

Does Openness to International Financial Flows Raise Productivity Growth?

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Disclaimer: The views presented in this paper are those of the authors and do not necessarily reflect the views of the IMF or IMF policies.

Motivation

- Extensive literature about the role of financial openness in promoting economic growth. **Mixed results.**
- Does financial openness increase productivity growth?
 - In theory, financial openness is expected to have a positive impact on productivity growth through a variety of channels.
 - Empirically, under-researched issue.

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

Results

- Does openness to international financial flows raise 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

Database

- Annual data
 - 1966-2005
 - 67 countries (21 industrial, 46 non-industrial)
- Real GDP per worker, labor supply, financial sector development, trade openness, schooling (main sources: PWT 6.2, IMF, Barro and Lee, 2001)
- 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 ratio to GDP

TFP

- Cobb-Douglas production function

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

- Follow Klenow and Rodriguez-Clare (1997) to compute TFP

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

$$\text{where } \alpha = \frac{1}{3}$$

Growth Accounting Exercise

- The CD production function implies

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

Where $\alpha = 1/3$

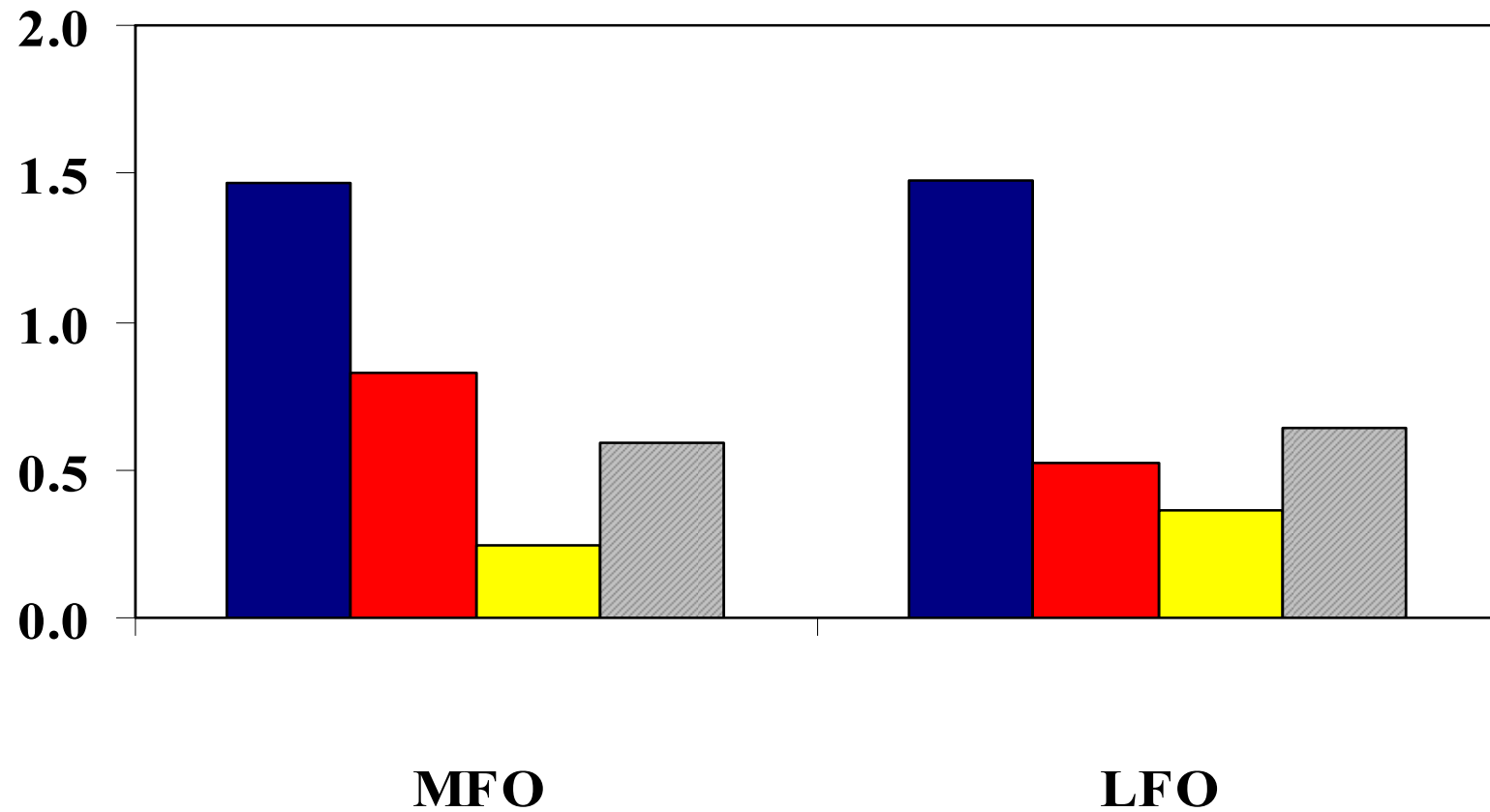
Empirical Approach

- 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 (MFO) and Less Financially Open (LFO).
 - 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)



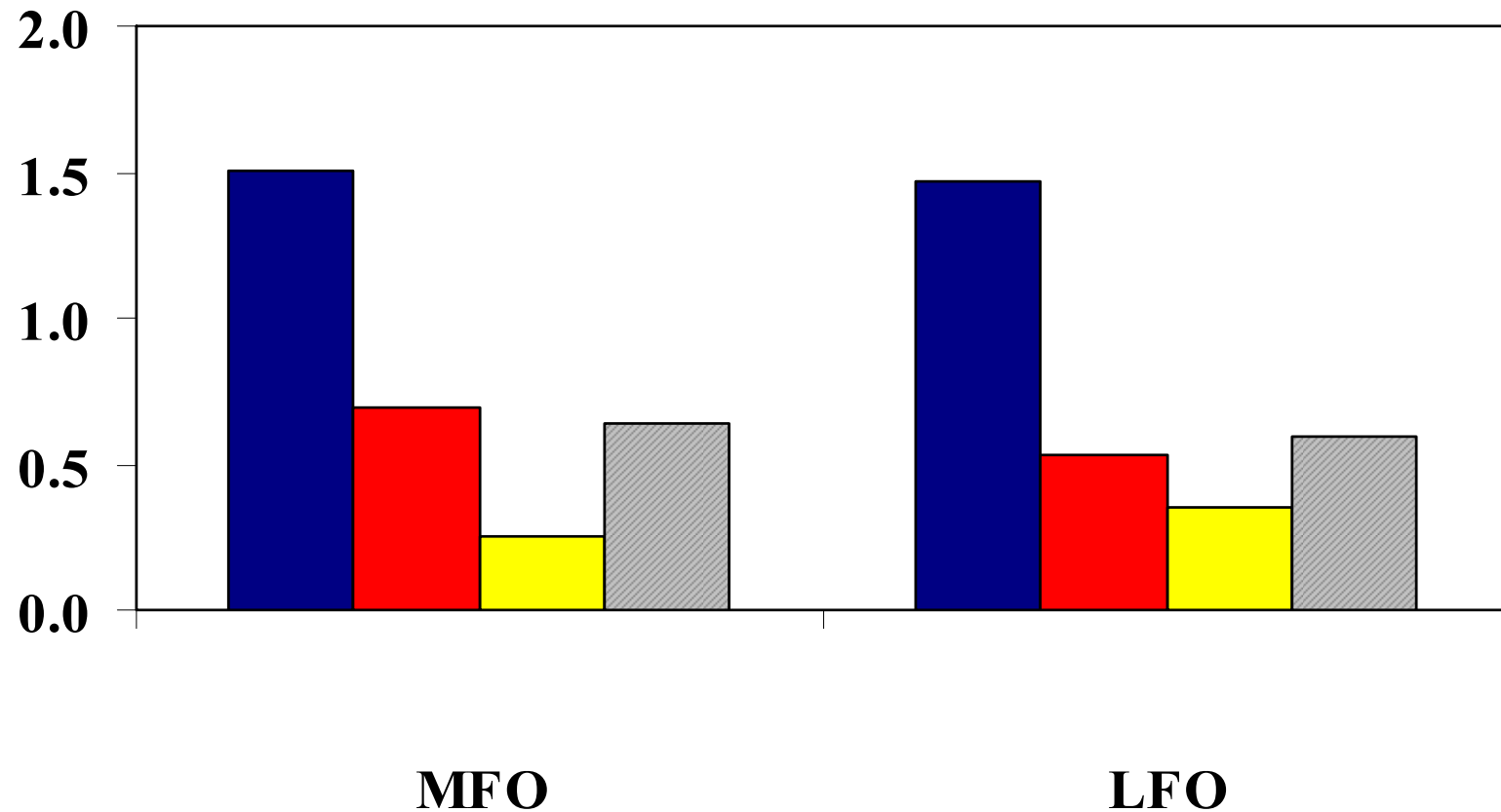
■ Real GDP per worker

■ K/Y Contribution

■ TFP contribution

■ H Contribution

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



■ Real GDP per worker

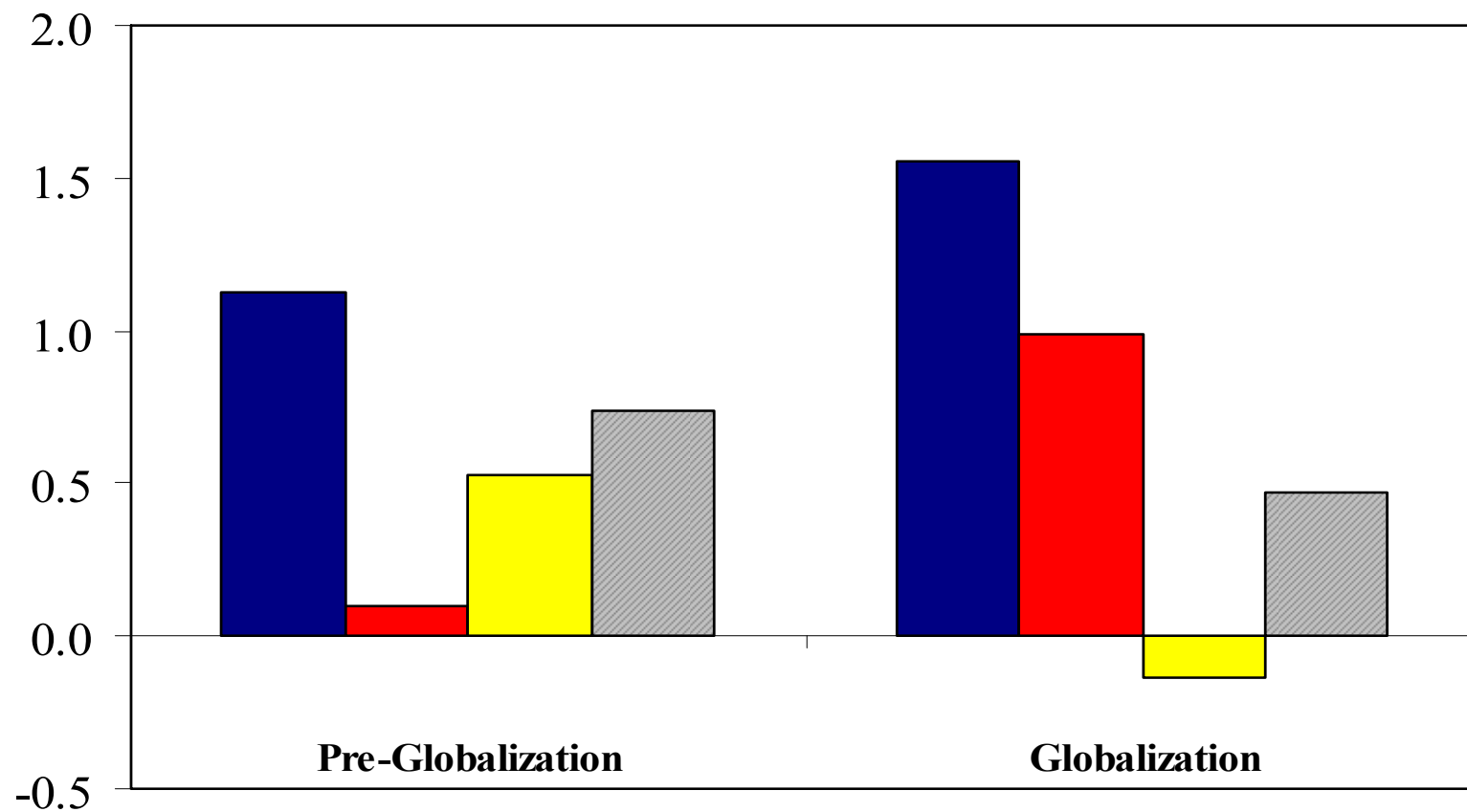
■ K/Y Contribution

■ TFP contribution

■ H Contribution

Growth Accounting for More Financially Open Economies (MFO)

(1966-1985 and 1986-2005)



■ Real GDP per worker

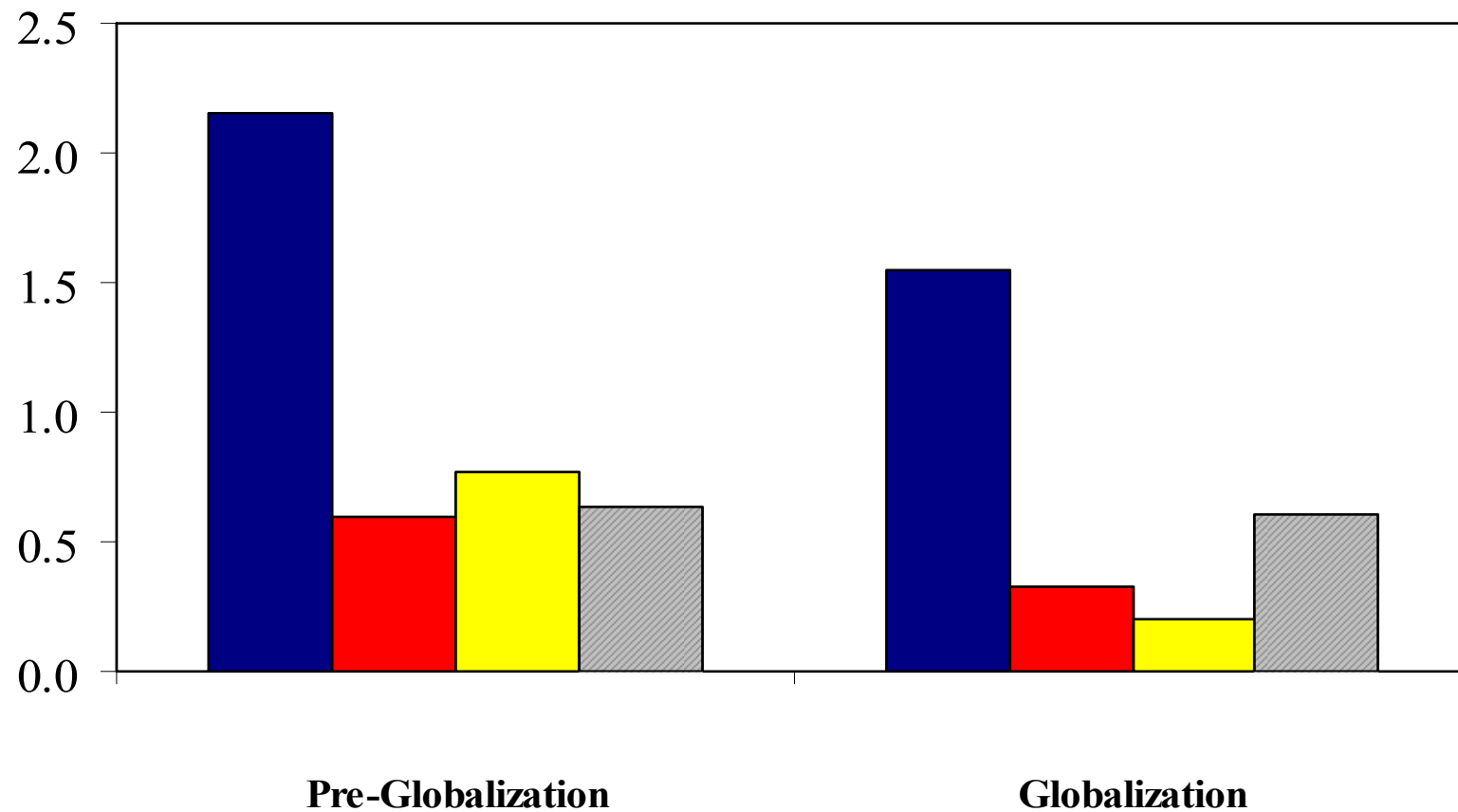
■ K/Y Contribution

■ TFP contribution

■ H Contribution

Growth Accounting for Less Financially Open Economies (LFO)

(1966-1985 and 1986-2005)



■ Real GDP per worker

■ K/Y Contribution

■ TFP contribution

■ H Contribution

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
 - 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 (1966-2005)

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

De facto

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

$$y_{i,t} - y_{i,t-1} = \alpha y_{i,t-1} + \beta F O_{i,t} + X_{i,t} \tau + \eta_i + \theta_t + \mu_{i,t}$$

where y_t is the $\ln(TFP_t)$

Financial Openness and TFP Growth: Ten-Year Panel

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

Financial Openness and TFP Growth: Ten-Year Panel

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

De Facto

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
- **But ...**
- Does the composition of external liabilities matter?
- Do country characteristics play any role?
- Second pass..

Does the Composition of External Liabilities Matter?

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

FDI and Equity Liability help TFP growth; Debt Liabilities hurt TFP growth ...

Does the Composition of External Liabilities Matter?

	FE	GMM	FE	GMM
CA Openness	0.03685 [0.03741]	0.04967 [0.04595]	0.02837 [0.04312]	0.03830 [0.05047]
FDI & Equity Liab.	-0.00141 [0.00190]	0.00607*** [0.00220]	0.00022 [0.00246]	0.00695*** [0.00207]
Debt Liab.	-0.00229* [0.00122]	-0.00383*** [0.00117]	-0.00305** [0.00116]	-0.00378*** [0.00087]
Private Sector Credit *				
FDI & Equity Liab.	0.00361* [0.00196]	-0.00332 [0.00228]		
Private Sector Credit *				
Debt Liab.	0.00033 [0.00131]	0.00261** [0.00113]		
Institutional Quality *				
FDI & Equity Liab.			0.00101 [0.00240]	-0.00640*** [0.00223]
Institutional Quality *				
Debt Liab.			0.00226* [0.00120]	0.00392*** [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** [0.03567]	0.15018*** [0.04906]	0.05094 [0.03863]	0.06897 [0.05542]
Liabilities	-0.00017 [0.00037]	-0.00014 [0.00151]		
FDI & Equity Liab.			0.00198*** [0.00067]	0.00492** [0.00206]
Debt Liab.			-0.00175** [0.00071]	-0.00259 [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 jure 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** [0.01308]	0.03059 [0.01861]	0.02184* [0.01298]	0.01885 [0.01758]
Liabilities	-0.00015 [0.00039]	0.00002 [0.00079]		
FDI & Equity Liab.			0.00195*** [0.00068]	0.00446*** [0.00134]
Debt Liab.			-0.00172** [0.00070]	-0.00230** [0.00091]

Alternative Measure of Capital Account Openness (Bekaert and Harvey)

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

Robustness Tests

- Alternative measures of TFP
- Alternative measures of de jure capital account openness
- 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 jure capital account openness
- 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** [0.04834]	0.24200*** [0.08750]	0.07183 [0.05264]	0.08496 [0.08367]
Liabilities	0.00006 [0.00031]	-0.00199 [0.00166]		
FDI & Equity Liab.			0.00233*** [0.00078]	0.00515** [0.00226]
Debt Liab.			-0.00158** [0.00072]	-0.00360* [0.00179]

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

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

Robustness Tests

- Alternative measures of TFP
- Alternative measures of de jure capital account openness
- 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

Thank you!!!!