Real Origins of the Great Depression
Monopoly Power, Unions and the Interwar Business Cycle

Monique Ebell       Albrecht Ritschl
HU Berlin & LSE     LSE & CEPR

May 2010
Previous Work on the Interwar Economy

  - Key role for efficiency and labor wedges
  - Focus on Great Depression and aftermath 1929-39

- **Business Cycle Accounting framework**
  - Perfect competition in goods markets
  - Walrasian labor markets

- **Cole and Ohanian (2004)**
  - Explicit modelling of frictions
  - Specific to New Deal institutions
  - Focus on slow recovery from Great Depression 1933 onwards
Our Contributions

1. Scope
   - Severe recession 1919-21, accompanying stock market crash
   - Recovery to trend 1922-29, stock market boom
   - Onset of the Great Depression 1929-31, stock market crash

2. Explicit modelling of frictions
   - Interactions between monopoly power and wage bargaining
   - Unemployment
   - Explanatory power for asset markets

3. History
   - Identify 3 major shifts in legal environment for organized labor: 1914/19, late 1921, 1929
   - Threat point of organized labor strengthened in a series of developments during 1929, culminating in October 1929
Real Private Non-Farm Per Capita GDP
Relative to 1.8% trend
Real Wages in Manufacturing, 1929-1939
Relative to 1.8% trend, deflated by PPI

Ebell/Ritschl (LSE & HU Berlin)
Real Origins of the Great Depression
May 2010 7 / 43
Interwar Labor Law Regimes

1. Clayton Act 1914-21
   - Clayton Act of 1914 exempts unions from anti-trust legislation
   - Trade union activity rises sharply after WWI

2. Laissez Faire 1922-29
   - 2 Supreme Court rulings in December 1921 invalidate the pro-union provisions of the Clayton Act
   - Picketing prohibited and subject to injunction
   - Trade union activity plummets
   - Laissez-faire anti-trust policy of Coolidge administration increases monopoly power

3. Welfare Capitalism 1929-32
   - Texas & N.O. Railroad case [DC August 1928, CC Appeals June 1929, Supreme Court May 1930] marks a sea change in labor law
   - Reversal of a unanimous district and appellate court decision would have been highly unusual, marking a break with precedent
   - Increasing pro-union legislative efforts in summer/fall 1929
   - High wage policy of Hoover
Texas & N.O. and Pro-Union Legislation

- **January - March 1929**

  Shipstead anti-injunction bill introduced and quickly tabled by the Senate Judiciary committee due to fears of unconstitutionality.

- **June 1929**

  2nd Circuit Court of Appeals upholds pro-union Texas & N.O. ruling.

- **August 1929**

  Delegation from Senate Judiciary Committee meets with executive council of the AFL to propose 'robust' anti-injunction legislation.

- **October 14 -18, 1929**

  AFL national convention in Toronto, Senate proposal adopted.

- **October 21 - 29, 1929**

  First weakness in stock market, followed by Black Thursday, Black Monday, Black Tuesday.
In an article published in the AER 12/30, Edward Berman writes:

“The Supreme Court’s decision in the Texas and N.O. Railroad case is without doubt one of the most important rendered in a labor case in many years. Considered as a whole, it may be regarded as a great victory for organized labor. . . . It puts the Supreme Court on record in favor of legislation designed to promote collective bargaining. It promises that the court will, in the future, be more friendly to state and federal legislation designed to protect workers from the coercive activities of anti-union employers. ”

Ohanian emphasizes Hoover’s role in persuading leading industrialists to implement high wage policy.

Threat of re-unionization if firms did not offer high wages.

Proto-Keynesian idea that high wages would prop up consumption, averting a "disastrous" recession as in 1920-21.
FEARS NEW CURBS ON LABOR WRITS

Counsel Tells Manufacturers Congress Is Planning New "Assaults" on Judiciary.

BACKS INJUNCTION POWER

J. A. Emery Also Assails Limiting of Flexible Tariff Provision at National Meeting Here.

The National Association of Manufacturers, in convention at the Hotel...
LABOR'S "MAGNA CARTA" DRAFTED FOR CONGRESS

Anti-Injunction Bill of the A. F. of L. Is Designed to Assure Workers the Right to Strike and to Picket, and the Same Liberty as Farmers to Combine

By LOUIS STARK.

ININE days ago in Toronto the forty-ninth annual convention of the American Federation of Labor opened a new chapter in the struggle for "labor's Magna Carta." On that day, and with but one dissenting vote, the convention adopted a proposal for relief from the use of the injunction that, in the opinion of those who drew it up, is the "furthest north" that such measures have gone.

With the passage of the report of the resolutions committee, labor threw down the gauntlet to its opponents in the form of a bill that will be introduced at the next session of Congress. This bill, the result of intensive study for the last year, is based upon experiences with many ill-fated anti-injunction measures during the third of a century.

Designed to free labor from the shackles of company unionism, the "yellow dog" contract and the court decisions limiting the right to organize, to strike and to picket, the proposed measure was drawn in consultation with legal counsel by the American Federation of Labor and (or) interested in a labor dispute; carrying on the routine business of a union or a strike, such as payment of strike or unemployment benefits, assisting in the defense of strikers, giving publicity to the facts of a dispute, holding a meeting in the interest of a dispute, or causing any of the foregoing acts without fraud or physical violence.

The bill would also invalidate the court's jurisdiction upon the ground that persons engaged in a labor dispute are not engaged in "any unlawful combination or conspiracy." Provision is also made for issuance of temporary or permanent injunctions only after the hearing of testimony of witnesses in open court.

WILLIAM GREEN

is charged with contempt for violation of a restraining order in a case arising out of a labor dispute, the proposed measure would assure the accused a speedy and public trial by a jury of his State and district where the alleged contempt is committed, but this does not apply to a contempt committed in the presence of the court or so near to it as to interfere with the administration of justice.

In concluding the presentation of its report the executive council, headed by President William Green, stated: "Our purpose should and must be that Congress clearly and in unmistakable language and legislation shall manifest its regard for and interest in the rights of labor to organize, to federate and by collective action to protect and to promote labor's community of interest and by that method and procedure usher in a better, fairer and more wholesome industrial order and industrial relationship."

John Frey, one of the three members of the committee appointed a year ago to frame the bill, informed the convention that more than two serious anti-injunction meas-
Monopolistic competition in the goods market
Mortensen-Pissarides search frictions in the labor market
Workers choose to search among firms of type $k \in \{I, C\}$
  - Individual $\Rightarrow$ each worker is marginal worker
  - Collective $\Rightarrow$ workers can garner share of profits

Complete asset markets, risk-neutral agents
Productivity growth constant and deterministic
No capital
Agents as Consumers

- Risk neutral, no savings
- Dixit-Stiglitz preferences over continuum of differentiated goods
- Elasticity of substitution across goods $-\sigma$
- Demand function facing firm $i$:

$$y_i = \left( \frac{p(y_i)}{P} \right)^{-\sigma} Y$$
Labor Market Search Frictions

- Segmented labor markets $k \in \{C, I\}$
- Matching function

$$m(U_k, V_k) = mU_k^\eta V_k^{1-\eta}$$

- Job-finding rate

$$\frac{m(U_k, V_k)}{U_k} = m\theta_k^{1-\eta} = f(\theta_k)$$

- Job-filling rate

$$\frac{m(U_k, V_k)}{V_k} = m\theta_k^{-\eta} = q(\theta_k)$$

where labor market tightness $\theta_k \equiv \frac{V_k}{U_k}$.

- Beveridge Curve

$$U_k \cdot f(\theta_k) = (1 - U_k) \chi$$

$$U_k = \frac{\chi}{\chi + f(\theta_k)}$$
Agents as Workers

- Value of unemployment in segment $k \in \{I, C\}$

$$V_k^U = b + \frac{1}{1+r} \left[ f_k V_k^{E'} + (1-f_k) V_k^{U'} \right]$$

- Value of employment

$$V_k^E = w_k + \frac{1}{1+r} \left[ (1-\chi) V_k^{E'} + \chi V_k^{U'} \right]$$

where $\chi$ is the exogenous separation rate.

- Worker’s surplus

$$V_k^W = w_k - b + \beta (1-\chi-f_k) V_k^{W'}$$
Firms

- **Value of the firm**
  
  \[ V^J_k (h_k) = \max_{v_k} \left\{ \frac{p(y_k)}{P} y_k - w_k h_k - \kappa v_k + \frac{1}{1 + r} V^J (h'_k) \right\} \]

  subject to

  - demand: \[ \frac{p(y_k)}{P} = \left( \frac{y_k}{Y} \right)^{-\frac{1}{\sigma}} \]
  - technology: \[ y_k = Ah_k \]
  - transition: \[ h'_k = (1 - \chi) h_k + q(\theta_k) v_k \]
  - wage curve: \[ w_k = w_k(h_k) \]

- **Firm’s Euler Equation (labor demand)**

  \[ \frac{\kappa}{q(\theta_k)} = \frac{1}{1 + r} \left( \frac{\sigma - 1}{\sigma} Ap(y'_k) - w'_k - h'_k \frac{\partial w'_k}{\partial h'_k} + (1 - \chi) \frac{\kappa}{q(\theta'_k)} \right) \]
Wage Bargaining Regimes

- **Individual Bargaining**
  - Each worker is treated as marginal worker
  - Worker’s threat point: Firm loses marginal worker
  - Bargained wage includes a share of hiring costs

- **Right-to-Manage Collective Bargaining**
  - Workers form a bargaining coalition
  - Workers’ threat point: Firm shuts down
  - Bargained wage includes a share of profits
Individual Wage Bargaining

- Nash bargaining problem

\[
\max_{w_i} \beta \ln V_i^W + (1 - \beta) \ln \frac{\partial V_i^J(h_i)}{\partial h_i}
\]

- IB wage curve

\[
w_i = (1 - \beta) \frac{r}{1 + r} V^U + \beta \frac{\sigma - 1}{\sigma - \beta} A p(y_i) P
\]

with slope

\[
\frac{\partial w_i}{\partial h_i} = -\frac{\beta \sigma - 1}{\sigma \sigma - \beta} A p(y)
\]
• Firm’s Euler equation at the steady state (labor demand)

\[
\begin{align*}
\nu_I &= \frac{\sigma - 1}{\sigma - \beta} A \frac{p(y_I)}{P} - (r + \chi) \frac{\kappa}{q(\theta_I)}
\end{align*}
\]

• Hiring externality (overhiring), interaction between \(\sigma\) and \(\beta\)

\[
\begin{align*}
\nu_I + (r + \chi) \frac{\kappa}{q(\theta_I)} &= \frac{\sigma}{\sigma - \beta} \frac{\sigma - 1}{\sigma} \frac{p(y_I)}{P} \frac{A}{MPL} \\
&> 1 \\
&< 1 \frac{A}{MRP}
\end{align*}
\]

• Hire workers beyond the point at which employment costs covered by MRP.

• Why? Adding a worker depresses the wages of all workers. [Stole and Zwiebel (AER, RESstud 1996)]
Right-to-Manage Collective Bargaining

- Right-to-Manage bargaining problem

\[
\max_{w_C} \beta \ln \left( h_C V_C^W \right) + (1 - \beta) \ln V_C^J
\]

- CB wage curve

\[
w_C - \frac{rV_C^U}{1 + r} = \frac{\beta}{1 - \beta} \left[ A \frac{p(y_C)}{P} - w_C - \chi \frac{\kappa}{q(\theta_C)} \right]
\]

worker’s surplus

profit per worker

- CB labor demand

\[
w_C = \frac{\sigma - (1 - \beta)}{\sigma} \cdot A p(y_C) - (r + \chi) \frac{\kappa}{q(\theta_C)}
\]
Bargained Wages

- Individual Bargaining

\[ w_I = \frac{rV_I^U}{1 + r} + \frac{\beta}{1 - \beta} \left( r + \chi \right) \frac{\kappa}{q(\theta_I)} \]

- Collective Bargaining

\[ w_C = \frac{rV_C^U}{1 + r} + \frac{\beta}{\sigma - 1} \left[ \frac{rV_C^U}{1 + r} + \frac{\kappa}{q(\theta_C)} \left( \frac{r}{1 - \beta} \sigma + \chi \right) \right] \]
Equilibrium

- Market Clearing when share $\mu \in [0, 1]$ of CB firms

$$l = (1 - \mu) \frac{p(y_I)}{P} y_I + \mu \frac{p(y_C)}{P} y_C$$

- Segmented labor markets, workers indifferent between searching in $I$ or $C$ market

$$\frac{rV^U_I}{1 + r} = \frac{rV^U_C}{1 + r}$$

$\Rightarrow$ 2 equilibrium conditions in the two unknowns $(\theta_I, \theta_C)$.

- Once have equilibrium tightnesses, can easily obtain remaining variables.
## Quantitative Results

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>$A$</td>
<td>1.0</td>
<td>normalization</td>
</tr>
<tr>
<td>$r$</td>
<td>0.01</td>
<td>4% annual $r$</td>
</tr>
<tr>
<td>$\eta$</td>
<td>0.50</td>
<td>empirical estimates</td>
</tr>
<tr>
<td>$\beta$</td>
<td>0.50</td>
<td>Hosios condition</td>
</tr>
<tr>
<td>$b/w$</td>
<td>0.30</td>
<td>post-war $b/w \geq 0.40$</td>
</tr>
<tr>
<td>$\chi$</td>
<td>0.118</td>
<td>BLS data</td>
</tr>
<tr>
<td>$\kappa$</td>
<td>0.19</td>
<td>perf. comp. $u = 5.5%$</td>
</tr>
</tbody>
</table>

$\Rightarrow$ all equilibrium variables as functions of $(\mu, \sigma)$
\[ \rightarrow \text{need to pin down time series of } \mu \text{ and } \sigma \]
Collective bargaining wage contains a share of monopoly rents
  - Total surplus depends on profits, so via wage bargaining, workers’ and firms’ incentives to maximize profits are well-aligned
  - By first principles, monopolistic(ally competitive) profits are maximized by restricting output below the socially efficient level.

Under collective bargaining, workers take a share of profits roughly equal to $\mu$ $\rightarrow$ asset values decline

Real wages increase, employment decreases $\rightarrow$ output decreases

Vacancies decrease, tightness increases $\rightarrow$ unemployment rises
Baseline Scenario

<table>
<thead>
<tr>
<th>Year</th>
<th>$\sigma$</th>
<th>Markup</th>
<th>$\frac{\sigma - \beta}{\sigma - 1}$</th>
<th>$\mu$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1913-1918</td>
<td>4.0</td>
<td>16.7%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1919</td>
<td>4.0</td>
<td>16.7%</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>1920</td>
<td>4.0</td>
<td>16.7%</td>
<td>0.50</td>
<td></td>
</tr>
<tr>
<td>1921</td>
<td>4.0</td>
<td>16.7%</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>1922-1924</td>
<td>4.0</td>
<td>16.7%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1925-1926</td>
<td>3.5</td>
<td>20%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1927</td>
<td>3.0</td>
<td>25%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1928</td>
<td>2.5</td>
<td>33.3%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1929</td>
<td>2.3</td>
<td>38.5%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1930</td>
<td>2.3</td>
<td>38.5%</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>1931-39</td>
<td>2.3</td>
<td>38.5%</td>
<td>0.50</td>
<td></td>
</tr>
</tbody>
</table>

$\rightarrow \sigma_{1913-21}$ so that $\Delta \mu$ accounts for 60% of drop in DJ Industrials

$\rightarrow \sigma_{1929}$ so that $\Delta \mu$ plus increase in $\sigma$ accounts for 60% of increase in DJ Industrials
Private Non-Farm GDP

Nonfarm Private GDP: Baseline Scenario

- Blue squares: data 1.8 pc trend
- Green circles: model

Ebell/Ritschl (LSE & HU Berlin)
Real Origins of the Great Depression
May 2010
29 / 43
Unemployment: Baseline Scenario

- Data nonfarm misplaced
- Data nonfarm
- Model

Ebell/Ritschl (LSE & HU Berlin)
Wages: Baseline Scenario

- Data
- Model

Ebell/Ritschl (LSE & HU Berlin)  
Real Origins of the Great Depression  
May 2010
Maximal Scenario

Dow Jones: Maximal Scenario

- data 1.8% trend
- model

Ebell/Ritschl (LSE & HU Berlin)
Real Origins of the Great Depression
May 2010 32 / 43
Nonfarm Private GDP: Maximal Scenario

- Blue squares: data 1.8% trend
- Green circles: model
Maximal Scenario

Unemployment: Maximal Scenario

Data misplaced

Ebell/Ritschl (LSE & HU Berlin)

Real Origins of the Great Depression

May 2010 34 / 43
A Counterfactual

• What if Hoover had vigorously enforced anti-trust, reducing the degree of monopoly power in the economy?

  • Asset prices would have declined
  • Incentives to unionize would have been diminished
  • If switch to CB: less severe recession
  • If stay with IB: no recession, slight expansionary effect
Summary

1. Model accounts well for
   - Early 1920s recession & stock market crash
   - Roaring 1920s expansion & stock market boom
   - Onset of the Great Depression 1929-31

2. Interactions between monopoly power and wage bargaining

3. Crucial difference between individual and collective bargaining is the threat point
   - Measures of union membership either overstate or understate importance of collective bargaining
   - Legal environment more important
   - Hanes (2000, AER) finds that time it took for firms to reduce wages after 1929 (during deflation) positively correlated with sectoral product market concentration
Individual Wage Bargaining - Details

- Nash bargaining problem

\[
\max_{w_I} \mu \ln V_I^W + (1 - \mu) \ln \frac{\partial V_J^I (h_I)}{\partial h_I}
\]

subject to

\[
\frac{\partial V_J^I (h_I)}{\partial h_I} = \frac{\sigma - 1}{\sigma} Ap(y) - w_I - h_I \frac{\partial w_I}{\partial h_I} + (1 - \chi) \frac{\Phi_v}{q(\theta_I)}
\]

\[
V_I^W = w_I - b + \beta (1 - \chi - f_I) V_I^{W'}
\]

- FOC

\[
w_I = (1 - \mu) b + \mu \left[ \frac{\sigma - 1}{\sigma} Ap(y) - h_I \frac{\partial w_I}{\partial h_I} + (1 - \chi) \frac{\Phi_v}{q(\theta_I)} \right] - (1 - \mu)
\]

Conjecture: \( V_I^{W'} \) is independent of \( h_I \) and \( w_I \). Solve first-order linear differential equation (1), then confirm conjecture.
Individual Wage Bargaining - Details

- **FOLDE**
  
  \[ w_I = (1 - \mu) b + \mu \left[ \frac{\sigma - 1}{\sigma} Ap(y) - h_I \frac{\partial w_I}{\partial h_I} + (1 - \chi) \frac{\Phi_v}{q(\theta_I)} \right] - (1 - \mu) \]

- **Solution to FOLDE**
  
  \[ w_I = (1 - \mu) b + \mu \left[ \frac{\sigma - 1}{\sigma - \mu} Ap(y) + (1 - \chi) \frac{\Phi_v}{q(\theta_I)} \right] - (1 - \mu) \frac{1}{1 + r} \]

  (2)

  with

  \[ h_I \frac{\partial w_I}{\partial h_I} = -\frac{\mu \sigma - 1}{\sigma \sigma - \mu} Ap(y) \]

  (3)

  - (3) into firm’s Euler equation
    
    \[ \frac{\Phi_v}{q(\theta)} = \frac{1}{1 + r} \left( \frac{\sigma - 1}{\sigma - \mu} Ap(y') - w' + (1 - \chi) \frac{\Phi_v}{q(\theta')} \right) \]

  - Solve (2) for \( V_I^{W'} \), substitute back into worker’s surplus
(3) into firm’s Euler equation

\[
\frac{\Phi_v}{q(\theta)} = \frac{1}{1 + r} \left( \frac{\sigma - 1}{\sigma - \mu} Ap(y') - w' + (1 - \chi) \frac{\Phi_v}{q(\theta')} \right)
\]

Solve (2) for \( V_l^W \), substitute back into worker’s surplus

\[
V_l^W = \frac{\mu}{1 - \mu} \left( \frac{\sigma - 1}{\sigma - \mu} Ap(y) - w_l + (1 - \chi) \frac{\Phi_v}{q(\theta_l)} \right)
\]

One step ahead

\[
\frac{1}{1 + r} V_l^{W'} = \frac{\mu}{1 - \mu} \frac{1}{1 + r} \left( \frac{\sigma - 1}{\sigma - \mu} Ap(y') - w'_l + (1 - \chi) \frac{\Phi_v}{q(\theta'_l)} \right)
\]

Future surplus depends only on aggregate variables. Search costs depend only on aggregate variables.

Wage curve
Equilibrium Wages

- **Individual Bargaining**

\[ w_I = \frac{rV^U_I}{1 + r} + \frac{\beta}{1 - \beta} (r + \chi) \frac{\kappa}{q(\theta_I)} \]

- **Collective Bargaining**

\[ w_C = \frac{rV^U_C}{1 + r} + \frac{\beta}{\sigma - 1} \left[ \frac{rV^U_C}{1 + r} + \frac{\kappa}{q(\theta_C)} \left( \frac{r}{1 - \beta} \sigma + \chi \right) \right] \]
Market Clearing, share $\mu \in [0, 1]$ of CB firms

$$I = (1 - \mu) \frac{p(y_I)}{P} y_I + \mu \frac{p(y_C)}{P} y_C$$

Yields the first equilibrium condition relating $\theta_I$ and $\theta_C$

$$A^{1-\sigma} = (1 - \mu) \left\{ \frac{\sigma - \beta}{\sigma - 1} \left[ \frac{rV_I^U}{1 + r} + \frac{1}{1 - \beta} (r + \kappa) \frac{\kappa}{q(\theta_I)} \right] \right\}^{1-\sigma}$$

$$+ \mu \left\{ \frac{\sigma}{\sigma - 1} \left[ \frac{rV_C^U}{1 + r} + \left( \frac{1}{1 - \beta} r + \chi \right) \frac{\kappa}{q(\theta_C)} \right] \right\}^{1-\sigma}$$
Segmented labor markets, workers indifferent between searching in $I$ or $C$ market

\[
\frac{rV^U_I}{1 + r} = \frac{rV^U_C}{1 + r}
\]

Yields a second condition relating $\theta_I$ and $\theta_C$

\[
b + \frac{\beta}{1 - \beta} \kappa \theta_I = \frac{r + \chi}{r + \chi - f(\theta_C) \frac{\beta}{\sigma - 1}} b + \frac{f(\theta_C) \frac{\beta}{\sigma - 1}}{r + \chi - f(\theta_C) \frac{\beta}{\sigma - 1}} \kappa \left( \frac{r}{1 - \beta} \sigma + \chi \right)
\]

Equilibrium $(\theta_I, \theta_C)$ pinned down for each $(\mu, \sigma)$ pair.