Does Openness to International Financial Flows Raise Productivity Growth?

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Motivation

- Extensive debate about the role of financial openness in promoting economic growth
- In theory, financial openness is expected to have a positive impact on productivity growth through a variety of channels
- Does financial openness contribute to productivity growth?

Financial Openness and TFP Growth: Channels

Standard theory: Financial integration can spur Total Factor Productivity (TFP) growth through

- **Indirect channels** (financial sector development, improvements in institutions, and better macro policies)

- **Direct channels**, mainly FDI (transfer of technology and managerial experience)

But limited empirical evidence…

Productivity Growth: Why Do We Care?

• TFP growth more important than factor accumulation for long-term per capita income growth (Hall and Jones, 1999)

• Even in theory, not obvious that capital mobility allows capital-poor countries to grow faster through higher investment (Gourinchas and Jeanne, 2007)

• *Positive* relationship between current account balances and GDP growth among non-industrial countries (Prasad, Rajan and Subramanian, 2007)

• Collateral (indirect) benefits from financial openness should be reflected in productivity gains (Kose, Prasad, Rogoff and Wei, 2006)

Database

- Annual data
  - 1966-2005
  - 67 countries (21 industrial, 46 non-industrial)
- Real GDP per worker, labor supply, stocks of physical and human capital (main sources: PWT 6.2, IMF)
- Financial openness
  - De jure capital account openness (Schindler, 2007; derived from IMF's AREAER)
  - De facto financial integration data from Lane and Milesi-Ferretti (2006) and IMF: Stocks of external assets and liabilities as ratios to GDP

Growth Accounting Exercise

- Cobb-Douglas production function

$$Y_{i,t} = A_{i,t} K_{i,t}^{a} (L_{i,t} H_{i,t})^{(1-a)}$$

- Implies

$$g_{Y/L} = \left(\frac{1}{1-a}\right) g_A + \left(\frac{a}{1-a}\right) g_{K/Y} + g_H$$

- Follow Klenow and Rodriguez-Clare (1997) to compute TFP
- Capital income share parameter set to one-third

Empirical Approach

- Use the growth accounting exercise to document the basic stylized facts

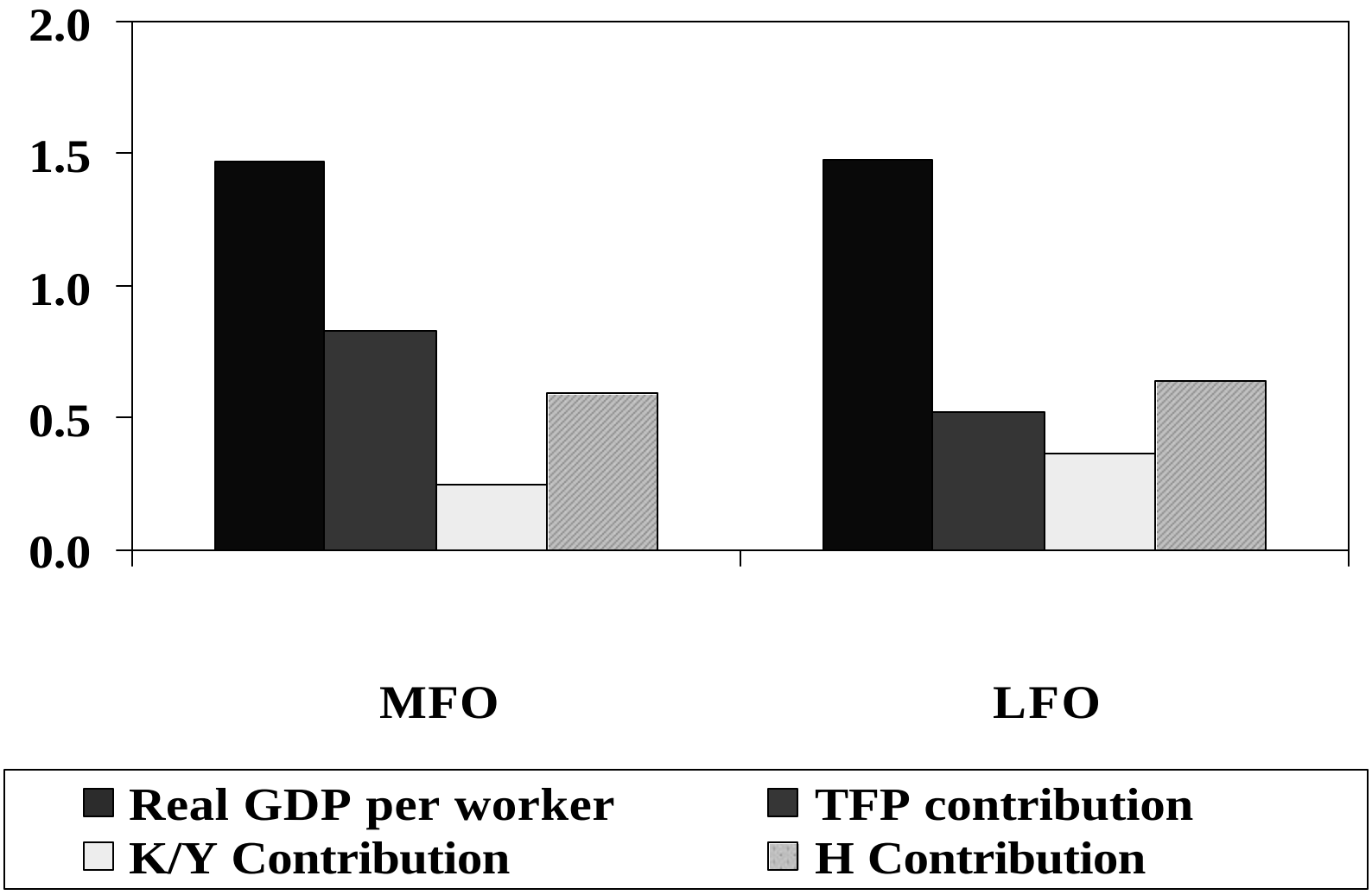
- Adapt standard growth regression framework:
  - Cross-section regressions to characterize long-term correlations
  - FE and GMM panel regressions to control for various factors

Stylized Facts

- Two types of economies:
  - More Financially Open, Less Financially Open
  - Sample median of financial openness variable used as cutoff
  - Constant sample, changing sample

- Two periods:
  - Pre-globalization (1966-1985)
  - Globalization (1986-2005)

Growth Accounting for More (MFO) and Less (LFO) Financially Open Economies (1966-2005. De Facto Measures. Median Values)



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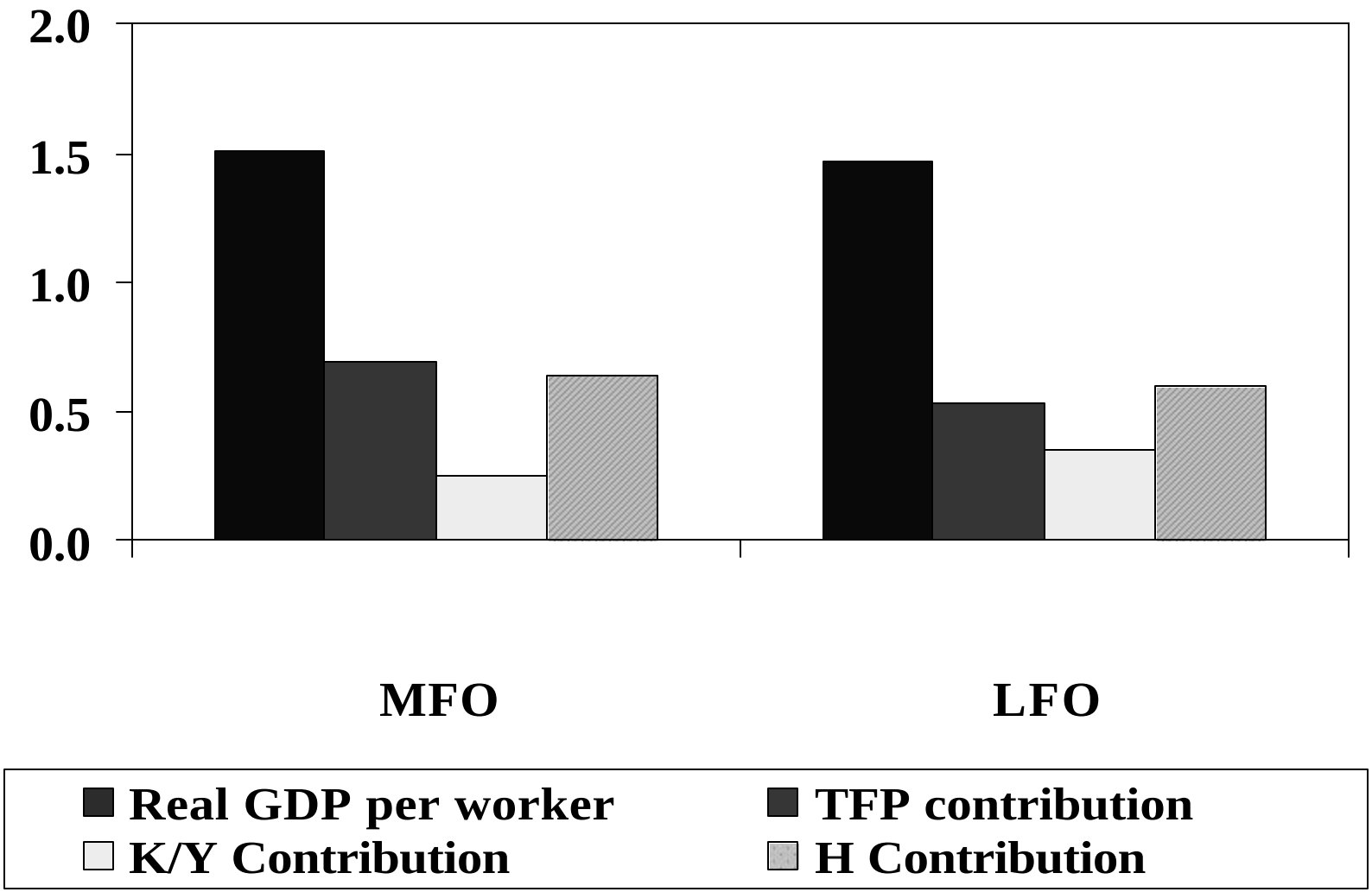
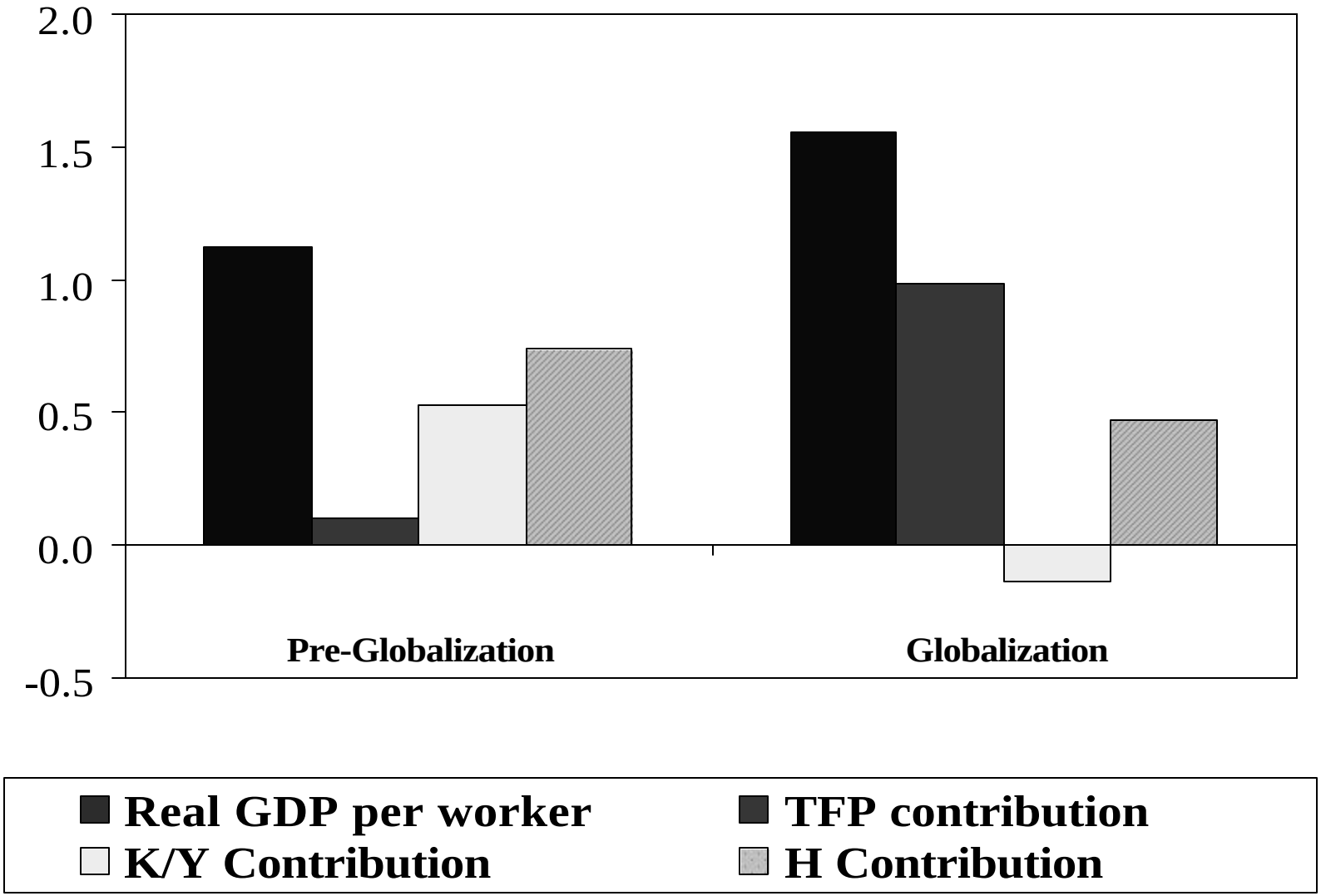
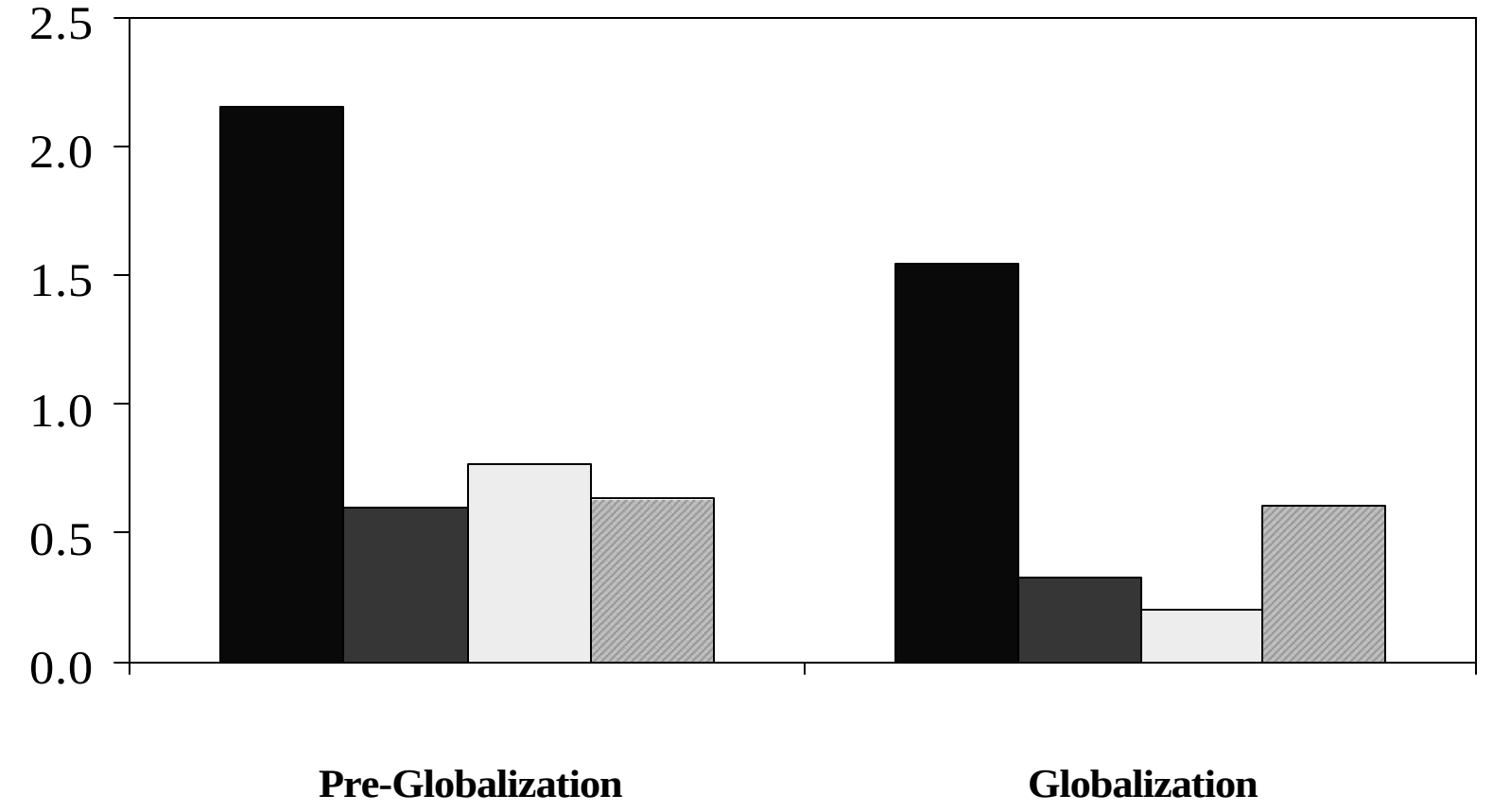


Growth Accounting for More Financially Open Economies (MFO) (1966-1985 and 1986-2005)



Growth Accounting for Less Financially Open Economies (LFO) (1966-1985 and 1986-2005)



Summary of Stylized Facts

- Full sample: MFO economies have higher productivity growth, larger contribution of TFP growth to output growth
- Globalization period: MFO economies registered much faster productivity growth; contribution of TFP growth to output growth increased sharply
- Globalization period: LFO economies registered a slight decline in TFP growth; output growth mostly attributed to the accumulation of factors.

Financial Openness and TFP Growth: Cross-Section

	OLS	OLS
Initial TFP (in logs)	-0.01883***	-0.01821***
	[0.00208]	[0.00211]
Trade Openness (% GDP)	-0.00001	0.00000
	[0.00007]	[0.00007]
Terms of Trade (% Change)	0.00129**	0.00131**
	[0.00063]	[0.00061]
Population Growth	-0.00449***	-0.00458***
	[0.00124]	[0.00130]
Private Sector Credit (% GDP)	0.00005	0.00006
	[0.00004]	[0.00004]
Institutional Quality	0.00067**	0.00068**
	[0.00032]	[0.00032]
CA Openness		-0.00396
		[0.00292]

Financial Openness and TFP Growth: Cross-Section

	OLS	OLS	OLS	OLS
CA Openness	-0.00396			
	[0.00292]			
Liabilities		-0.00004		
		[0.00003]		
Assets			-0.00002	
			[0.00002]	
Liab. + Assets				-0.00002
				[0.00001]

Some Conceptual, Econometric Issues

- Effects of financial openness on productivity and output growth may be temporary (Henry, 2007)--but transition could take many years
- Endogeneity and reverse causality--not an obvious problem (Gourinchas and Jeanne, 2007) but can not ignore (Prasad, Rajan and Subramanian, 2007)
- Financial openness has changed enormously over time

Financial Openness and TFP Growth: Panel Regressions

- 10-year panels; 1966-2005; 67 countries.
- FE and System GMM Regressions
- Include standard determinants of GDP growth since these influence TFP growth as well

$$y_{i,t} - y_{i,t-1} = a\, y_{i,t-1} + b\, FO_{i,t} + X_{i,t}\, t + h_i + q_t + m_{i,t}$$

$$where\ y_t\ is\ the \ln(TFP_t)$$

Financial Openness and TFP Growth: Ten-Year Panel

	FE	GMM
CA Openness	0.07373**	0.15476**
	[0.03547]	[0.06056]

Financial Openness and TFP Growth: Ten-Year Panel

	FE	FE	FE	GMM	GMM	GMM
CA Openness	0.07571**	0.06735*	0.07258**	0.10896**	0.14777**	0.12083**
	[0.03555]	[0.03550]	[0.03516]	[0.04984]	[0.06009]	[0.05300]
Liabilities	-0.00017			-0.00031		
	[0.00037]			[0.00058]		
Assets		0.00028			-0.00027	
		[0.00019]			[0.00039]	
Liab. + Assets			0.00003			-0.00028
			[0.00013]			[0.00024]

First Pass: Summary

- De jure capital account openness seems to have a positive effect on TFP growth
- De facto financial integration (gross assets or gross liabilities) not correlated with TFP growth
- Does the composition of external liabilities matter?
- Do country characteristics play any role?
- Second pass..

Does the Composition of External Liabilities Matter?

	FE	OLS
CA Openness	0.05249	0.08216*
	[0.03849]	[0.04638]
FDI & Equity Liab.	0.00201***	0.00379**
	[0.00066]	[0.00161]
Debt Liab.	-0.00178**	-0.00247**
	[0.00069]	[0.00096]

Does the Composition of External Liabilities Matter?

	FE	GMM	FE	GMM
CA Openness	0.03685	0.04967	0.02837	0.03830
	[0.03741]	[0.04595]	[0.04312]	[0.05047]
FDI & Equity Liab.	-0.00141	0.00607***	0.00022	0.00695***
	[0.00190]	[0.00220]	[0.00246]	[0.00207]
Debt Liab.	-0.00229*	-0.00383***	-0.00305**	-0.00378***
	[0.00122]	[0.00117]	[0.00116]	[0.00087]
Private Sector Credit *				
FDI & Equity Liab.	0.00361*	-0.00332		
	[0.00196]	[0.00228]		
Private Sector Credit *				
Debt Liab.	0.00033	0.00261**		
	[0.00131]	[0.00113]		
Institutional Quality *				
FDI & Equity Liab.			0.00101	-0.00640***
			[0.00240]	[0.00223]
Institutional Quality *				
Debt Liab.			0.00226*	0.00392***
			[0.00120]	[0.00120]

Second Pass: Summary

- Composition of liabilities crucial
- FDI and equity liabilities boost TFP growth while debt liabilities reduce it.
- Well-developed financial markets and good institutions reduce the negative impact of debt liabilities on TFP growth

Robustness Tests

- Alternative measures of TFP
  - National income accounts data indicate capital income shares ranging from 0.2 to 0.8
  - Gollin (2002) adjusts national income data for self-employed persons' income, income of small firms => shares cluster in range of 0.2 to 0.35
  - Bernanke and Gurkaynak (2002) update and extend the dataset
  - Gollin's dataset covers 18 countries in our sample
  - Bernanke-Gurkaynak cover 45 countries

Alternative Measure of TFP (Gollin, 2002)

	FE	GMM	FE	GMM
CA Openness	0.07381**	0.15018***	0.05094	0.06897
	[0.03567]	[0.04906]	[0.03863]	[0.05542]
Liabilities	-0.00017	-0.00014		
	[0.00037]	[0.00151]		
FDI & Equity Liab.			0.00198***	0.00492**
			[0.00067]	[0.00206]
Debt Liab.			-0.00175**	-0.00259
			[0.00071]	[0.00179]

Alternative Measure of TFP (Bernanke and Gurkaynak, 2002)

	FE	GMM	FE	GMM
CA Openness	0.06975*	0.19215*	0.04715	0.10460
	[0.03509]	[0.10779]	[0.03765]	[0.09572]
Liabilities	-0.00010	0.00171		
	[0.00037]	[0.00107]		
FDI & Equity Liab.			0.00203***	0.00415*
			[0.00066]	[0.00240]
Debt Liab.			-0.00167**	0.00003
			[0.00070]	[0.00167]

Robustness Tests

- Alternative measures of TFP
- Alternative measures of de facto capital account openness
  - Chinn and Ito (2006)
  - Edwards (2007)
  - Equity market liberalization: dates from Bekaert and Harvey (2000), Henry (2000)

Alternative Measure of Capital Account Openness (Chinn and Ito)

	FE	GMM	FE	GMM
CA Openness	0.02895**	0.03059	0.02184*	0.01885
	[0.01308]	[0.01861]	[0.01298]	[0.01758]
Liabilities	-0.00015	0.00002		
	[0.00039]	[0.00079]		
FDI & Equity Liab.			0.00195***	0.00446***
			[0.00068]	[0.00134]
Debt Liab.			-0.00172**	-0.00230**
			[0.00070]	[0.00091]

Alternative Measure of Capital Account Openness (Bekaert and Harvey)

	FE	GMM	FE	GMM
CA Openness	0.04532	0.09231	0.02669	0.07075
	[0.03849]	[0.08015]	[0.04131]	[0.04417]
Liabilities	-0.0001	-0.00021		
	[0.00039]	[0.00065]		
FDI & Equity Liab.			0.00211***	0.00383***
			[0.00069]	[0.00112]
Debt Liab.			-0.00181**	-0.00201***
			[0.00073]	[0.00073]

Robustness Tests

- Alternative measures of TFP
- Alternative measures of de facto capital account openness
- Alternative specification: diff-in-diff

Difference-in-Differences Estimates

$$y_{i,t} = a + bFO_{i,t-1} + X_{i,t-1}t + h_i + q_t + m_{i,t}$$

Where y_i is the $\ln(TFP_t)$

Include time and country fixed effects

This makes the parameter beta a measure of the change in pre- and post-capital account liberalization productivity in countries that liberalized relative to comparable-period change in countries that did not liberalize

Difference-in-Differences Estimation

	IMF	Chinn-Ito	Bekaert-Harvey	Edwards
CA Openness	0.15778***	0.04536***	0.05898	0.00308***
	[0.04765]	[0.01635]	[0.04301]	[0.00108]
Total Liabilities	-0.00094	-0.00099	-0.00092	-0.00099
	[0.00091]	[0.00089]	[0.00093]	[0.00090]

Robustness Tests

- Alternative measures of TFP
- Alternative measures of de facto capital account openness
- Alternative specification: diff-in-diff
- Are results driven by advanced industrial economies?

Non-Industrial Countries

	FE	GMM	FE	GMM	FE	GMM
CA Openness	0.05742	0.20021**	0.00508	0.07715	0.01880	0.07019
	[0.05447]	[0.08287]	[0.07795]	[0.10578]	[0.06945]	[0.11795]
Liabilities			-0.00312**	-0.00566***		
			[0.00133]	[0.00198]		
FDI & Equity Liab.					0.00001	0.00419
					[0.00271]	[0.00560]
Debt Liab.					-0.00315**	-0.00602***
					[0.00129]	[0.00177]

Robustness Tests

- Alternative measures of TFP
- Alternative measures of de facto capital account openness
- Alternative specification: diff-in-diff
- Are results driven by advanced industrial economies? *No*
- Does level of financial integration matter?

Is There a Threshold Level of Financial Integration? (MFO economies)

	FE	GMM	FE	GMM
CA Openness	0.12139**	0.24200***	0.07183	0.08496
	[0.04834]	[0.08750]	[0.05264]	[0.08367]
Liabilities	0.00006	-0.00199		
	[0.00031]	[0.00166]		
FDI & Equity Liab.			0.00233***	0.00515**
			[0.00078]	[0.00226]
Debt Liab.			-0.00158**	-0.00360*
			[0.00072]	[0.00179]

Is There a Threshold Level of Financial Integration? (LFO economies)

	FE	GMM	FE	GMM
CA Openness	0.00092	0.14501	0.00076	0.14827
	[0.04884]	[0.11039]	[0.04839]	[0.12966]
Liabilities	-0.00178	-0.00183		
	[0.00133]	[0.00242]		
FDI & Equity Liab.			-0.00178	-0.00399
			[0.00298]	[0.00954]
Debt Liab.			-0.00158	-0.00173
			[0.00153]	[0.00355]

Robustness Tests

- Alternative measures of TFP
- Alternative measures of de facto capital account openness
- Alternative specification: diff-in-diff
- Are results driven by advanced industrial economies? *No*
- Does level of financial integration matter? *Yes*
- Are results sensitive to outliers? *No*

Summary

- Does financial openness contribute to productivity growth? ***Yes! But in a subtle way..***

- De jure capital account openness good for TFP growth

- Impact of de facto financial integration on TFP growth depends on the form of capital flows

- FDI and portfolio equity boost TFP growth; debt does not

- Well-developed financial markets, good institutions attenuate the negative impact of debt inflows on TFP growth

Why *TFP* Growth but Not *GDP* Growth?

- Timing of the effects of financial openness on TFP and output may be different
- Reallocation of outputs and inputs across individual producers, technological obsolescence
- Adjustment costs delaying the realization of the positive effects of TFP on output growth in developing countries

Next Steps in Research Program

- Need to better understand why financial openness boosts TFP growth but not GDP growth -- growth decomposition (regressions by component)
- Explore implications of level of financial openness itself as a threshold
- Need to use microeconomic (firm- or industry-level) data to get at these issues in a more convincing way

Extra Slides

Calculating TFP

- Cobb-Douglas production function

$$Y_{i,t} = A_{i,t} K_{i,t}^{a} (L_{i,t} H_{i,t})^{(1-a)}$$

- Then

$$A = \frac{(Y / L)^{(1-a)}}{(K / Y)^{a} (H)^{(1-a)}}$$

$$where\ a = 1/3$$

Calculating TFP

- Human capital (Mincerian function of schooling)

$$H = e^{j\ att}$$

$$where\ j = 0.085$$

- Physical Capital

$$\left(\frac{K}{Y}\right)_{1960} = \frac{\left(I/Y\right)}{\left(g+n+d\right)}$$

$$\left(\frac{K_{t+1}}{Y_{t+1}}\right)\left(\frac{Y_{t+1}}{Y_t}\right) = (1-d)\left(\frac{K_t}{Y_t}\right) + \left(\frac{I_t}{Y_t}\right)$$

Alternative Specifications

$$y_{i,t} - y_{i,t-1} = a y_{i,t-1} + b FO_{i,t} + X_{i,t} t + h_i + q_t + m_{i,t}$$

Where y_t is the $\ln(TFP_t)$

$$y_{i,t} = a + b FO_{i,t-1} + X_{i,t-1} t + h_i + q_t + m_{i,t}$$

Where y_i is the $\ln(TFP_t)$