Why Has the Financial Sector Grown so Much?
The Role of Corporate Finance.

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July 2008
Economic Share of Finance Industry

Year versus Income Share
Within finance

- Subsectors
  - Shares of GDP (fig 2)
  - Value added vs. assets under management (fig 3)
Figure 2: GDP Shares of Finance Industries

Source: U.S. Annual Industry Accounts, Bureau of Economic Analysis
Within finance

- Subsectors
  - Shares of GDP (fig 2)
  - Value added vs. assets under management (fig 3)

- Functional analysis:
  - A trader is a trader
  - tasks performed vs. industry classification (fig4)
Finance Activity related to Corporate Finance.
Within finance

• Subsectors
  – Shares of GDP (fig 2)
  – Value added vs. assets under management (fig 3)

• Functional analysis:
  – A trader is a trader
  – tasks performed vs. industry classification (fig4)

• Bottom line: importance of corporate finance and credit intermediation
Potential explanations

• Globalization
  – Financial globalization starts later
  – Not highly correlated over long period
  – U.S. financial sector is not a large exporter (unlike UK)

• Finance is special ...empirically
  – Different from rest of service industry (see health care in Table 1)

• Finance is special...theoretically
  – Elasticity of substitution not applicable
  – Growth. Neither in theory nor in practice
Taking stock

• Importance of Finance in the economy varies a lot
  – Why? Types of growth?

• Look for an explanation inside the domestic corporate non financial sector
  – Fundamental determinants of finance share of income?

• Need a model to organize the data
  – Explicit role for financial intermediation
  – Career choice & general equilibrium
Technology and Preferences

- Overlapping generations of risk neutral agents

\[ U_t^i = E_t \left[ C_t^i + \frac{C_t^{i+1}}{1 + \rho} \right] \]

- Agent chooses a career in the first period of her life
  - Each cohort of size 1

- Two sectors
  - Industrial sector: \( n_t \)
  - Financial sector: \( 1 - n_t \)
existing capital: $k_t$

generation born at $t$
existing capital: $k_t$

current output: $F(\alpha n_t, k_t)$

indiv. prod. $\alpha^i$

$nt$

generation born at $t$

$1-n_t$
existing capital: $k_t$

current output: $F(\alpha n_t, k_t)$

indiv. prod. $\alpha^i$

$n_t$

generation born at $t$

$1-n_t$

fraction $\pi$ gets idea

- rich enough

new projects

productivity $\theta$

new capital $k_{t+1}$
existing capital: $k_t$

current output: $F(\alpha n_t, k_t)$

indiv. prod. $\alpha^i$

$\pi$ gets idea
- rich enough
- too poor

new projects

productivity $\theta$

fraction $\pi$ gets idea

Simple MH and monitoring

new capital $k_{t+1}$

financial sector

productivity $\mu$

generation born at $t$

$\pi$ gets idea

rich enough

too poor

Simple MH and monitoring

financial sector

productivity $\mu$

new capital $k_{t+1}$

fraction $\pi$ gets idea

rich enough

too poor

Simple MH and monitoring

financial sector

productivity $\mu$
Savings

existing capital: $k_t$

current output: $F(\alpha n_t, k_t)$

indiv. prod. $\alpha^i$

fraction $\pi$ gets idea

- rich enough
- too poor

new capital $k_{t+1}$

new projects productivity $\theta$

generation born at $t$

$n_t$

$1-n_t$

financial sector productivity $\mu$
Demand for fin. services

existing capital: $k_t$

current output: $F(\alpha n_t, k_t)$

indiv. prod. $\alpha^i$

$n_t$

generation born at $t$

fraction $\pi$ gets idea

• rich enough
• too poor

1-$n_t$

financial sector

productivity $\mu$

new capital $k_{t+1}$

new projects productivity $\theta$

joint dist. innovative ideas & current income
Supply of financial services

existing capital: $k_t$

current output: $F(\alpha n_t, k_t)$
indiv. prod. $\alpha^i$

fraction $\pi$ gets idea
- rich enough
- too poor

new projects
productivity $\theta$
but $e_t < \pi n_t$

new capital $k_{t+1}$

financial sector
productivity $\mu$

generation born at $t$

$1-n_t$
Equilibrium without Financial Intermediation
Equilibrium without Moral Hazard

New projects

Investment

Savings

r
Equilibrium with Moral Hazard

New projects

Savings

Investment
Equilibrium Financial Intermediation

- Career Choice

\[ \mu\phi = \bar{\alpha} + \pi \left(1 - F^\theta (\alpha_h)\right) v + \pi \int_{\alpha_l}^{\alpha_h} (v - \phi m (\alpha)) \, dF^\theta (\alpha) \]

- Monitoring Market Clearing

\[ \mu (1 - n) = \pi n \int_{\alpha_l}^{\alpha_h} m (\alpha) \, dF^\theta (\alpha) \]
Figure 9: Equilibrium With Monitoring

Density function $f^0(\alpha)$

Constrained

Invest

0 $\alpha_l$ $\alpha_h$ 1

Monitored Finance

Direct Finance

Self-Finance
Theoretical Comparative Statics

Proposition.

- The income share of the financial sector is constant on the balanced growth path.

- For a given interest rate, the income share of finance is independent of the growth rate of the economy.

- The size of the financial sector goes to zero when its efficiency becomes either very small or very large.

- Efficiency gains in finance reduce rationing and increase investment, but have an ambiguous effect on the GDP share of the finance industry.
Estimation of model parameters

- Moments
  - Investment share of low cash firms:
    \[ s = \frac{F^\theta (0.33) - F^\theta (\alpha_l)}{1 - F^\theta (\alpha_l)} \]
  - Investment share of GDP
  - Corporate CMI over GDP
  - Corporate finance share of GDP
### Table 1: Data

<table>
<thead>
<tr>
<th>Period</th>
<th>Finance Share of Compensation</th>
<th>Investment Share of Firms with Income&lt;0.33*Capex</th>
<th>Non Financial Corporate Credit Market Instruments over GDP</th>
<th>Health Care Share of Compensation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1927-1931</td>
<td>5.03%</td>
<td>28.51%</td>
<td>58.79%</td>
<td>0.87%</td>
</tr>
<tr>
<td>1937-1941</td>
<td>4.07%</td>
<td>17.92%</td>
<td>49.24%</td>
<td>0.96%</td>
</tr>
<tr>
<td>1947-1955</td>
<td>2.99%</td>
<td>14.61%</td>
<td>30.24%</td>
<td>1.21%</td>
</tr>
<tr>
<td>1956-1965</td>
<td>3.77%</td>
<td>18.61%</td>
<td>37.27%</td>
<td>1.76%</td>
</tr>
<tr>
<td>1966-1975</td>
<td>4.12%</td>
<td>20.41%</td>
<td>47.34%</td>
<td>3.11%</td>
</tr>
<tr>
<td>1976-1985</td>
<td>4.77%</td>
<td>25.85%</td>
<td>52.44%</td>
<td>5.27%</td>
</tr>
<tr>
<td>1986-1995</td>
<td>5.87%</td>
<td>35.37%</td>
<td>60.41%</td>
<td>7.89%</td>
</tr>
<tr>
<td>1996-2005</td>
<td>7.13%</td>
<td>39.41%</td>
<td>62.38%</td>
<td>8.85%</td>
</tr>
</tbody>
</table>

Notes: Finance Share is the compensation of employees in the Finance and Insurance industry divided by the compensation of all employees. Investment share of low cash firms is the fraction of all capital expenditures in Compustat accounted for by firms whose income is less than one third of their capital expenditures. Before 1955, the investment share of low cash firms is estimated from turnover of industry leaders using CRSP. Before 1952, non financial corporate credit market is estimated using total corporate credit. Sources: National Income and Product Accounts, Annual Industry Accounts, CRSP, Compustat, Flow of Funds, and Historical Statistics of the United States.
Table 2: Estimation of Model Parameters

<table>
<thead>
<tr>
<th>Empirical Moments (1956-1965)</th>
<th>Share of Compensation for Corporate Finance Services</th>
<th>Investment Share of Firms with Income&lt;0.33*Capex</th>
<th>Non Financial Corporate Credit Market Instruments over GDP</th>
<th>Aggregate Investment over GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.26%</td>
<td>18.61%</td>
<td>37.27%</td>
<td>11%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Implied Parameters</th>
<th>z/θ</th>
<th>μ/π</th>
<th>E[α]/π</th>
<th>α^θ</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.74</td>
<td>4.22</td>
<td>5.38</td>
<td>1.27</td>
</tr>
</tbody>
</table>

Notes: See Table 1 for a description of the data. Share of Compensation for Corporate Finance Services is 0.6 times the Share of Finance. The aggregate investment to GDP ratio is set at its post war average. Notice that 1-0.5α^θ is the financing need for the median potential entrepreneur. Source: National Income and Product Accounts, Compustat, and Flow of Funds, NBER.
Testing model predictions

• Calibrate to 1960. Keep $(z, \theta, \pi, \bar{\alpha})$ constant
Testing model predictions

• Calibrate to 1960. Keep \((z, \theta, \pi, \bar{\alpha})\) constant

• Inputs
  – Investment share of low cash firms
  – Aggregate investment rate
Table 3: Testing the Model’s Predictions

<table>
<thead>
<tr>
<th>Time Period</th>
<th>$z/\theta$</th>
<th>$E[\alpha]/\pi$</th>
<th>Investment Share of Low Cash Firms</th>
<th>Aggregate Investment over GDP</th>
<th>$\mu/\pi$</th>
<th>$\alpha^\theta$</th>
<th>Predicted Values</th>
<th>Realized Values</th>
<th>Extra Prediction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1927-1931</td>
<td>0.74</td>
<td>5.38</td>
<td>28.5%</td>
<td>11.0%</td>
<td>4.52</td>
<td>0.94</td>
<td>3.29%</td>
<td>53.6%</td>
<td>3.52%</td>
</tr>
<tr>
<td>1937-1941</td>
<td>0.74</td>
<td>5.38</td>
<td>17.9%</td>
<td>10.0%</td>
<td>3.18</td>
<td>0.94</td>
<td>2.41%</td>
<td>41.3%</td>
<td>2.57%</td>
</tr>
<tr>
<td>1947-1955</td>
<td>0.74</td>
<td>5.38</td>
<td>14.6%</td>
<td>10.9%</td>
<td>3.87</td>
<td>1.41</td>
<td>1.87%</td>
<td>31.3%</td>
<td>1.48%</td>
</tr>
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<td>1956-1965</td>
<td>0.74</td>
<td>5.38</td>
<td>18.6%</td>
<td>11.0%</td>
<td>4.22</td>
<td>1.27</td>
<td>2.26%</td>
<td>37.3%</td>
<td>2.26%</td>
</tr>
<tr>
<td>1966-1975</td>
<td>0.74</td>
<td>5.38</td>
<td>20.4%</td>
<td>11.2%</td>
<td>4.60</td>
<td>1.29</td>
<td>2.41%</td>
<td>39.3%</td>
<td>2.61%</td>
</tr>
<tr>
<td>1976-1985</td>
<td>0.74</td>
<td>5.38</td>
<td>25.8%</td>
<td>11.1%</td>
<td>4.59</td>
<td>1.04</td>
<td>3.00%</td>
<td>48.9%</td>
<td>3.26%</td>
</tr>
<tr>
<td>1986-1995</td>
<td>0.74</td>
<td>5.38</td>
<td>35.4%</td>
<td>10.8%</td>
<td>4.42</td>
<td>0.77</td>
<td>4.01%</td>
<td>61.0%</td>
<td>4.36%</td>
</tr>
<tr>
<td>1996-2005</td>
<td>0.74</td>
<td>5.38</td>
<td>39.4%</td>
<td>11.2%</td>
<td>4.90</td>
<td>0.76</td>
<td>4.44%</td>
<td>67.2%</td>
<td>5.62%</td>
</tr>
</tbody>
</table>

Notes: See Table 1 and 2 for a complete description of the data. The moral hazard and technology parameters are estimated in 1956-1965 (see Table 2), and are kept constant over time. The two implied parameters (efficiency of financial intermediation and structural financing needs of entrepreneurs) are estimated by matching two time-varying inputs: investment over GDP and the investment share of low cash firms. The model is then used to predict the size of the credit market and the share of income devoted to corporate finance services. The actual values are from Table 1. The corporate finance income share is the finance income share minus a fixed fraction of 1.51% corresponding to other financial services.
Figure 6: Investment Shares of Low Cash Firms

Notes: Sum of capital expenditures by firms whose income is less than 15%, 25% or 33% of their capital expenditures, divided by the sum of capital expenditures by all the firms in the sample.
Source: Author’s calculations, Compustat sample of non financial firms.
Testing model predictions

- Calibrate to 1960. Keep \((z, \theta, \pi, \bar{\alpha})\) constant

- Inputs
  - Investment share of low cash firms
  - Aggregate investment rate

- Implied parameters & historical interpretation
Figure 10: Implied Structural Parameters

Notes: The efficiency index is $\mu/\pi$ normalized to one in 1956-1965. The demand index is the external finance needed for the median project, $1-\alpha^0/2$. 
Testing model predictions

• Calibrate to 1960. Keep \((z, \theta, \pi, \bar{\alpha})\) constant

• Inputs
  – Investment share of low cash firms
  – Aggregate investment rate

• Implied parameters & historical interpretation

• Quantitative predictions: fin. size and credit market
Figure 11: Predicted Size of Financial Sector

Notes: Actual share is income share of finance and insurance minus the fraction that does not reflect corporate finance services (see Table 3). Predicted value constructed from estimated model using aggregate investment rate and s33 (investment share of low cash firms, and its predicted value before 1955) as inputs.
Figure 12: Predicted Size of Credit Market

Notes: Corporate non financial credit market instruments from the Flow of Funds (1952-2006) over GDP. Before 1952, predicted value using total corporate debt from Historical Statistics of the United States. Predicted value constructed from estimated model using aggregate investment rate and s33 (investment share of low cash firms, and its predicted value before 1955) as inputs.
## Table 4: Counter-Factual Experiments

<table>
<thead>
<tr>
<th></th>
<th>$\mu/\pi$</th>
<th>$\alpha^0$</th>
<th>Corporate Finance Income Share</th>
<th>Fraction of Constrained Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starting Values (from model)</td>
<td>4.22</td>
<td>1.27</td>
<td>2.26%</td>
<td>9.04%</td>
</tr>
<tr>
<td>Final Values (from model)</td>
<td>4.90</td>
<td>0.76</td>
<td>4.44%</td>
<td>6.47%</td>
</tr>
<tr>
<td>Predicted by demand shift only</td>
<td>4.22</td>
<td>0.76</td>
<td>3.90%</td>
<td>13.91%</td>
</tr>
<tr>
<td>Predicted by efficiency gains only</td>
<td>4.90</td>
<td>1.27</td>
<td>2.60%</td>
<td>4.61%</td>
</tr>
</tbody>
</table>

Notes: Starting values correspond to 1956-1965. Final values correspond to 1996-2005. See Table 3. The model is non linear, so the effects are not additive.
Conclusion

- Financial services in equilibrium
  - Time varying needs

- A macro view on credit constraints

- Next steps
  - Dynamic model with endogenous growth
  - Open economy
  - Households
  - Efficiency of allocation