Financial Integration, Macroeconomic Volatility and Welfare

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Perspective

- This paper is part of a research project aimed at enriching the financial side of international macroeconomic models.
- Why?
  - To provide quantitative analysis of the data, and
  - a framework for policy evaluation and design.
- Key Modeling Choices
  - Primary vs Secondary Capital Markets
  - Complete vs Incomplete Risk-Sharing
- We focus on Secondary Capital Markets and Incomplete Risk-Sharing

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Motivation for this paper

- How does greater financial integration affect macroeconomic dynamics and welfare?
- We examine the implications of greater integration in a standard two country model.
- We interpret greater integration as giving households access to a wider array of financial assets.
- An important feature of our model is that increased integration permits greater risk-sharing, but not complete risk-sharing.

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Findings

- The quantitative predictions of the model are generally consistent with the data.
- The relation between financial integration and the volatility of consumption and output is nonlinear (hump-shaped).
- Volatility of consumption output ratio increases with integration.
- Greater integration affects the distribution of conditional welfare.

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U.S. International Investment Position

Figure 1a. U.S.-owned assets abroad, % capitalization

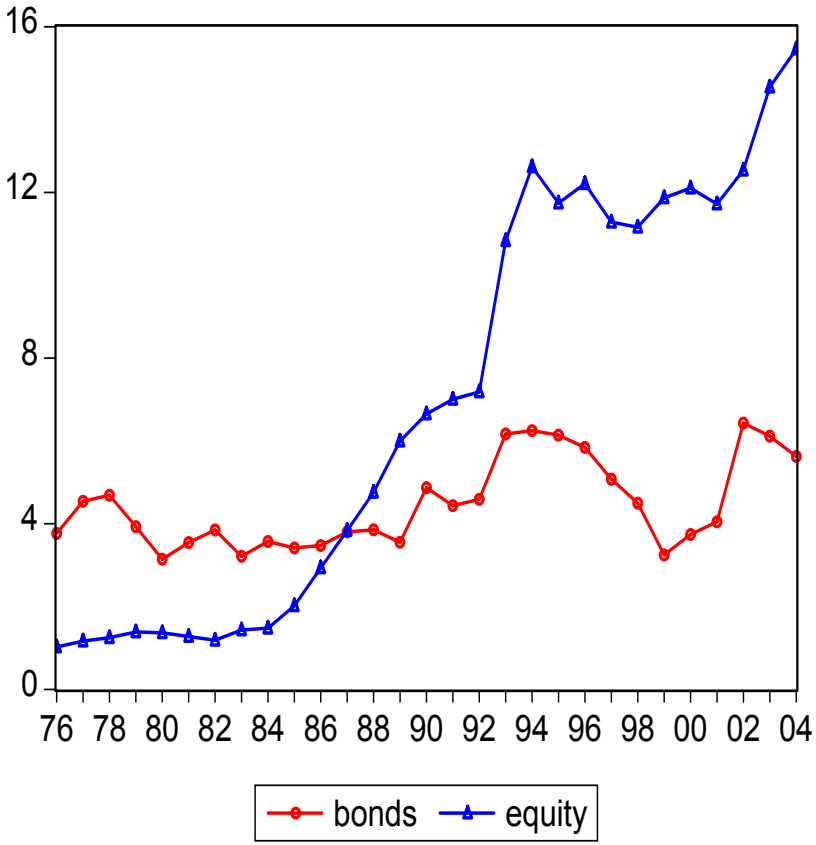
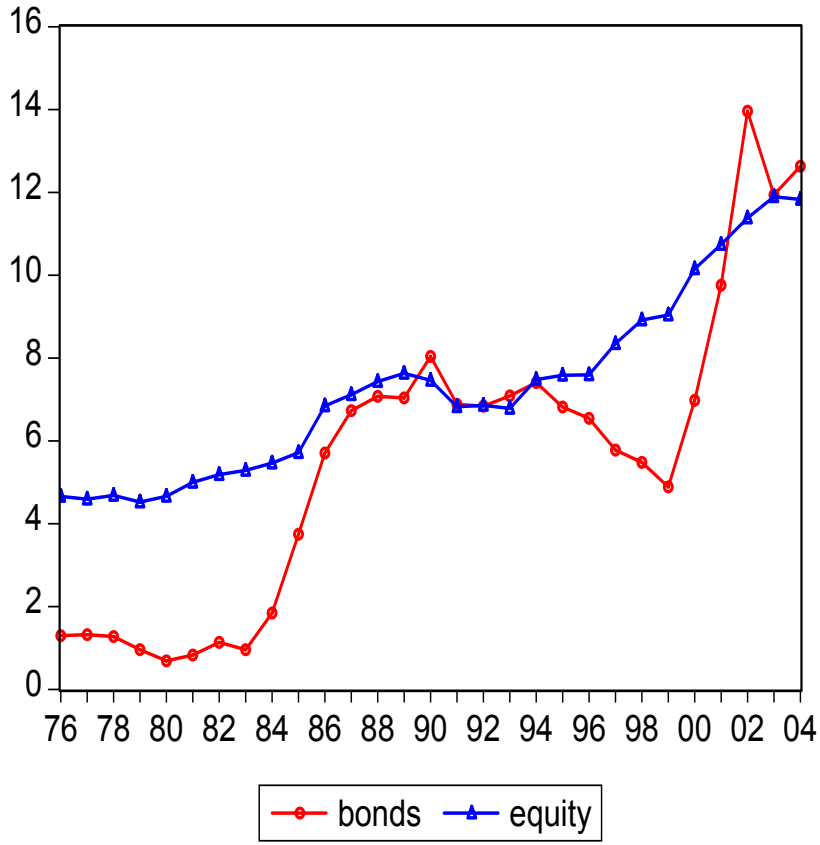


Figure 1b. Foreign-owned assets in the U.S., % capitalization



Related Literature

Macroeconomic implications of integration:

- theoretical: Baxter and Crucini (1995), Heathcote and Perri (2002), Sutherland (1996), Senay (1998), Buch and Pierdzioch (2003).
- empirical: Razin and Rose (1994), Kose, Prasad and Terrones (2003).

Welfare effects of financial integration:

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Portfolio Choice in DSGE models

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Macroeconomic Volatilities

Table 1. Volatility of Growth Rates of Selected Variables in the 1990s

	Output Y	Consumption C	Income Q	Total cons (C+G)	Ratio (C+G)/Q
	(i)	(ii)	(iii)	(iv)	(v)
Industrial countries	1.61	1.72	1.91	1.38	0.58
MFI countries	3.59	4.66	4.78	4.10	0.92
LFI countries	2.70	5.72	4.59	4.79	0.84

Source: Kose et. al. (2003), Table 1.

Contribution

Provide a theoretically based assessment of the link between financial integration and macroeconomy, in a model

- which has a relatively standard real side:
  1. Two sectors
  2. Production economy
  3. No rigidities or market imperfections (frictions?)

- and which has a "realistic" financial side:
  1. Bonds and stocks can be traded
  2. Asset markets are incomplete
  3. Dynamic portfolio and consumption choices

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Model: Building Blocks

- 2 countries: H and F
- **Firms**:
  - Tradable, T sector (production sector):
    - make investment decisions
    - issue equity, which provides claims to T dividends, D_t^T, and is priced at P_t^T
  - Nontradable, N sector (endowment sector):
    - issue equity, which is indexed to N dividends, D_t^N, and is priced at P_t^N
- **Households**:
  - consume T and local N goods
  - allocate portfolio between H and F T equity (A_t^T, $A_t^{\hat{T}}$), local N equity A_t^N, and bonds B_t
- **Three scenarios**: financial autarky (FA), low integration (LI), and high integration (HI)

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Model: Firms

T sector: A representative H firm owns its capital stock, K_t^T, and produces output, Y_t^T, according to $Y_t^T = Z_t^T \left(K_t^T\right)^\theta$, where Z_t^T is exogenous state of T productivity.

A problem facing H firm is:

$$\max_{I_t^T} \left(P_t^T + D_t^T\right),$$

subject to

$$I_t^T = K_{t+1}^T - (1-\delta) K_t^T, \qquad \text{and} \qquad D_t^T = Y_t^T - I_t^T$$

N sector: A representative H firm produces output, Y_t^N, according to $Y_t^N = \kappa Z_t^N$, where $\kappa > 0$ is a constant, and Z_t^N is the period $-t$ state of N productivity.

Model: Households

A representative H household solves:

$$\max \mathbb{E}_t \sum_{i=0}^{\infty} \beta^i \ln C_{t+i},$$

subject to

$$W_{t+1} = R^W_{t+1} \left(W_t - C^T_t - Q^N_t C^N_t \right),$$

where

$$R^W_{t+1} = R_t + \alpha^T_t (R^T_{t+1} - R_t) + \alpha^{\hat{T}}_t (R^{\hat{T}}_{t+1} - R_t) + \alpha^N_t (R^N_{t+1} - R_t)$$

The *consumption basket* at H country:

$$C_t = \left[\lambda_T^{1-\phi} (C^T_t)^\phi + \lambda_N^{1-\phi} (C^N_t)^\phi \right]^{1/\phi},$$

where $1/(1-\phi) > 0$ is the elasticity of substitution between T and N consumption.

Model: Equilibrium I

Definition

An equilibrium in our world comprises a set of equity prices $\{P_t^T, \hat{P}_t^T, P_t^N$ and $\hat{P}_t^N\}$, relative goods prices $\{Q_t^N$ and $\hat{Q}_t^N\}$ and interest rate on bonds, R_t that clear all markets given the state of productivity, the optimal investment decisions of firms producing tradable goods, and the optimal consumption, savings and portfolios decisions of households.

Model: Equilibrium II

The following markets must clear:

1. Non-tradable good markets

$$C_t^N = Y_t^N = D_t^N$$

$$\hat{C}_t^N = \hat{Y}_t^N = \hat{D}_t^N$$

2. Tradable goods market

$$C_t^T + \hat{C}_t^T = Y_t^T + \hat{Y}_t^T - I_t - \hat{I}_t$$

3. Bond market

$$0 = B_t + \hat{B}_t$$

4. Equity markets

$$\textit{tradables}: \quad 1 = A_t^T + \hat{A}_t^T, \quad \text{and} \quad 1 = \hat{A}_t^{\hat{T}} + A_t^{\hat{T}},$$

$$\textit{nontradables}: \quad 1 = A_t^N, \quad \text{and} \quad 1 = \hat{A}_t^N$$

Calibration

Table 2. Model Parameters

Preferences	β	λ_{T}	λ_{N}	$1/(1-\phi)$
	0.99	0.5	0.5	0.74
Production	θ	δ		
	0.36	0.02		
Productivity	a_{ii}^{T}	a_{ii}^{N}	Ω_e	
	0.78	0.99	0.0001	

Macroeconomic Volatilities I

1. In response to integration, households are able to share risks better.

Table 3. Macroeconomic Volatilities and Correlations

		Autarky (i)	Low Integration (ii)	High Integration (iii)
Volatility	c	0.6676	0.6788	0.6782
(% std. dev.)	c^T	0.1990	0.1647	0.1560
	y	0.7739	0.8588	0.8390
	w	0.2887	0.2268	0.2183
	c/y	0.5973	0.7350	0.7578
Correlations	$MRS, \widehat{MRS}$	-0.0017	0.5264	0.6737
	c^T, c^N	0.2023	0.4139	0.4357

Macroeconomic Volatilities II

2. The relation between financial integration and volatility of aggregate consumption and output is non-linear.

Table 3. Macroeconomic Volatilities and Correlations

		Autarky (i)	Low Integration (ii)	High Integration (iii)
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Macroeconomic Volatilities III

3. Volatility of T consumption declines with integration. Correlation between T and N consumption increases with integration.

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Macroeconomic Volatilities IV

4. Volatility of consumption output ratio increases with integration.

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Macroeconomic Volatilities V

5. Volatility of financial wealth declines with integration.

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Welfare effects of financial integration I

1. Greater integration increases unconditional welfare under HI, but the effects are small. Welfare improvement between HI and FA equilibria is equivalent to a 0.006% permanent increase in consumption.

2. Dynamic responses of lifetime utility vary significantly across the three equilibria.

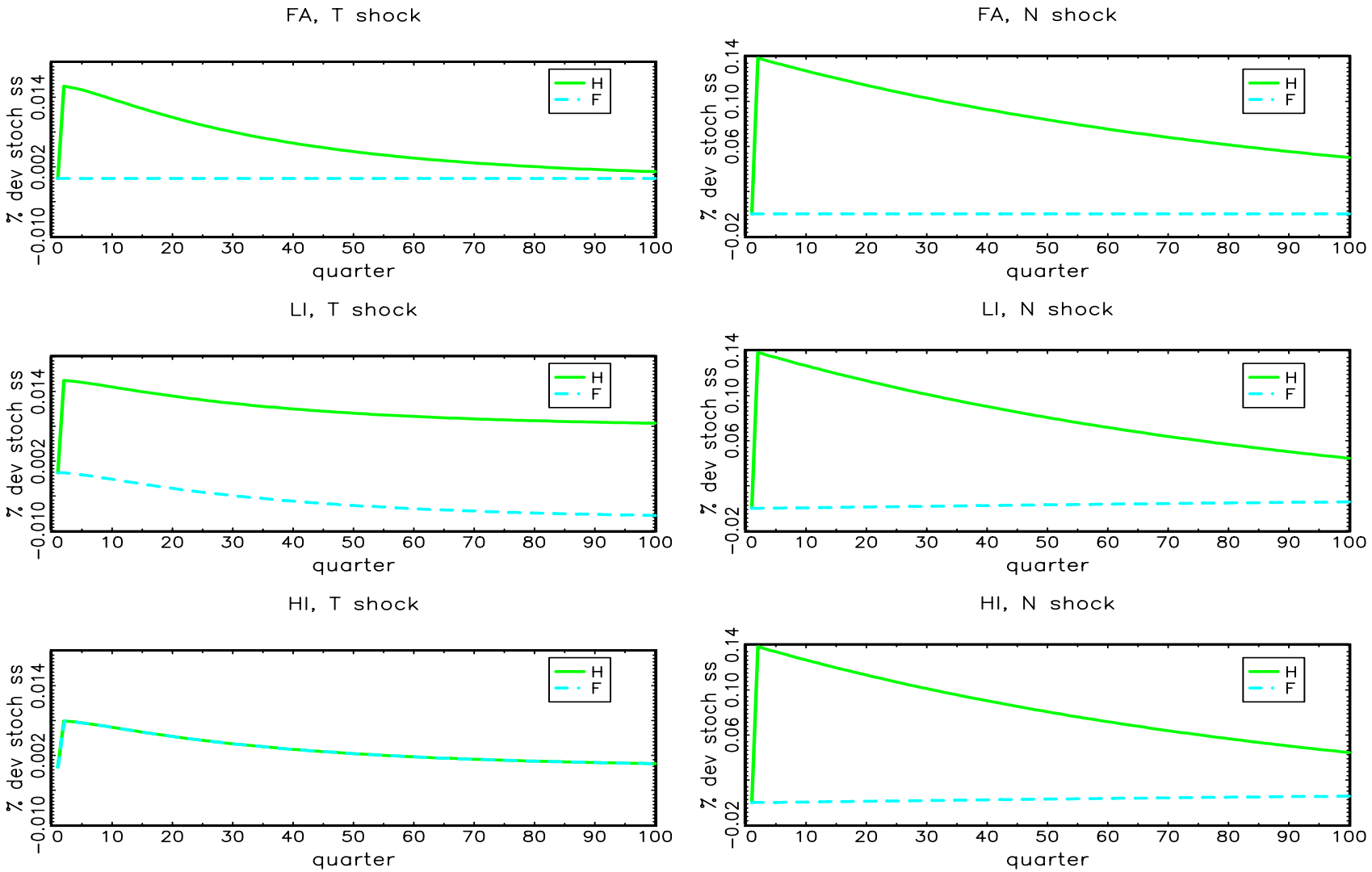

Figure 6. Conditional Expected Utility

Conclusions

- Gaining access to international equity markets allows investors to share risks better, but consumption volatility can increase.
- Volatile consumption and output are characteristic of countries at the early stages of globalization.
- Despite the increase in consumption volatility households are better off when having access to international equity markets.

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