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Presentation to

"By a Silken Thread: regional banking integration and pathways to financial development in Japan's Great Recession"

By a Silken Thread: regional banking integration & pathways to financial development in Japan's Great Recession

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Background

- Current Financial Crisis has two historical precedents: the Great Depression and Japan's Great Recession ('Lost Decade')
- Which is more relevant?
  - Worst declines seem to have been averted, so comparison with Great Depression seems somewhat less relevant now than it first appeared.
  - But problems are far from over: sluggish growth in the US and elsewhere, balance sheets of banks continue to be weak, continued monetary and fiscal stimulus needed to prop up financial sector (QE2, Euro crisis etc)
  - Also: casual observation suggests much regional and cross-country heterogeneity in the impact of the crisis.
  - That's what we saw in the last two decades in Japan. The current crisis seems to be 'japanifying', making the analysis of Japan's experience seems more relevant than ever.

Our story

- We analyze the regional spread of Japan's great recession (GR).
- Specifically: look at how regional variation in credit demand affected patterns in regional business cycles and growth.
- Two dimensions to the identification:
  - Demand for finance.
    - ★ regional differences in external finance-dependence as a way to identify differences in the exposure to the common shock (i.e. the 1990 burst of the housing and stock bubble). (Rajan and Zingales (1998))
    - ★ Here: use small manufacturing firms to identify such differences.
- Supply dimension: focus on regional financial (specifically: banking) integration in the recession.

Our story (I): financial frictions made worse

- Interaction between D&S: Better financial integration facilitates small firm access to finance.
  - recession deeper and longer in prefectures with many small (credit-dependent) firms
  - link between SME importance and recession severity stronger in prefectures that are less financially integrated with the rest of the country
  - Transmission seems to work through reduced lending in less integrated prefectures by City (i.e.: nationwide) banks.

Our story (I): intra-national barriers to capital flows

- Note: Japan is centralized country, no regional differences in banking or financial regulation etc. but there is a regionally tiered banking system
  - city banks & 1st tier regional banks $\rightarrow$generally operate nationwide
  - 2nd tier regional banks (Sogo banks), industrial cooperative banks (Shinkin) + agricultural and consumer cooperatives $\rightarrow$ regional lenders & regional deposit base
- Our measure of financial (banking sector) integration: share of regional vs. city (nationwide) banks in prefecture-level lending

Our story (II): how we got here matters

- What are the deep sources of prefecture-level differences in financial integration?
- We argue that there are important differences in the historical pathways to financial development that lead to different levels of financial integration.
  - Opening of Japan in mid-19th century lead to emergence of silk as first export staple
  - silk is an fragmented industry with many small firms, cut off from direct bank finance. At the same time, extreme need for trade credit / working capital in silk reeling industry.
  - Emergence of industrial cooperatives associations that provided credit, organized quality control and led mechanization of the silk reeling industry.
  - We use # of (mechanized) reeling plants (filatures) as an instrument for the market share of regional banks in the 1980s

Data set

- Panel data set for 47 prefectures. Drop Okinawa.
- GDP, Consumption p.c.
- Lending by type of bank by prefecture, 1964-96
- Data on small manufacturing firms by prefecture, employment and value added from the 'Manufacturing Census'. Here focus on SMEs with <300 employees. (This is also the cut-off value for Shinkin membership).
- Data on bankruptcies by prefecture, by firm size and cause 1983-2005.
- ....

Empirical framework.

1. Sample Splits by high/low FI

$$\Delta gdp_t^k = \alpha AggShock_t \times SME^k + \mu^k + \tau_t + \epsilon_t^k \quad (1)$$

—

2. Interaction Regressions

$$\begin{aligned} \Delta gdp_t^k &= AggShock_t \times \left[\alpha_0 SME^k + \alpha_1 FI^k + \alpha_2 FI^k \times SME^k + ...\right] \\ &\quad + \mu^k + \tau_t + \epsilon_t^k \end{aligned} \quad (2)$$

where

$$AggShock_t = Post1991_t \text{ or } AggShock_t = Post1991_t \times \Delta gdp_t$$

Table: Small business importance, financial integration and the Great Recession

Small manufacturing firms and the effect of the Great Recession on prefecture-level output growth rates

Panel A: Based on value added SME-measure

	All prefectures	Sample split by importance of ...					
		Regional Banks		City Banks		Regional Banks: Shinkins only	
		high	low	high	low	high	low
$Post1991_t \times SME^k_{VA}$	-0.07	-0.13	-0.01	-0.0140	-0.12	-0.12	-0.03
	(-2.04)	(-4.04)	(-0.19)	(-0.25)	(-3.82)	(-3.03)	(-0.70)
R^2	0.55	0.56	0.58	0.6042	0.53	0.57	0.552

Panel B: Based on employment based SME-measure

	All prefs.	high	low	high	low	high	low
$Post1991_t \times SME^k_{EMP}$	-0.08	-0.15	0.01	-0.002	-0.15	-0.15	-0.04
	(-1.96)	(-3.73)	(0.01)	(-0.02)	(-3.78)	(-4.06)	(-0.64)
R^2	0.55	0.55	0.58	0.60	0.53	0.55	0.5866

The table shows the coefficient α in panel regressions of the form $\Delta gdp^k_t = \alpha \times Post1991_t \times SME^k + \mu^k + \tau_t + \epsilon^k_t + constant$ where $Post1991_t$ is a dummy indicating the period from 1991, $SME^k$is small-business importance and$\mu^k$and τ_t are prefecture-fixed and time effects respectively. Sample period is 1980-2005. Cooperative banks include Shinkin banks and industrial credit cooperatives. OLS estimates, t-statistics in parentheses. Standard errors are clustered by prefecture.

Robustness

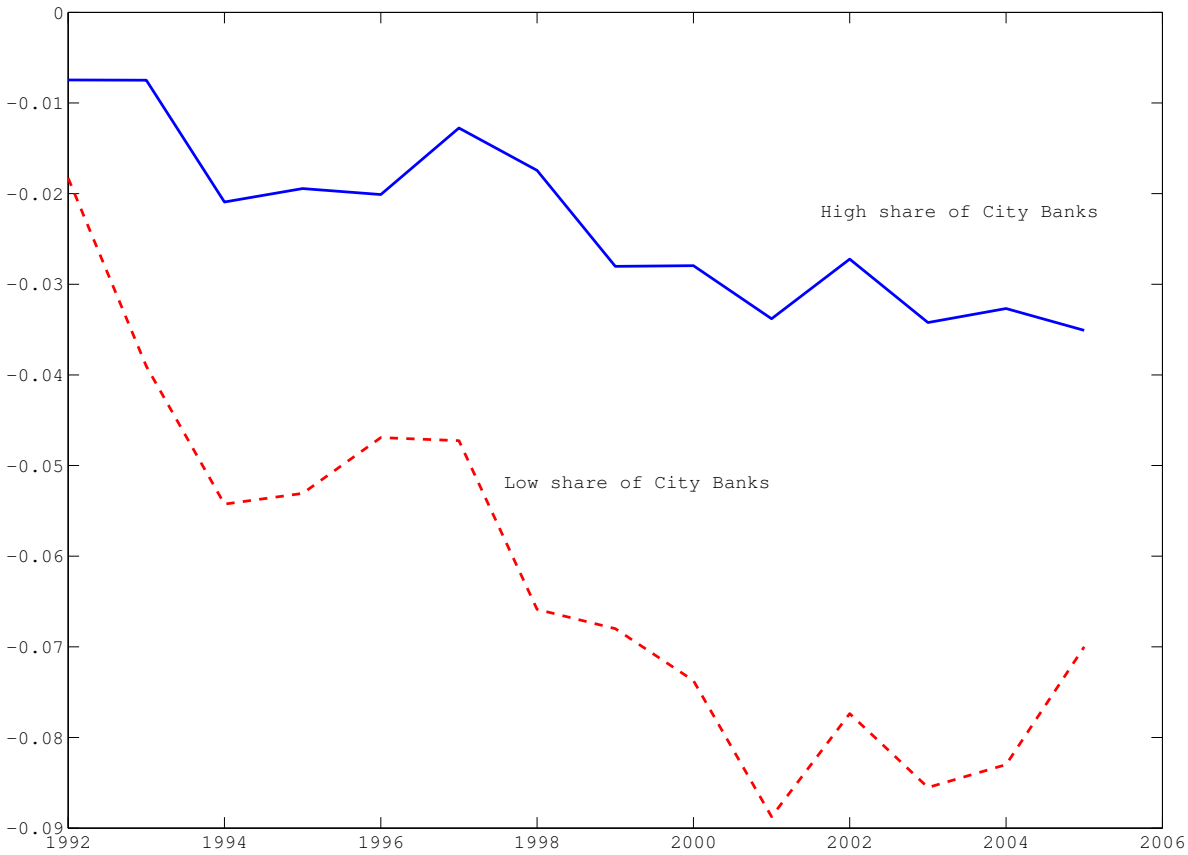
Table: Robustness – interaction terms and additional controls

Interactions of $Post1991_t$ with pre1990 variables:	I Regional	II City	III Regional	IV City	V Regional	VI City	VII Regional	VIII City
$...SME^k_{VA}$	-0.09	-0.07	0.33	-0.45	0.30	-0.47	0.32	-0.52
	(-4.16)	(-2.85)	(2.19)	(-3.57)	(2.39)	(-3.68)	(2.70)	(-4.19)
$...RegionalBankShare$	0.04		0.27		0.24		0.18	
	(0.89)		(3.04)		(3.31)		(2.67)	
$...CityBankShare$		-0.05		-0.15		-0.16		-0.08
		(-2.39)		(-4.54)		(-4.19)		(-1.85)
$...SME^k \times RegionalBankShare$			-1.51		-1.36		-1.34	
			(-2.73)		(-2.95)		(-3.06)	
$...SME^k \times CityBankShare$				0.68		0.72		0.81
				(3.13)		(3.22)		(3.91)
$...Lending/GDP$					-0.0006)	0.0003		
					(-1.28)	(0.60)		
$...CoreArea$							-0.01	-0.01
							(-1.67)	(-2.90)
$\Delta LandPrice_t \times CityBankShare$ (sample ends 2003)							0.15	0.19
							(3.32)	(2.06)
R^2	0.55	0.56	0.56	0.56	0.56	0.55	0.58	0.58

The Table shows results from the regression $\Delta gdp^k_t = Post1991_t \times \left[\alpha_1 SME^k_{VA} + \alpha_2 FI^k + \alpha_3 SME^k_{VA} \times FI^k + \boldsymbol{\alpha}_4' X_t\right] + \mu^k + \tau_t + \epsilon^k_t$ where where $Post1991_t$ is a dummy indicating the period from 1991, $SME^k_{VA}$is small-business importance based on value added, FI^k is the emasure of financial integration (regional and city bank share in total lending in prefecture k). $\mu^k$and τ_t are prefecture-fixed and time effects respectively. *CoreArea* is a dummy for the core economic areas (Tokyo, Osaka, Aichi, Kanagawa, Chiba, Saitama, Hyogo prefectures) and $\Delta LandPrice_t$ is the percentage change in land prices in the core precfectures from Imai and Takarabe (2011). The sample period is 1980-2005 (2003 for regressions *VI*and *VIII* involving $\Delta LandPrice$. OLS estimates, t-statistics in parentheses. Standard errors are clustered by prefecture.

Dynamics over time

Figure: Difference between high and low SME group in two-way sample split (High/Low City Bank Share)



The channel

Table: Lending growth after 1991

Interactions of $Post1991_t$ with pre1990 variables:	Δlog(Total lending)					Δlog(City Bank lending)					Δlog(Regional	
	I	II	III	IV	V	VI	VII	VIII	IX	X	XIII	XIV
$...SME^k_{EMP}$	0.02	0.03	0.02	0.04	0.05	-0.05	-0.01	-0.04	-0.004	0.0055	0.14	0.17
	0.36	0.56	0.43	0.74	0.81	-0.44	-0.13	-0.37	-0.05	0.0626	1.04	1.43
...*RegionalBankShare*	0.04		0.03			0.10		0.08			0.04	
	0.65		0.63			1.00		1.02			0.56	
...*CityBankShare*		-0.08		-0.06	-0.03		-0.17		-0.15	-0.10		0.00
		-2.21		-2.48	-1.21		-4.34		-4.09	-1.99		0.05
$...SME^k \times$ *RegionalBankShare*			-2.26					-4.21			1.04	
			-1.44					-2.27			0.64	
$...SME^k \times$ *CityBankShare*				1.12	1.21				1.47	1.65		0.36
				1.64	1.86				1.73	2.02		0.31
...*CoreArea*					-0.01					-0.02		
					-1.22					-1.93		
R^2	0.58	0.58	0.58	0.59	0.59	0.79	0.79	0.79	0.80	0.80	0.73	0.73

The Table shows results from the regression $\Delta lending_t^{X,k} = Post1991_t \times \left[\alpha_1 SME^k_{EMP} + \alpha_2 FI^k + \alpha_3 SME^k_{EMP} \times FI^k + \boldsymbol{\alpha}_4' X_t\right] + \mu^k + \tau_t + \epsilon_t^k$ where $\Delta lending_t^{X,k}$ is lending growth and X stands in turn for total lending, universal bank lending and regional bank lending. $Post1991_t$ is a dummy indicating the period from 1991, $SME^k_{EMP}$is small-business importance based on employment, FI^k is the measure of financial integration (pre-1991 regional and city bank share in total lending in prefecture k). $\mu^k$and τ_t are prefecture-fixed and time effects respectively. *CoreArea* is a dummy for the core economic areas (Tokyo, Osaka, Aichi, Kanagawa, Chiba, Saitama, Hyogo prefectures) The sample period is 1980-1996 . The variables *SME*,*CitybankShare* and *RegionalBankShare* are cross-sectionally demeaned.

A first set of results

- Demand side: Great Recession is deeper and more prolonged in areas with many SME's.
- That's true for both value-added and employment-based measures of SME importance.
  - The effect is big: a prefecture with a 20 percent SME share would have ~1.5 percent lower growth than the country as a whole.
- Link between SME and recession depth is stronger in areas with low (pre-1990) levels of banking integration (low share of universal / high share of regional banks)
- Lendingt channel & low financial integration? City banks withdraw most strongly in areas where they have lowest local market share.

Endogeneity issues

- Lending shares of regional / city banks might be endogenous as might be small firm importance.
- But: using pre-1990 data would counter most endogeneity issues.
- However, Using pre-1990 data does not entirely preclude expectational feedbacks:
  - If investment and growth prospects were poor in some areas, the big city banks might have started to withdraw from such regions even before the 1990s. This would lead to a high market share of regional banks.
  - Conversely, small firms might stay small because they can't get finance once they 'graduate' (Shinkins are only allowed to lend up to a maximum equity and employment threshold). Again, this effect may be stronger in areas with relatively poor growth prospects.

So it seems we need some instruments to proxy for that part of SME and Shinkin importance that is 'unpolluted' by such feedbacks.

Our story – part II

Japan – some historical background

- 1853: a US flotilla under Commodore Perry sails into Yokohama bay and forces Japan to open its ports to international trade. Japan has to cede: the 1858 Harris treaty opens a number of ports (including Hakodate, Niigata, Kobe, Yokohama and Nagasaki) for international trade.
- This external pressure is the death-blow to the Tokugawa-shogunate that had secluded Japan from international exposure since the early 17th century. A modernizing group of the Samurai eventually wins the ensuing power struggles. In 1869 the emperor's traditional role is restored (Meiji-restoration), while, simultaneously, Japan embarks on a breath-taking process of modernization ('fukoku-kyohei': enrich the country, strengthen the army) .

Japan's first export industry

Japan's first and (until the eve of WW II) foremost export industry is actually pretty low-tech: silk thread. Machinery etc. only followed much later. Conditions for Japan's entry into the world silk market in the 1860s and 1870s were very propitious:

- Silk worm pests had decimated the production of cocoons in Italy and France.
- China was by far the biggest and highest-quality supplier in 1870. But political unrest and continued war and turmoil led the Chinese to eventually fall behind.
- The US had just closed its Pacific border (California became a federal state in 1851) and therefore emerged as a huge market for silk. What was needed were huge quantities of industrial-level quality silk for mechanical weaving —> very consistent, medium-high quality silk thread. Japan was ready to oblige ...

The silk industry in Japan: early stages

Climatic requirements and the availability of seasonal labor led to a considerable regional concentration of Japan's silk industry in some prefectures in the mountains of central Japan: Gunma, Gifu, Nagano ...

- Processing of the silk thread needed to take place close to where cocoons were being bred:
  - A large pool of seasonally available labor was required. Daughters and spouses of the local cocoon farmers provided this pool that worked in the silk filatures after the cocoon harvest.
  - Cocoons dry up when transported over large distances, leading to low-quality, fragile silk thread. Hence, filatures located near where the cocoons were growing. Also, it was important to secure cocoon supply in sufficient quantities.
- All this made for a small-scale, fragmented industry.


OLD PHOTOS of JAPAN

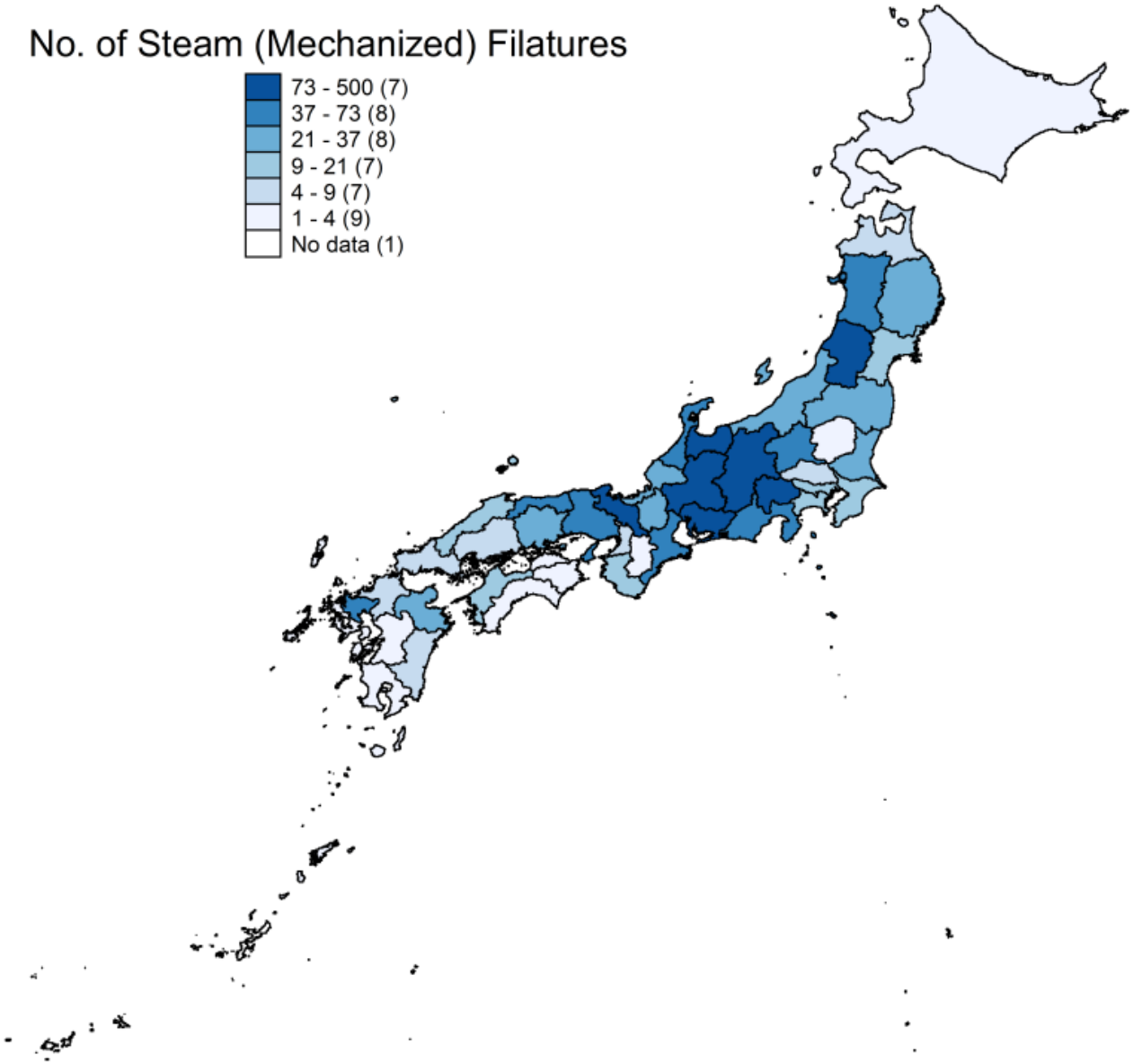
Silk and finance

- Silk filatures (i.e. reeling plants) were heavily dependent on working capital: the (highly seasonal) purchase of cocoons amounted to 80 percent of the operating costs of a silk filature.
- Silk reelers were located in remote mountain areas and could not usually borrow from (initially: Yokohama-based) city banks.
- Yokohama silk merchants would advance credit to small reelers:
  - Yokohama merchant would advance credit to a reeler in the form of a 'documentary bill'.
  - Reeler would would discount the bill at a a local (often cooperative) bank.
  - These banks were often founded by silk industry associations themselves (Shinkins).
  - These banks were purely regional – and stayed it for more than a century.

Silk finance: the role of mechanization

- Huge relative price increase of mechanically vs. hand-reeled silk in the 1890s.
- Mechanization central in the quality improvement. But increased dependence on working capital — it reinforced the separation of cocoon-growing and reeling.
- Early stages of mechanization: cooperatively organized and centralized second (mechanical) reeling process of (possibly manually reeled) silk.
- Centralized re-reeling allowed the implemenation of quality control system and the development of internationallly recognized brands. (Nakabayashi (2006)).
- Quality was central in the monitoring of the credit relationship between silk producers and the Yokohama silk merchants: regional banks would provide credit ('advances') against a documentary bill issued by Yokohama silk merchants.
- Ultimately, only those producers could continue to export who mechanized early. The others produced mainly for the domestic market.

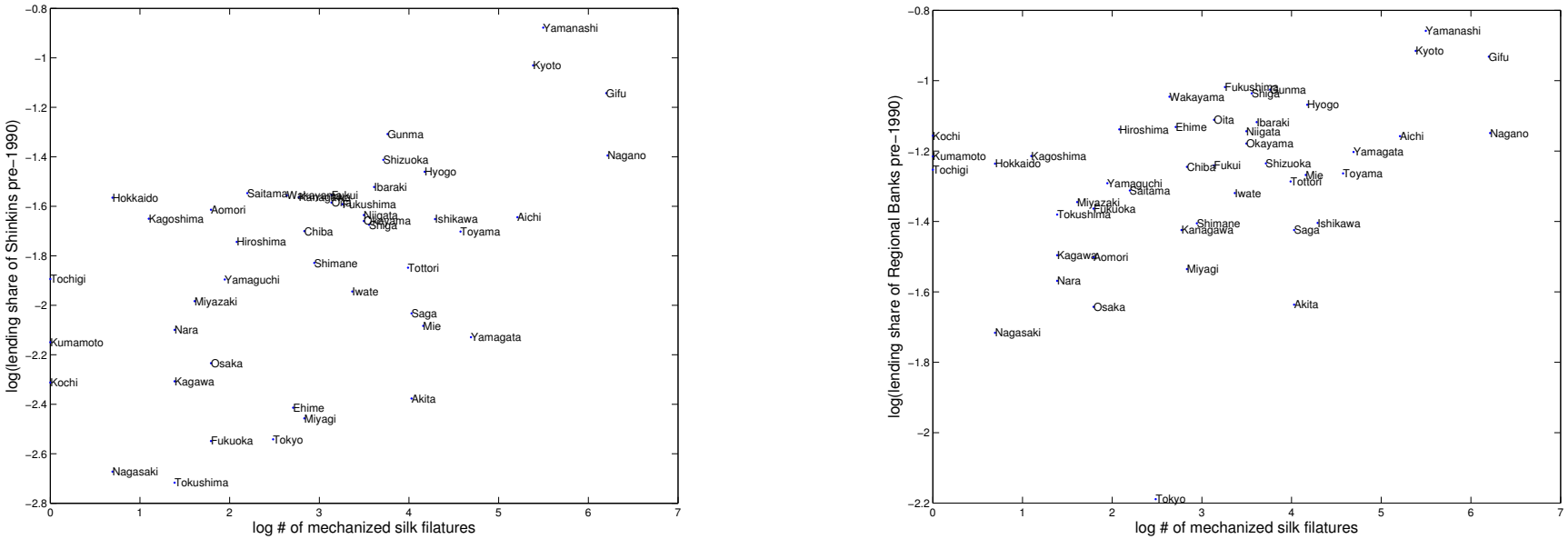
Mechanized silk filatures in 1895



Reeling machine at Tomioka plant, Gunma prefecture

FILATURES AT SUWA, NAGANO PREFECTURE.

Figure: The silken thread: Regional Bank Lending Shares (pre-1990 averages) vs. number of silk filatures



NOTE: Left panel shows link for Shinkin banks (small business industrial credit associations), right panel for all regional banks (Shinkin+Sogo (mutual) banks))

Table: Silk reeling and 1980s prefecture-level characteristics

	City Bank lending share		Regional Bank lending share				Agg. Lending (Credit/GDP)		SME importance	
			All		Shinkins only					
silk filatures 1895	-0.03	-0.03	0.03	0.02	0.04	0.03	-0.05	0.01	0.02	0.01
(log (# per capita))	(-2.83)	(-3.90)	(3.82)	(2.81)	(4.83)	(3.59)	(-1.39)	(0.34)	(4.63)	(2.83)
Controls										
rel. GDP pre 1990		-0.02		0.00		-0.02		0.13		-0.02
		(-1.34)		(0.30)		(-1.21)		(3.23)		(-2.78)
Core-Dummy		0.04		-0.18		-0.12		1.05		-0.17
		(0.53)		(-2.63)		(-1.55)		(4.08)		(-3.64)
Tokyo-Dummy		0.08		-0.01		0.02		0.23		-0.02
		(2.72)		(-0.28)		(0.60)		(2.54)		(-0.92)
log Distance2Yokohama		0.76		0.21		0.15		1.12		0.24
		(8.10)		(2.69)		(1.64)		(3.75)		(4.53)
R^2	0.15	0.65	0.25	0.39	0.35	0.42	0.04	0.54	0.33	0.55

Long-Run regressions: baseline & IV

Table: Long-term cross-sectional regressions

	Dependent variable is prefecture-level mean post-1991 GDP growth (relative to country-mean)							
	$FI =$							
	Regional bank share		City bank share		Regional bank share		City bank share	
$...SME^k \times FI^k$	-0.40	-0.30	0.15	0.20	-0.83	-2.20	0.34	0.84
	(-2.01)	(-1.61)	(1.57)	(1.53)	(-1.27)	(-0.65)	(1.65)	(1.31)
FI^k	0.07	0.05	-0.05	-0.05	0.21	0.50	-0.08	-0.18
	(2.23)	(1.64)	(-3.35)	(-2.02)	(1.33)	(0.64)	(-2.01)	(-1.35)
$...SME^k_{VA}$	0.07	0.07	-0.11	-0.12	0.16	0.59	-0.21	-0.46
	(1.26)	(1.25)	(-2.23)	(-1.78)	(1.00)	(0.63)	(-1.97)	(-1.36)
Controls	no	yes	no	yes	no	yes	no	yes
R^2	0.23	0.60	0.50	0.65	0.20	0.63	0.20	0.63
Method	OLS	OLS	OLS	OLS	IV	IV	IV	IV
					First-stage F-statistic on IA-term			
					10.74	11.56	11.13	14.74

Exogenous credit dependence measures: Panel Reg based on Manufacturing Census

Table: Panel IV regressions based on manufacturing census

Dependent variable is prefecture-sector growth, $\Delta va^k_{s,t}$						
$FI =$	City		Regional			
	bank share		All		Shinkin only	
$CD^s \times FI^k \times Post1991_t$	0.06	1.20	-0.17	-1.52	-0.27	-1.05
	(0.71)	(1.67)	(-1.04)	(-1.68)	(-1.62)	(-1.68)
Method	OLS	IV	OLS	IV	OLS	IV
First-Stage F-test		344.53		565.87		799.63

Panel regressions of the form $\Delta va^k_{s,t} = \alpha \times \left[CD^s \times FI^k \times Post1991_t\right] + \beta \Delta va^k_{s,t-1} + \tau_t + \mu^k + \delta^s + \tau_t \mu^k + \tau_t \delta^s + \mu^k \delta^s$ based on the manufacturing census 1980-2005 for 14 manufacturing sectors. Instrumental variable for prefecture-level financial integration is $log(\#silkfilatures^k / population^k)$

Second stage sample split regs

Table: Small firms, traditional financial institutions and financial development - IV estimates

	Sample split by importance of instrumented financial integration as measured by				
	Regional Banks			City Banks	
	All		Shinkin		
	high	low	&Cooperatives	high	low
$Post1991_t \times SME^k_{VA}$	-0.12	-0.03		-0.06	-0.11
	(-3.03)	-0.70		(-1.19)	(-2.61)
R^2	0.57	0.55		0.56	0.56
	high	low	high low	high	low
$Post1991_t \times SME^k_{EMP}$	-0.14	-0.05		-0.09	-0.13
	(-2.46)	(-0.83)		(-1.46)	(-2.45)
R^2	0.57	0.55		0.57	0.56
Instruments	#mech. silk filatures Tokyo Dummy			#mech. silk filatures Tokyo Dummy Core Area dummy	

The table shows the coefficient α in panel regressions of the form $\Delta gdp^k_t = \alpha \times Post1991_t \times SME^k + \mu^k + \tau_t + \epsilon^k_t + constant$ where $Post1991_t$ is a dummy indicating the period from 1991, $SME^k$is small-business importance based on the value added (VA) and employment (EMP) based measures respectively and $\mu^k$and τ_t are prefecture-fixed and time effects respectively. Sample period is 1980-2005. Regional banks include 2nd tier regional banks (Sougo), industrial credit cooperative bsnkd (Shinkin) and agricultural cooperatives. OLS estimates, t-statistics in parentheses. Standard errors are clustered by prefecture. The lending share of regional banks, city banks and savings-investment (FH) correlations are instrumented using the best (in terms of 1st stage F-stats) set of instruments as shown in Tables 3-5 and as indicated below the regression results.

Results

- Paper has studied what we believe to be an under-researched area: the regional dimension of Japan's great recession.
- Show that financial frictions have played a key role in deepening the recession: areas with many small manufacturing firms were hit harder.
- But this link is present only among prefectures with banking sectors that are poorly integrated with the rest of the country. Lack of regional integration has exacerbated the decline.
- Paper documents that financial integration in key areas was kept back by a 'silken thread'

Interpretation and outlook

- Differential pathways to financial development can manifest themselves in terms of considerable cross-regional differences in financial integration.
  - Either pathway to development may have served the respective regions well (an interesting, non-Schumpetarian interaction between credit requirements of a sector and financial development here!)
  - Differences in financial integration may also have been benign in normal economic times. But they may resurface in major crises.
  - Financial development and financial integration not only interact in terms of macroeconomic outcomes. They may feed back on each other.
- Obvious analogies: Sparkassen and 'Genossenschaftsbanken' in Germany, Segmentation of the US banking market ranging back to the 19th century, internationalization of the banking sector in Europe ...
- Have latent (historical) differences in financial development and financial integration influenced the regional dimension of the build-up and deflation of the US housing bubble?