Financial Development and Growth

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Questions

- Huge literature on growth.
- A large fraction of this ignores the role of finance

1) Does financial development affect aggregate growth?
2) How does it do it? Mechanisms
   - Allocation of resources
   - Income distribution/poverty
   - Business cycle fluctuations
   - Composition of industry/ source of comparative advantage
   - Size distribution of firms?
   - Response to shocks?
4) Local or global financial development?
5) Which aspects of financial development matters and when
   - Banks,
   - markets,
   - venture capital

1. Does financial development affect aggregate growth?

Functions of a financial system

1) Risk sharing
   1) Cross-section
      - Risk vs. uncertainty (the role of insurance)
   2) Temporal smoothing
   3) Decompose controllable risk from uncontrollable risk
2) Intermediation of funds from units with an excess of funds to sectors in need.
   1) creator - identify investment opportunities
   2) preserver - monitoring investments
   3) destroyer - subtract resources at right time

Finance and Growth: Early Evidence

Goldsmith (1969) compile data on 35 countries over the period 1860 to 1963 on the value of financial intermediary assets as a share of economic output.

He measures financial development as the size of the financial intermediary sector.

He graphically documented a positively correlations between financial development and the level of economic activity.

He recognizes that he cannot distinguish between correlation and growth

He is unable to provide much cross-country evidence because of the absence of data for a broad range of countries.

Finance and Growth: Causation or Correlation?

Why don't financial markets appear on demand?

- Set up costs -- Railways in U.S.
- Liquidity
  - Liberty Bonds in World War I
  - Junk bond markets
- Time to build (Rajan, 1998):
  - Reputations
  - Institutions (credit rating agencies)(e.g. Merton, 1995)
  - Knowledge (how to do credit scoring)
- Financial and legal innovation

Example of financial innovation: Limited liability

The economic historian of the future may assign to the nameless inventor of the principle of limited liability, as applied to trading corporations, a place of honor with Watt and Stephenson, and other pioneers of the Industrial Revolution. The genius of these men produced the means by which man's command of natural resources was multiplied many times over; the limited liability company, the means by which huge aggregations of capital required to give effect to their discoveries were collected, organized, and efficiently administered.

The Economist, December 18, 1926

First Modern Approach

- Post hoc ergo propter hoc
- King and Levine (1993): beginning-of-decade measures of a country's financial development
  - the ratio of liquid liabilities of the financial system to GDP
  - the share of domestic credit allocated by banks
  - the ratio of domestic credit to private enterprises to GDP

  are strongly related to the country's subsequent economic growth, capital accumulation, and productivity growth.

Table 1: Growth and Financial Intermediary Development, 1960-89

Dependent Variable	Depth	Bank	Privy
Real per Capita GDP Growth	2.4**	3.2**	3.2**
	(0.007)	(0.005)	(0.002)
R^2	0.50	0.50	0.52
Real per Capita Capital Growth	2.2**	2.2**	2.5**
	(0.006)	(0.008)	(0.007)
R^2	0.65	0.62	0.64
Productivity Growth	1.8**	2.6**	2.5**
	(0.026)	(0.010)	(0.006)
R^2	0.42	0.43	0.44

Source: King and Levine (1993b), Table VII

Table 2: Growth and Initial Financial Depth, 1960-89

Dependent Variable	Depth in 1960
Real per Capita GDP Growth, 1960-89	2.8**
	(0.001)
R^2	0.61
Real per Capita Capital Growth, 1960-89	1.9**
	(0.001)
R^2	0.63
Productivity Growth, 1960-89	2.2**
	(0.001)
R^2	0.58

Problems with first approach

- Anticipation: Debt to GDP ratios can be seen as macro market-to-book ratios, which are well know to predict (not cause) future growth.
- Omitted Variables: good financial system is correlated with good institutions. How can we tell a part with so few data points?
- No direct evidence of the causal link: many mechanisms through which financial development can cause growth, which one is important?

Solutions

- Anticipation:
  - Panel estimation: (Levine 2003, Beck, Levine,and Loayza, 2000)
  - Instrumental Variables" Rajan and Zingales (1998)
- Omitted Variables:
  - Natural Experiments: Jayaratne and Strahan (1996), Guiso et al. (2004), Bekaert et al.(2001, 2002).
  - Within country evidence: Rajan and Zingales (1998)
- No direct evidence of the causal link:
  - Industry based evidence: Rajan and Zingales (1998), Demirguc Kunt and Maksimovic (1998))
  - Firm-based evidence: Guiso et al. (2004)

Panel Estimation

- Beck, Levine, and Loayza (2000) use a GMM estimator developed for panel data. This approach improves upon pure cross-country work in 3 ways:

1. Ability to exploit both the time-series and cross-sectional variation in the data
2. Control for the unobserved country-specific effect
3. Use internal" instruments (instruments based on previous realizations of the explanatory variables) to consider the potential joint endogeneity of the other regressors as well

GMM Dynamic Panel Estimation

- In sum:

$$y_{i,t} = \gamma y_{i,(t-1)} + x_{i,t}^{'}\beta + \eta_i + \varepsilon_{i,t}$$

Where x' is a (K-1)×1 vector of exogenous regressors and $\varepsilon_{i,t} \sim N(0,\sigma_\varepsilon^2)$. The fixed-effects model generates a biased estimate of the coefficients (the bias $\to 0$ as T $\to$large).

To solve the bias problem, remove the fixed effects taking differences.

$$(y_{i,t} - y_{i,(t-1)}) = \gamma(y_{i,(t-1)} - y_{i,(t-2)}) + (x_{i,t}^{'} - x_{i,t-1}^{'})\beta + (\varepsilon_{i,t} - \varepsilon_{i,t-1})$$

- However, the errors are now correlated with the one of the independent variables $(y_{i,(t-1)} - y_{i,(t-2)})$
- Solution is to instrument it:
  - With $y_{i,(t-2)}$ (Andersen-Hsiao)
  - With $(y_{i,(t-2)} - y_{i,(t-3)})$

Mankiw's critique

- Mankiw (1995) identifies the following three problems with the existing cross-country methodology:

1) It is difficult to interpret observed correlations in cross-country regressions in a causal sense.
2) Variables are multi-collinear and are measured with error.
3) Limited degrees of freedom: -- there are fewer than 200 countries on which the myriad theories have to be tested.

Rajan and Zingales (1998):

- RZ (98) address all these three problems by looking at the micro evidence in a panel of industries-countries.
- They use data on 36 industries across 42 countries.
- Main Idea: Financial sector facilitates the reallocation of funds from agent with an excess of funds to agents with a deficit of funds.
- This function is particularly important when the mismatch between resources and opportunities is large.
- If financial development matters, then it should matter relatively more for those firms with a shortage of internal funds with respect to the profitable investment opportunities.

Rajan and Zingales (1998) – 2 :

- If we are able to identify a priori which firms are in a cash shortage, then we can test the following proposition:

"industrial sectors that are relatively *more in need* of external finance develop <u>disproportionately faster</u> in countries with *more developed* financial markets"

$$Growth_{i,k} = \sum_j \alpha_j Country_j + \sum_I \beta_I Industry_I + \gamma Share_{i,k} + \delta_1 (External_k * FD_1) + \varepsilon_{i,k}.$$

How Do They Identify the Demand for Funds?

- In a perfect capital market, supply of funds is infinitely elastic at the ``proper'' cost of capital.
- In such a case observed amount of funds raised = demand of external funds
- Pick the most developed and least imperfect capital market: the U.S.
- Use the demand of funds of U.S. firms as a proxy for the actual demand of funds of similar firms in other countries
- We define the need for external funds or ``external dependence" as the fraction of investments not financed by funds generated from operations in each industry.

Table 1:

Pattern of external financing and investment across industries in the U.S. during the 1980s

Measure of Financial Development:

- Consistent with earlier studies in this literature (e.g., King and Levine (1993)) they start using:
  - Ratio of Stock Market Capitalization to Gross Domestic Product
  - Ratio of Domestic Credit To Private Sector to GDP to Gross Domestic Product
- As a basic measure they sum these two measures. This roughly represents the total amount of intermediation of funds to finance an economy.
- They then use Accounting Standards and they also instrument it with legal variables

Industry Growth and Financial Development

Growth of value added of industry k in country i, 1980-1990

$External_k$ * Total Capitalization$_i$	$External_k$ * Accounting Standards$_i$	R^2	Observations
0.069 (0.023)		0.29	1217
	0.155 (0.034)	0.35	1067

Source: Rajan and Zingales (1998), Table 4.

Table 4:

Industry growth and various measures of development.

Variable	I	II	III	IV	V	VI
Industry's share of total value added in manufacturing in 1980	-0.912 (0.246)	-0.899 (0.245)	-0.643 (0.204)	-0.587 (0.223)	-0.433 (0.135)	-0.648 (0.203)
Interaction (external dependence X total capitalization)	0.069 (0.023)				0.012 (0.014)	
Interaction (external dependence X domestic credit to private sector)		0.118 (0.037)				
Interaction (external dependence X accounting standards)			0.155 (0.034)		0.133 (0.034)	0.165 (0.044)
Interaction (external dependence X accounting standards 1983)				0.099 (0.036)		
R-squared	0.290	0.290	0.346	0.239	0.419	0.346
Number of observations	1217	1217	1067	855	1042	1067
Differential in real growth rate (%)	1.3	1.1	0.9	0.4	1.3	1.0

Allocation of resources

TABLE 5—EFFECT OF FINANCIAL DEVELOPMENT ON ACTUAL GROWTH RATES IN DIFFERENT INDUSTRIES

	Countries below the median in accounting standards	Countries above the median in accounting standards
Least financially dependent industries		
Tobacco	0.53	−0.60
Pottery	0.25	−0.30
Leather	0.77	−0.77
Most financially dependent industries		
Drug	−1.11	1.30
Plastics	−0.21	0.21
Computers	−2.00	1.80

Notes: This table reports the mean residual growth rate (in percentage terms) obtained after regressing the annual compounded growth rate in real value added for the period 1980–1990 on industry and country dummies.

Methodological Contribution

1) Two steps forward in the causality debate:
   - Using theory to identify the mechanisms through which financial development affects growth
   - Using instrumental variables
2) By controlling for country fixed effects they eliminate the multicollinearity problem
3) By using the industry variation, expand degrees of freedom, allowing to test more theories and more sophisticated implication of theories.

Natural Experiment

- Jayaratne and Strahan (1996) innovate in three dimensions:
  - Focus on within country differences (U.S.)
  - They use a new measure financial development: bank deregulation
  - The variation in their measure of financial development is "exogenous" (political decision)
- Different states deregulated at different times: perfect from an econometric point of view.
- Annual growth rates increased by 0.51 to 1.19 percent per year in states that de-regulated banking.

Natural Experiment –2

- What caused deregulation?
  - Is expected growth that increases the potential demand for loans and hence the political demand for deregulation?
  - If so, loan to GDP ratio should go up after deregulation.
  - Jayaratne and Strahan (1996) show it does not. It is only the ratio of losses to loan that goes down. (improved efficiency)
- Similarly, Bekaert et al. (2001, 2002) use financial liberalization (opening of equity markets to foreign participation) to examine the impact of financial development on economic growth.

Understanding more the aggregate effect

1) Measures of financial development
2) Mechanism through which it works
3) Does <u>domestic</u> financial development matter?

1) Measures of financial development

- Major improvements in how financial development is measured
- Still quite far from what theory would suggest and not obviously correlated with that.
- JS (1996) document no increase in loans after deregulation of the banking sector
- But a decrease in the non performing loans
- Did financial development increase?

Measures of financial development

- Guiso, Sapienza, and Zingales (GSP) (2004) address this issue.
- They measure FD as the local variability in access to credit per given characteristics
- What about systematic overlending?
- They control for local level of loan losses
- Thus, they measure not just the access to credit, but also the "right" access to credit.

Indicator of local fin. dev. -1

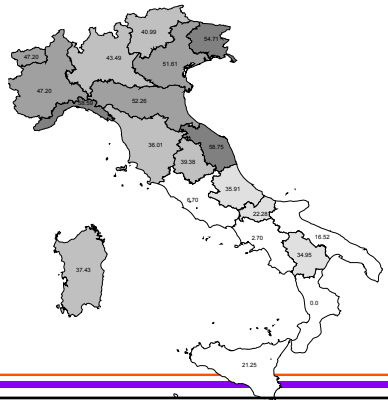
- GSZ estimate a linear probability model of the likelihood a household is shut off from the credit market. The sample includes only "households at risk".
- Explanatory variables:
  - household income (linear and squared),
  - household wealth (linear and squared),
  - number of people in household,
  - number of kids in household,
  - households head age (linear and squared),
  - education (number of years of schooling)
  - indicator variables for whether the head is married, is a male, for the sector in which he works, and for the level of job he has
  - calendar year dummies
  - percentage of firms that go bankrupt
  - Fraction of non performing loans to total loans in the province
  - regional dummies

Indicator of local fin. dev. -2

- The coefficients on regional dummies are indicators of financial underdevelopment
- For ease of interpretation this is transformed in the following way
  - 1 – Conditional Probability of Rejection/
  - Max{Conditional Probability of Rejection}.

Indicator of local fin. dev. –3

Region	Coefficient on regional dummy	Normalized measure of financial development
Marche (C)	0.117779	0.587475
Liguria (N)	0.118225	0.585912
Emilia (N)	0.136291	0.522636
Veneto (N)	0.13815	0.516125
Piemonte (N)	0.150737	0.472038
Trentino (N)	0.155007	0.457084
Lombardia (N)	0.161345	0.434883
Friuli ven. (N)	0.168468	0.409936
Umbria (C)	0.171919	0.397846
Sardegna (S)	0.178635	0.374325
Toscana (C)	0.182688	0.360131
Abruzzo (S)	0.182972	0.359135
Basilicata (S)	0.186578	0.346504
Molise (S)	0.21475	0.247832
Sicilia (S)	0.224546	0.213521
Puglia (S)	0.23835	0.165173
Lazio (S)	0.26639	0.066959
Campania (S)	0.277784	0.027051



Possible Objection

Our measure captures geographical clustering of individual characteristics

- Unobserved both to the lender and the econometrician (e.g., honesty) -> fine
- Unobserved to the econometrician but observed by the lender (e.g.,energy) -> problem

-> Instrument this measure with "exogenous" changes in financial development

1. "natural experiment" banking regulation in 1936 driven by political considerations
2. Use R-Z method to exclude other possible omitted factors
   - » Larger firms depend less on local F.D.

Why in the QJE? Clever Instruments

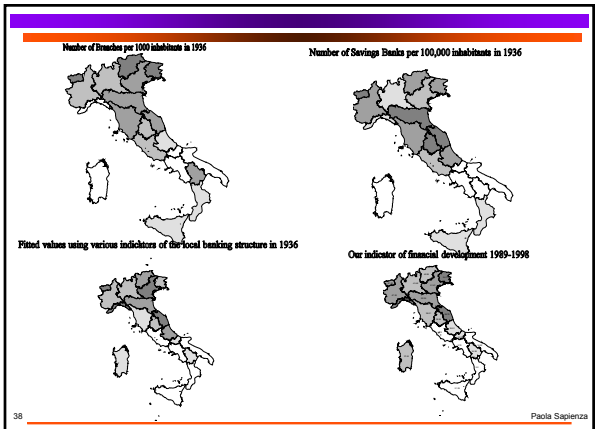
- After the 1933 financial crisis a new banking regulation was put in place.
- The law passed in 1936 and abolished in the 1990s froze the local banking markets as they were in 1936.
- Discriminated across types of banks (depending on their charter) on the ability to open new branches. Favored local banks over national banks and savings banks over other local banks
- Regions that had more branches as 1936, that had more local banks as of 1936 (and relatively less "popular banks" among the local banks) did better in the subsequent 60 years.
- From 1936 till 1984 banks could not lend outside the areas where they had branches. This regulation removed in 1984, allowing banks to lend outside their area.

Instruments

- We use as instrument the regional characteristics of the banking system as of 1936:
  - the number of total branches (per million inhabitants) present in a region in 1936. Since local banks had more flexibility to grow than national banks, we also control for the fraction of branches owned by local versus national banks. Finally, since among the local banks savings banks had more flexibility to grow than cooperative banks, we separately control for the number of savings banks and number of cooperative banks per million inhabitants.

Instruments

	Financial development
Branches per million inhabitants in the region in 1936	0.0006*
	(0.0003)
Fraction of branches owned by local banks in 1936	0.6121***
	(0.1758)
Number of savings banks per million inhabitants in the region: 1936	0.0182*
	(0.0088)
Number of cooperative banks per million inhabitants in the region: 1936	-0.0186***
	(0.0049)
Constant	-0.1230
	(0.1172)
Observations	19
R-squared	0.720



2) Mechanism

Mechanism

- We still have to learn about the mechanism through which finance work.
- Is by stimulating savings, reducing the cost of capital, improving allocation, reducing wastes or all the above?
- Rajan and Zingales (1998): improvement in allocation is important
- So suggest Jayaratne and Strahan (1996)
- Need to look more at the microeconomic evidence

Mechanism -2

GSZ (2004) traces the effect from the micro evidence to the macro evidence

- Effect on entrepreneurship -> effect on firm entry ->effect on competition
- Effect on firm growth -> effect on local growth

Mechanism -2

- GSZ(2004):
  - Self employment: (probability to be self employed)
    - » Moving from the most financially underdeveloped region to the most financially developed increases a person's probability to start his own business by **5.6 percentage points** (40% of the sample mean)
  - Age of entrepreneurs: (average entrepreneurial age in the area)
    - » Moving from the most financially underdeveloped region to the most developed lowers the average age by **5 years**
  - Firm creation & number of firms in a province:
    - » Moving from the most financially underdeveloped region to the most financially developed
      - increases the ratio of new firms to population by **.46** (1 firm every 200 inhabitants)
      - the total number of firms by **2.8 firms per 100** people

Mechanism -3

- More GSZ (2004)
  - Competition: (profit margin at the firm level)
    - » firms in the most financially developed region have a mark up **1.8 percentage points lower** than in the least financially developed region, i.,e., 31% below the sample mean
  - Firm's Size:
    - » Not a significant effect. A priori ambiguous. More entry lower size; faster growth implies larger size
  - Firm's Growth:
    - » FD allows to grow beyond what internal funds warrant (Maximum rate of growth internally financed = ROA/(1-ROA))

Summary so far

1) Does financial development affect aggregate growth?

Very little doubt now.

2) How does it do it?

Clear evidence of the role in

i) intermediating funds

ii) Improvement in the efficiency of the allocation of funds

3) Does it affect other dimensions we care about?

- Still very active area of research

More on mechanisms

- Effects on poverty
- Effects on convergency
- Effects trade
- Other effects

3) Domestic F.D.?

Domestic FD? - 1

- All the evidence comes from a period when cross-border capital movements were very limited.
- In the last decade, international capital mobility has exploded.
- Does *domestic* financial development matters when there is capital mobility?
- Levine's survey is silent on this important point.

Domestic FD? - 2

- This is not an easy issue.
- No matter how updated the time period is, the skeptic can always claim that we are in a transitional phase and when capital is perfectly mobile across countries, domestic financial development will be irrelevant
- Guiso et al. (2004) try an alternative approach
- Study the effect of *local* financial development within a single country.
- If this matters, a fortiori domestic financial development will matters.
- We find it does.

Topics still in need for research

- Which aspect of financial development is more important and where?

1) Banks vs market vs VC

2) Negative effects of financial development (a lot of recent opportunities – more later)

3) Causes of financial development

Conclusions

- Broad consensus that finance affects growth.
- Less broad consensus on how and when