Women's Liberation as a Financial Innovation

${\sf Moshe \, Hazan^1 \quad David \, Weiss^2 \quad Hosny \, Zoabi^3}$

¹Tel-Aviv University and CEPR

 2 Tel-Aviv University

 3 New Economic School

• 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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- 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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- Overture's Effect on Portfolio Choices:
 - Combs (2006) finds that the 1870 Property Act in England has positively affected the share of household property owned by the wife: From 23.8% to 38%.
 - Combs (2005) studies the portfolio allocation of women married before and after the 1870 Property Act in England. Portfolio
 - Baskerville (2008) shows that in Canada females' portfolios begin to resemble males' after rights.
- Growing importance & democratization of financial markets. (Michie 2011)
- 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)

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- As technology develops, distortion gets stronger.
- When rights are granted, there is a structural shift towards manufacturing.
- Using cross-state variation in US data, we find that:
 - Higher TFP in non-agriculture predicts granting rights.
 - Rights \rightarrow
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 - Reduction in interest rate and an increase in credittion

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Pinance and Development:

- King & Levine (1993), Acemoglu & Zilibotti (1997), Rajan & Zingales (1998)
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Production

 $\bullet\,$ Production of a final good, Y is CES in two input goods:

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

• 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 :

$$Y_t^M = \left[A_t^M (K_t)^\sigma + (S_t)^\sigma\right]^{\frac{\alpha}{\sigma}} (L_t^M)^{(1-\alpha)}.$$

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• OLG model.

- Each household consists of a husband and wife and has one son and one daughter.
- Individual live for two periods:
 - In childhood they do nothing.
 - In adulthood they make all economic choices.

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Model: Sequence of Events at Adulthood



• 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\} = \arg\max\{\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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$$c_{t}^{m} + c_{t}^{f} + 2b_{t} = r_{t}^{K}K_{t} + r_{t}^{S}S_{t} + r_{t}^{T}T + w_{t} \equiv I_{t}.$$

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

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

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

- 1λ 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:

$$c_t^f = \frac{2\theta_t}{2+\gamma} I_t,$$

$$c_t^m = \frac{2(1-\theta_t)}{2+\gamma} I_t,$$

and

$$b_t = \frac{\gamma}{2+\gamma} I_t.$$

- 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(c_t^f(S_t^f) \right) + \gamma \log \left(b_t \left(I(S_t^f) \right) \right) \right\},\$$

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

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- 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(c_t^f(S_t^f) \right) + \gamma \log \left(b_t \left(I(S_t^f) \right) \right) \right\},\$$

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Portfolio Choice Before Marriage

• Under coverture, women's optimal investment in structures, S_t^f , is given by:

(i)
$$b_{t-1}$$
 if $r_t^S \ge r_t^K$.
(ii) $\min\left\{b_{t-1}, \frac{r_t^S S_t^m + (b_{t-1} + K_t^m) r_t^K + r_t^T T\left[1 - \frac{\gamma}{2}\left(\frac{r_t^K - r_t^S}{r_t^S}\right)\right] + w}{(1+\gamma)(r_t^K - r_t^S)}\right\}$ if $r_t^S < r_t^K$.

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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 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:

- 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.
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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.
- High A_t^M , s.t. with coverture $r_t^S < r_t^K$ (distortions), but men give rights, so in practice distortion is gone ($r_t^S = r_t^K$).

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• Fix $A_t^A = 1 \ \forall t$, and let A_t^M grow exogenously.

- Take some parameters.
- Solve for:
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Model

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



Women's Liberation as a Financial Innovation

Model

Fraction of Labor in Manufacturing (L_t^M)



Hazan, Weiss, Zoabi

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



Women's Liberation as a Financial Innovation

$Rights_{st} = \beta_1 A_{st}^M + \beta_2 A_{st}^A + d_t + \lambda_s + \lambda_s \times t + X_{st}'\beta + \epsilon_{st}$

• 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.
- Controls: South in 1870/1880 dummies, fraction women, fraction of women in school, fraction of non-whites, territory, fraction under 35, Fertility 10.
- TFP data from Turner et. al. (2013). Other data from IPUMS.
- Mean (sd): Non-agriculture: 0.033 (0.0086); Agriculture: 0.007 (.0036)

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	(1)	(2)	(3)	(4)	(5)
	Rights	Rights	Rights	Rights	Rights
					Round Up
A^M	9.528***	7.215***	8.088***	7.842***	6.765***
	(2.939)	(2.307)	(2.075)	(2.704)	(2.146)
A^A	10.168	5.355	5.081	-4.047	-5.839
	(6.583)	(10.545)	(8.969)	(8.229)	(18.236)
Fertility 10			-0.299*	-0.244	-0.175
			(0.155)	(0.186)	(0.171)
State dummies	No	Yes	Yes	Yes	Yes
State Time Trend	No	No	No	Yes	Yes
N	349	349	349	349	349

Dependent Variable: Rights

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×1870 and South×1880 dummies, fraction nonwhite, and fraction of adults under 35.

Analysis - Population Census

Data from U.S. census (IPUMS).

See what happens to non-agricultural employment (industrialization) dynamically after rights are given. Non-Agricultural Employment

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Male Non-Agriculture Employment Over Time



$$L_{st}^{M} = \sum_{k} \alpha_{k} \cdot rights_{st}^{k} + d_{t} + \lambda_{s} + \lambda_{s} \times t + X_{st}^{\prime}\beta + \epsilon_{st}$$

- 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 $k \in \{\leq -30, -20, -10, 0, 10, 20, \geq 30\}.$
- d_t is year fixed effects, λ_s is state fixed effects, & $\lambda_s \times t$ is state specific linear time trend.
- X_{st} include south in 1870/1880 dummies, fraction women, fraction of women in school, fraction of non-whites, territory, fraction under 35

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Dependent variable: Fraction of Workers in Non-Agriculture

	(1)	(2)	(3)	(4)	(5)	(6)
\geq 3 decades before	-0.013	-0.019	-0.033	-0.039*	-0.030	0.007
	(0.032)	(0.031)	(0.026)	(0.023)	(0.022)	(0.019)
2 decades before	0.021	0.022	0.011	0.008	0.008	0.010
	(0.021)	(0.022)	(0.022)	(0.019)	(0.017)	(0.012)
1 decade before	0	0	0	0	0	0
i decide before	Ŭ	Ŭ	Ŭ	Ŭ	Ŭ	Ŭ
Rights given	0.035***	0.036***	0.038***	0.036***	0.035***	0.019**
	(0.011)	(0.010)	(0.011)	(0.010)	(0.010)	(0.007)
4.1	0.070	0.074	0.077	0.070	0.070	0.011
1 decade after	0.072***	0.074***	0.077***	0.070***	0.069***	0.044***
	(0.018)	(0.016)	(0.016)	(0.016)	(0.016)	(0.012)
2 decades after	0.088***	0.092***	0 101***	0.086***	0.084***	0.059***
2 decides arter	(0.028)	(0.027)	(0.027)	(0.027)	(0.025)	(0.015)
	(0.020)	(0.027)	(0.02.)	(0.027)	(0.020)	(0.010)
\geq 3 decades after	0.106***	0.115***	0.124***	0.104***	0.100***	0.077***
	(0.039)	(0.037)	(0.035)	(0.036)	(0.033)	(0.019)
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

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 specifications include state fixed effects, time fixed effects and dummy for territory

The Dynamic Response of Non-Agriculture Employment



Dependent variable: Fraction of Workers in Non-Agriculture – round up

	(1)	(2)	(3)	(4)	(5)	(6)
\geq 3 decades before	-0.004	-0.010	-0.030	-0.038	-0.030	-0.029**
	(0.030)	(0.030)	(0.026)	(0.023)	(0.022)	(0.012)
2 daga dag baƙana	0.000	0.008	0.000	0.002	0.002	0.007
2 decades before	(0.009	(0.000	(0.000	-0.002	-0.003	-0.007
	(0.021)	(0.021)	(0.022)	(0.01))	(0.017)	(0.012)
1 decade before	0	0	0	0	0	0
Rights given	0.032***	0.030***	0.030***	0.027**	0.027**	0.024***
	(0.010)	(0.009)	(0.010)	(0.010)	(0.011)	(0.008)
1 decade after	0.045**	0.042**	0.045**	0.040**	0.037**	0.050***
i decade arter	(0.018)	(0.018)	(0.018)	(0.019)	(0.018)	(0.015)
	(0.010)	(0.010)	(0.010)	(0.01))	(0.010)	(0.010)
2 decades after	0.062**	0.061**	0.068**	0.056**	0.052**	0.071***
	(0.028)	(0.028)	(0.027)	(0.027)	(0.026)	(0.019)
> 2 1 1	0.077*	0.070*	0.077**	0.0/1*	0.054	0.007***
\geq 3 decades after	0.066	0.070	(0.02()	(0.025)	(0.034	(0.024)
	(0.056)	(0.036)	(0.036)	(0.055)	(0.033)	(0.024)
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

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 specifications include state fixed effects, time fixed effects and dummy for territory

Dependent variable: Fraction of Workers in Non-Agriculture – Robustness

	(1)	(2)	(3)	(4)	(5)
	Industry	Occupation	Drop 1890	Alternate FE	w/o Rights
			-		btwn. 1870-1880
\geq 3 decades before	-0.001	0.002	-0.001	0.009	0.017
	(0.012)	(0.014)	(0.021)	(0.018)	(0.03)
2 decades before	0.009	0.013	0.002	0.003	0.028
	(0.011)	(0.012)	(0.007)	(0.007)	(0.023)
1 decade before	0	0	0	0	0
			The second se	The second se	
Rights given	0.015**	0.019***	0.019**	0.015**	0.014
	(0.007)	(0.007)	(0.008)	(0.007)	(0.010)
1 decade after	0.039***	0.043***	0.038***	0.031**	0.045***
	(0.011)	(0.012)	(0.012)	(0.012)	(0.012)
2 decades after	0.053***	0.059***	0.058***	0.047***	0.067***
	(0.014)	(0.015)	(0.018)	(0.017)	(0.019)
> 3 decades after	0.069***	0.081***	0.077***	0.058***	0.088***
	(0.019)	(0.021)	(0.022)	(0.021)	(0.023)
Ν	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.
Interest Rate – Breckenridge (1898)



• Large literature explores regional bank lending rates in the United States:

- Landon-Lane & Rockoff (2007):
 - Found that "In the late nineteenth century the main source of shocks to rates on the periphery (the Plains, the South, and the West) were shocks originating on the periphery itself."
 - Concluded that "This is rather surprising because most students of the American capital market thought that regional markets had been fully integrated by 1900 or shortly afterwards."
- Rajan and Ramcharan (2011) find that "in the early 20th century, the distribution of land in the United States is correlated with the extent of banking development."

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Rights, Interest Rates, Loans and Deposits

Table: Summary Statistics

Variable	Mean	S.D.
Real Interest Rate	7.99	2.90
Change in Real Loans Per Capita (1920 \$)	3.72	13.76
Change in Real Deposits Per Capita (1920 \$)	3.79	12.18
Fraction of the Population in the Region with Rights	0.74	0.25

Interest Rates (net of year dummies) and Years Since Rights



Interest Rates and Fraction of the Population in the Region with Rights



Rights and Interest Rate

Dependent Variable:	Real Interest Rate				
	(1)	(2)	(3)	(4)	
Rights	-0.846**	-0.556*		-0.583*	
	(0.362)	(0.305)		(0.319)	
Fraction of the Population			-4.076***	-3.421***	
in the Region with Rights			(1.342)	(1.184)	
Year Dummies	Yes	No	Yes	Yes	
State Dummies	Yes	Yes	Yes	Yes	
Region-year interaction	No	Yes	No	No	
N	1971	1971	1971	1971	

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

Rights, Loans and Deposits

Dependent Variable:	Chan	ge in Rea	l Loans Pe	r Capita	Change in Real Deposits			er Capita
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Rights	2.389**	1.443		1.405	2.018**	1.325*		1.333*
	(1.004)	(0.941)		(0.847)	(0.801)	(0.672)		(0.740)
Fraction of the Population			16.771***	15.179***			12.052***	10.540***
in the Region with Rights			(5.324)	(5.312)			(2.908)	(3.173)
Year Dummies	Yes	No	Yes	Yes	Yes	No	Yes	Yes
State Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region-year interaction	No	Yes	No	No	No	Yes	No	No
N	2508	2508	2508	2508	2506	2506	2506	2506

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

Economic Rights vs. Political Rights



• 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.
- Still working on some data.
- Some cool avenues for future work that we've already started.

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Thank you!

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

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

Table: Shopkeepers' Wives, Died 1901-1903

Source: Combs (2005), Table 2.

Basch (1982) cites 19th century legal analysts stating that the closest correspondence between the American and English legal system was the law of wife and husband.

▶ Back

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)



▶ Back

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



Back

• In every t, take A_t^M and b_{t-1} as given.

O 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 .

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.

Update guess and iterate until convergence.

▶ back

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 - 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)



Returns to Capital (\boldsymbol{r}_t^K) and Structures (\boldsymbol{r}_t^S)





Returns to Land (\boldsymbol{r}_t^T)



Difference in Men's Utility: Rights - No Rights



▶ Back

Regional Interest Rate - Breckenridge (1898)



the average interest rate
Cross State Comparison of Non-Agriculture Employment



■ Rights ■ No Rights ■ All