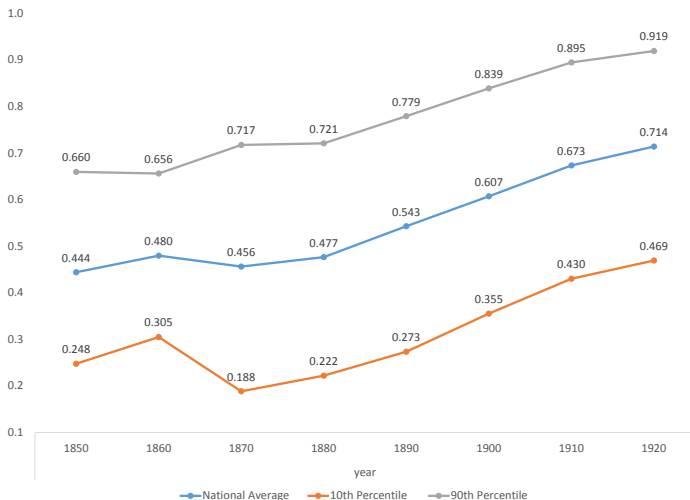
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Male Non-Agriculture Employment Over Time



Empirical Specification

$$L_{st}^M = \sum_k \alpha_k \cdot rights_{st}^k + \lambda_s + d_t + \lambda_s \times t + controls_{st} + \epsilon_{st}$$

- L_{st}^M is the fraction of workers in non-agricultural sectors in state s in year t , $t \in \{1850, 1860, \dots, 1920\}$.
- $rights_{st}^k$ is a series of dummy variables set equal to one if a state had granted rights k years ago, where $k \in \{\leq -30, -20, -10, 0, 10, 20, \geq 30\}$.
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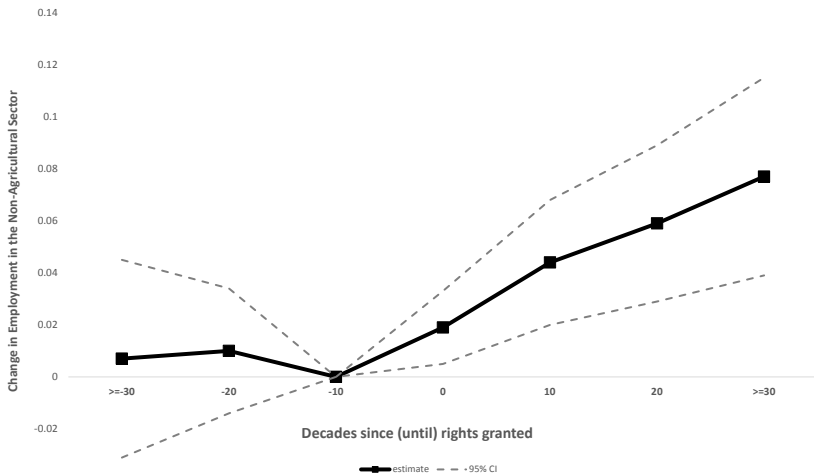
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The Dynamics Response of Non-Agriculture Employment

Dependent Variable: Fraction of Workers in Non-Agriculture – Basic Coding

	(1)	(2)	(3)	(4)	(5)	(6)
≥ 3 decades before	-0.013 (0.032)	-0.019 (0.031)	-0.033 (0.026)	-0.039* (0.023)	-0.030 (0.022)	0.007 (0.019)
2 decades before	0.021 (0.021)	0.022 (0.022)	0.011 (0.022)	0.008 (0.019)	0.008 (0.017)	0.010 (0.012)
1 decade before	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)	0.019** (0.007)
1 decade after	0.072*** (0.018)	0.074*** (0.016)	0.077*** (0.016)	0.070*** (0.016)	0.069*** (0.016)	0.044*** (0.012)
2 decades after	0.088*** (0.028)	0.092*** (0.027)	0.101*** (0.027)	0.086*** (0.027)	0.084*** (0.025)	0.059*** (0.015)
≥ 3 decades after	0.106*** (0.039)	0.115*** (0.037)	0.124*** (0.035)	0.104*** (0.036)	0.100*** (0.033)	0.077*** (0.019)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
State dummies	Yes	Yes	Yes	Yes	Yes	Yes
Territory	Yes	Yes	Yes	Yes	Yes	Yes
South×1870	No	Yes	Yes	Yes	Yes	Yes
South×1880	No	Yes	Yes	Yes	Yes	Yes
Fraction Female	No	Yes	Yes	Yes	Yes	Yes
Fraction of Female in school	No	No	Yes	Yes	Yes	Yes
Fraction Non-White	No	No	No	Yes	Yes	Yes
Fraction under 35	No	No	No	No	Yes	Yes
State time trend	No	No	No	No	No	Yes
N	356	356	356	356	356	356

The Dynamics Response of Non-Agriculture Employment



The Dynamics Response of Non-Agriculture Employment – Robustness 1

Dependent Variable: Fraction of Workers in Non-Agriculture – Alternative Coding

	(1)	(2)	(3)	(4)	(5)	(6)
≥ 3 decades before	-0.004 (0.030)	-0.010 (0.030)	-0.030 (0.026)	-0.038 (0.023)	-0.030 (0.022)	-0.029** (0.012)
2 decades before	0.009 (0.021)	0.008 (0.021)	0.000 (0.022)	-0.002 (0.019)	-0.003 (0.017)	-0.007 (0.012)
1 decade before	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)	0.024*** (0.008)
1 decade after	0.045** (0.018)	0.042** (0.018)	0.045** (0.018)	0.040** (0.019)	0.037** (0.018)	0.050*** (0.015)
2 decades after	0.062** (0.028)	0.061** (0.028)	0.068** (0.027)	0.056** (0.027)	0.052** (0.026)	0.071*** (0.019)
≥3 decades after	0.066* (0.036)	0.070* (0.036)	0.077** (0.036)	0.061* (0.035)	0.054 (0.033)	0.087*** (0.024)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
State dummies	Yes	Yes	Yes	Yes	Yes	Yes
Territory	Yes	Yes	Yes	Yes	Yes	Yes
South×1870	No	Yes	Yes	Yes	Yes	Yes
South×1880	No	Yes	Yes	Yes	Yes	Yes
Fraction Female	No	Yes	Yes	Yes	Yes	Yes
Fraction of Female in school	No	No	Yes	Yes	Yes	Yes
Fraction Non-White	No	No	No	Yes	Yes	Yes
Fraction under 35	No	No	No	No	Yes	Yes
State time trend	No	No	No	No	No	Yes
N	356	356	356	356	356	356

The Dynamics Response of Non-Agriculture Employment – Robustness 2

	<i>Robustness</i>				
	(1)	(2)	(3)	(4)	(5)
	Industry	Occupation	Drop 1890	Alternate FE	w/o Rights btwn. 1870-1880
≥ 3 decades before	-0.001 (0.012)	0.002 (0.014)	-0.001 (0.021)	0.009 (0.018)	0.017 (0.03)
2 decades before	0.009 (0.011)	0.013 (0.012)	0.002 (0.007)	0.003 (0.007)	0.028 (0.023)
1 decade before	0	0	0	0	0
Rights given	0.015** (0.007)	0.019*** (0.007)	0.019** (0.008)	0.015** (0.007)	0.014 (0.010)
1 decade after	0.039*** (0.011)	0.043*** (0.012)	0.038*** (0.012)	0.031** (0.012)	0.045*** (0.012)
2 decades after	0.053*** (0.014)	0.059*** (0.015)	0.058*** (0.018)	0.047*** (0.017)	0.067*** (0.019)
≥ 3 decades after	0.069*** (0.019)	0.081*** (0.021)	0.077*** (0.022)	0.058*** (0.021)	0.088*** (0.023)
N	356	356	308	356	197

NOTE. Estimated using state population weights. Standard errors, clustered at the state level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. All regressions include year dummies, state dummies, territory dummies, south interacted with 1870 and 1880, fraction female, fraction of female in school, fraction non white, fraction under 35, and state linear time trend.

Data – Manufactures Census

- 1 Data from U.S. Census of Manufactures, via Attack and Bateman (1999).
- 2 Repeated cross section of firms from 1850-1880.
- 3 See what happens to value-added per worker & per capital after rights at firm level.
 - Mean value added per worker (sd): \$678 (847). Per capital: 2.2 (3.8)
 - 1860 \$ (Hoover 1960)
 - 16,647 firm in 122 industries (after cleaning)

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Empirical Specification

$$va_{jist}^d = \sum_k \alpha_k \cdot rights_{st}^k + d_t + \lambda_s + I_i + \lambda_s \times t + I \times t + controls_{st} + \epsilon_{jist}$$

- va_{jist}^d is the value added of firm j , belong to industry i , operates in state s , in year t , $d \in \{L, K\}$.
- $rights_{st}^k$ is a series of dummy variables set equal to one if a state s had granted rights k years ago at time t , where $k \in \{\leq -20, -10, 0, 10, \geq 20\}$.
- d_t is year fixed effects, λ_s is state fixed effects, I_i is industry fixed effects, & $\lambda_s \times t$ & $I_i \times t$ are state & industry specific linear time trend.
- $controls_{st}$ include south in 1870/1880 dummies.

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- $controls_{st}$ include south in 1870/1880 dummies.

The Dynamic Response of Value Added

Effects of Rights on Firms

	(1) value added per worker	(2) value added per capital
≥ 2 decades before	30.081 (66.786)	-0.051 (0.271)
1 decade before	0	0
Rights given	67.710 (51.519)	0.620*** (0.216)
1 decade after	201.938** (95.290)	1.353*** (0.330)
≥ 2 decades after	187.207 (131.159)	1.987*** (0.412)
Year dummies	Yes	Yes
State dummies	Yes	Yes
Industry dummies	Yes	Yes
South×1870	Yes	Yes
South×1880	Yes	Yes
Industry time trend	Yes	Yes
State time trend	Yes	Yes
N	16,647	16,647
R ²	0.211	0.243

NOTE. Standard errors, clustered at the state-year level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

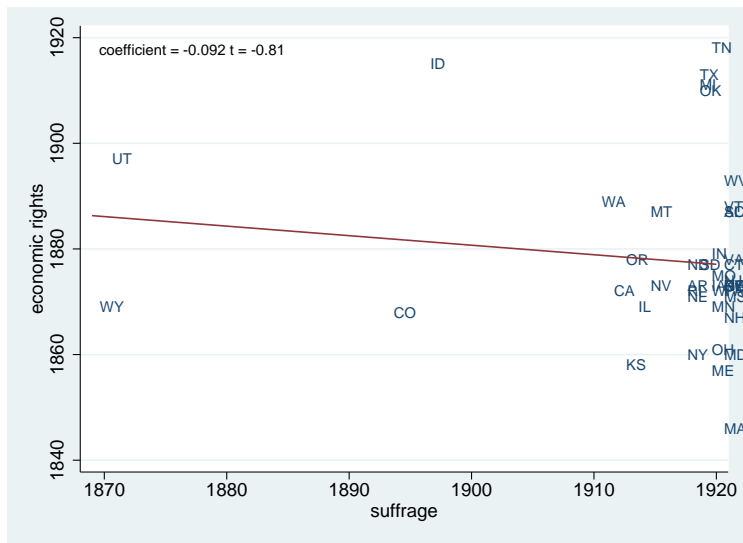
The Dynamic Response of Value Added

Effects of Rights on Firms

	(1) value added per worker	(2) value added per capital
≥ 2 decades before	-103.194 (101.103)	-0.459 (0.441)
1 decade before	0	0
Rights given	193.769** (90.251)	0.963*** (0.333)
1 decade after	283.734** (137.417)	1.459*** (0.518)
≥ 2 decades after	325.968* (179.516)	2.286*** (0.642)
Year dummies	Yes	Yes
State dummies	Yes	Yes
Industry dummies	Yes	Yes
South × 1870	Yes	Yes
South × 1880	Yes	Yes
Industry time trend	Yes	Yes
State time trend	Yes	Yes
N	16,647	16,647
R ²	0.212	0.244

NOTE. Standard errors, clustered at the state-year level in parentheses. * $p < 0.10$,
 ** $p < 0.05$, *** $p < 0.01$.

Economic Rights vs. Political Rights



Conclusions

- Examine how rules regarding asset ownership upon marriage affected economic allocations with coverture.
- Argue that development caused men to give rights to undo misallocations.
- Examine mechanism in a model.
- Verify with cross-state evidence.

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Thank you!

Portfolio Choice before and after the 1870 Married Women's Property Act

Shopkeepers' Wives, Died 1901-1903

Married	Tot. Records	Ave. Real (£)	Ave. Moveable (£)	Ave. Total (£)
Before 1870	123	958	762	1,720
After 1870	518	435	1,299	1,734

Source: Combs (2005), Table 2.

TFP by Sector: UK 1780s- 1860s

Table 2: Sources of Industrial Revolution Efficiency Advance, 1780s-1860s

Sector	Efficiency Growth Rate (%)	Share of value added	Contribution to National Efficiency Growth Rate (% per year)
All Textiles	2.3	0.11	0.25
Iron and Steel	1.8	0.01	0.02
Coal Mining	0.2	0.02	0.00
Transport	1.5	0.08	0.12
Agriculture	0.4	0.30	0.11
Identified Advance	-	0.51	0.49
Whole Economy	-	1.00	0.58

Source: Clark, 2007, table 12.1.

Real Returns - stocks and short bonds (Siegel 1992)

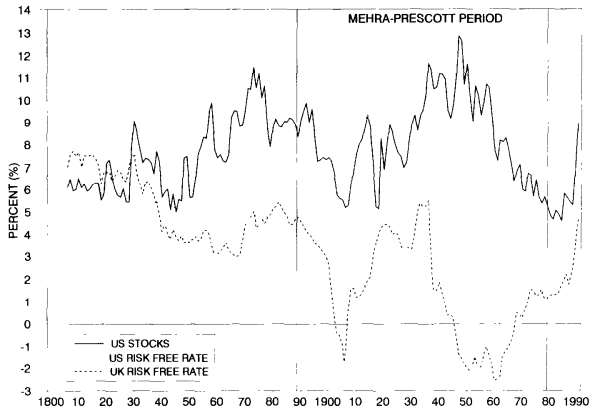
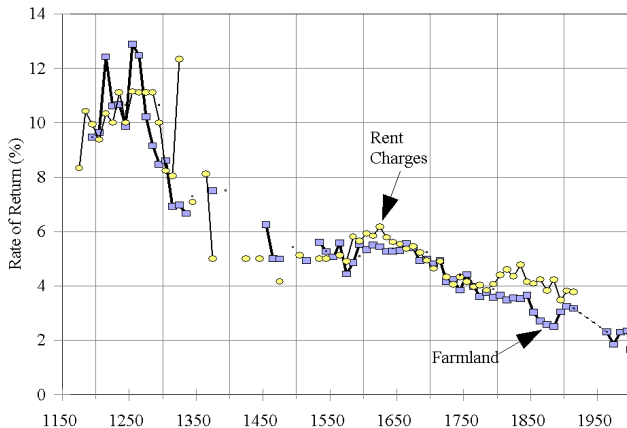


Fig. 6. Real returns - stocks and short bonds, 30-year centered moving average, 1806-1990.

Returns to Farmland (Clark 2010)



More

Effects of Rights on Firms

	(1) Capital/Worker	(2) Capital	(3) Workers
≥ 2 decades before	3.139 (55.435)	-1581.670* (901.675)	-5.527*** (1.458)
1 decade before	0	0	0
Rights given	-101.692 (65.628)	1807.401 (1206.800)	9.385*** (1.915)
1 decade after	-171.834 (140.471)	3013.081 (2235.417)	21.436*** (3.115)
≥ 2 decades after	-379.233 (258.426)	-3810.320 (3596.823)	22.187*** (5.558)
N	16,647	16,647	16,647
r2	0.193	0.143	0.132

NOTE. Standard errors, clustered at the state-year level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

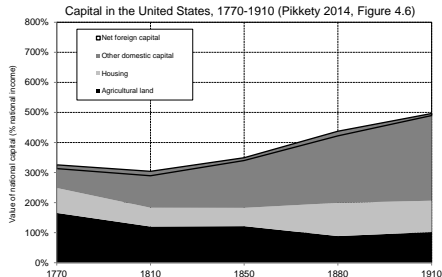
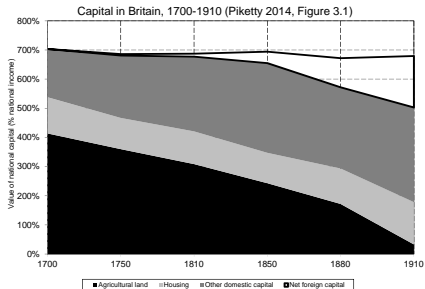
More- Alternative Coding

Effects of Rights on Firms

	(1) Capital/Worker	(2) Capital	(3) Workers
≥ 2 decades before	12.218 (69.554)	-280.401 (808.462)	-3.986*** (1.234)
1 decade before	0	0	0
Rights given	-61.736 (66.937)	918.187 (1095.491)	8.374*** (1.736)
1 decade after	-149.527 (147.392)	1997.335 (1870.405)	19.912*** (2.801)
≥ 2 decades after	-342.511 (276.077)	-8137.454*** (2969.339)	15.903*** (5.194)
N	16,647	16,647	16,647
r2	0.193	0.143	0.133

NOTE. Standard errors, clustered at the state-year level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Composition of Wealth: England and the U.S. (Piketty 2014)



Numerical Example – Solution Method

- In every t , take A_t^M and b_{t-1} as given.
 - 1 Guess w_t, r_t^K, r_t^S, r_t^T and infer portfolio allocations for men and women, and thus K_t and S_t .
 - 2 Using the production side, solve for L_t^M and L_t^A .
 - 3 Using K_t, S_t, T, L_t^M , and L_t^A , infer w_t, r_t^K, r_t^S and r_t^T from FOCs.
 - 4 Update guess and iterate until convergence.

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 - 4 Update guess and iterate until convergence.

Numerical Example – Parameters

We solve the model using the following (illustrative) parameter values:

Weight on Children $\gamma = 1$

Women's share of land $\lambda = 0.5$

Elast. Subst. btw. Y^M and Y^A $\rho = 0.9$

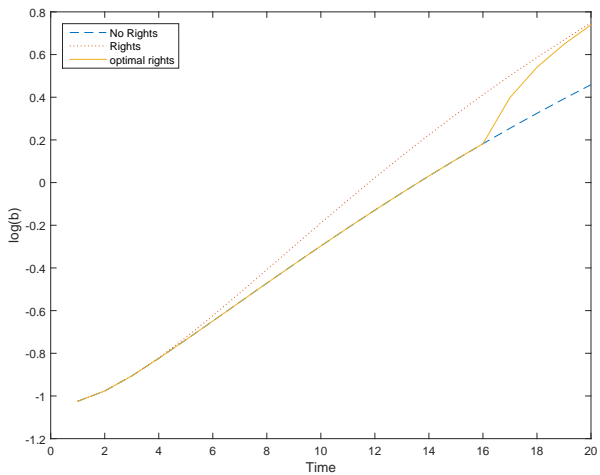
Elast. Subst. btw. K and S $\sigma = 0.5$

Capital/Land Share Inc. $\alpha = 0.5$

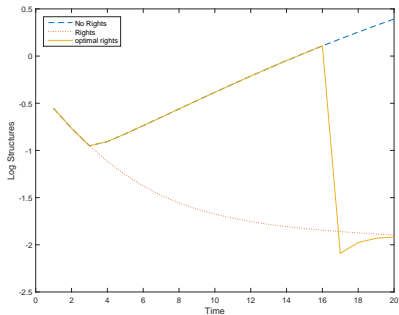
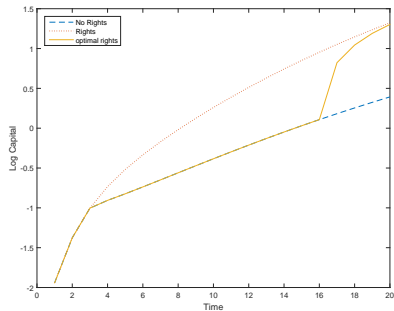
Land $T = 1$

Tech in Land $A_t^A = 1$

Bequests (b_t)

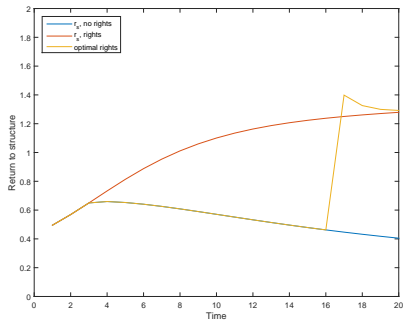
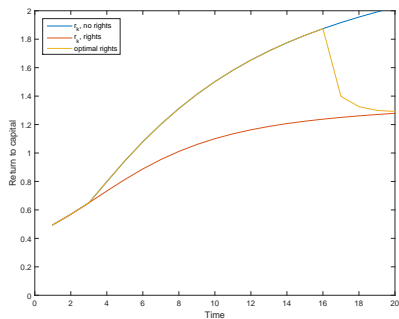


Capital (K_t) and Structures (S_t)



► Back

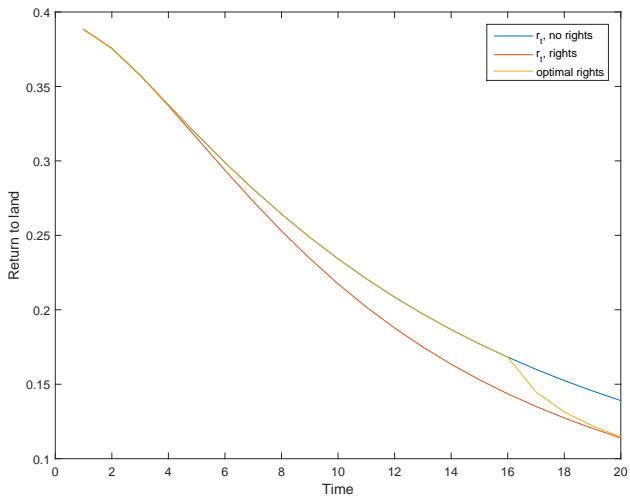
Returns to Capital (r_t^K) and Structures (r_t^S)



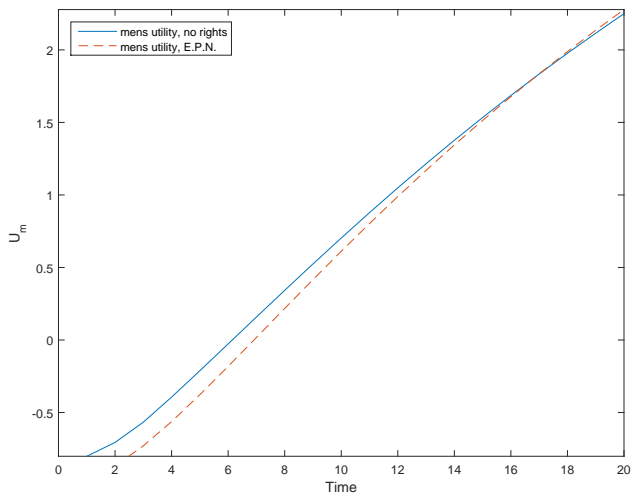
▶ Returns to Capital

▶ Back

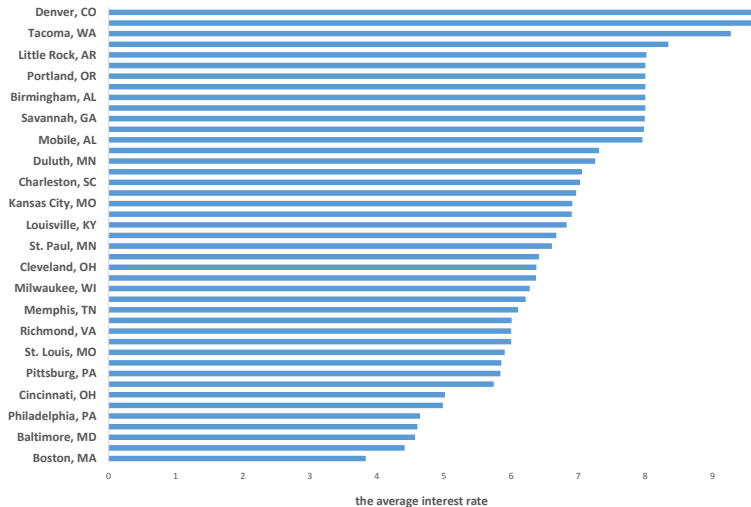
Returns to Land (r_t^T)



Difference in Men's Utility: Rights - No Rights



Regional Interest Rate – Breckenridge (1898)



Cross State Comparison of Non-Agriculture Employment

