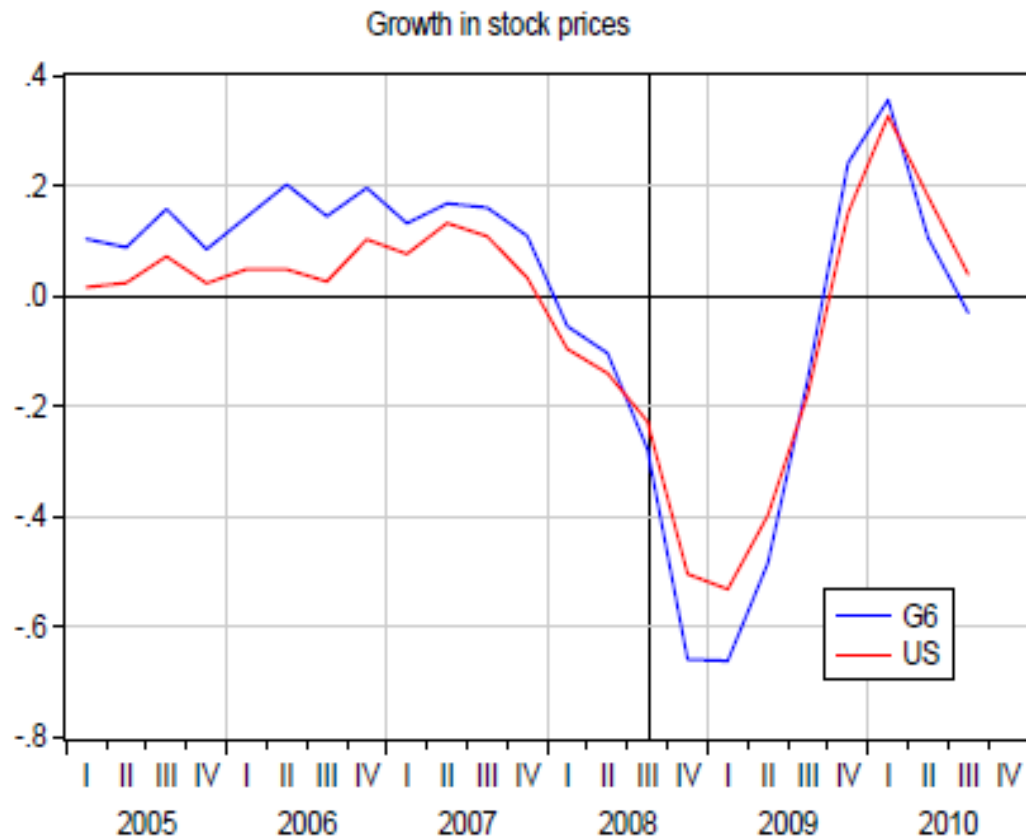


International Contagion Through Leveraged Financial Institutions

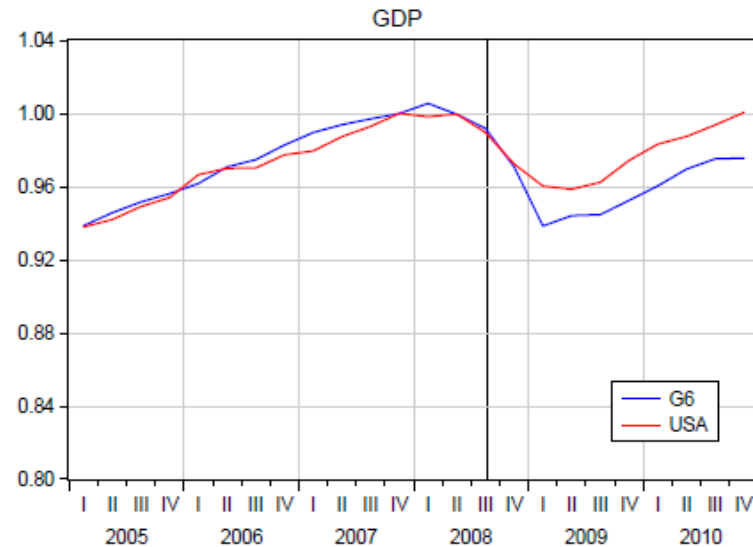
Eric van Wincoop
University of Virginia
and NBER

The 2008 Crisis Was Global, with Similar Drop in Growth and Asset Prices in ROW as in U.S.

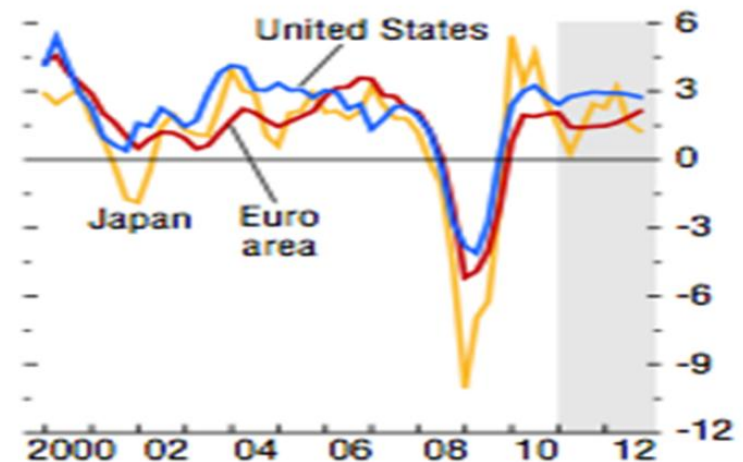
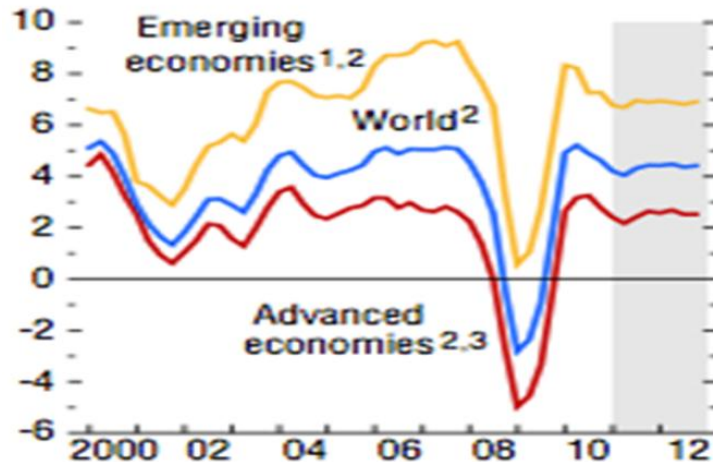


The 2008 Crisis Was Global, with Similar Drop in Growth and Asset Prices in ROW as in U.S.

GDP Level →



GDP growth rates →



Why was Impact of the 2008-2009 Crisis just as large in ROW as in U.S.?

two hypotheses:

1. the shock, originating mostly in the U.S., was transmitted abroad through leveraged financial institutions (banks)
 2. there was a self-fulfilling global spike in perceived risk (about future stock prices, future wages, future employment)
- today I will discuss #1, and dismiss it
 - a lot of my recent work focuses on #2, which I find much more plausible; happy to discuss it during the coffee break

Motivation

after the 2008 crisis a literature developed that explicitly introduced leveraged financial institutions into open economy DSGE models:

- Dedola and Lombardo (2010)
- Devereux and Yetman (2010)
- Devereux and Sutherland (2010)
- Kalemli-Ozcan, Papaioannou and Perri (2011)
- Kollmann, Enders and Muller (2010)
- Korinek, Roitman and Vegh (2010)
- Krugman (2008)
- Nguyen (2010)
- Perri and Quadrini (2011)
- Ueda (2012)

Recent Literature

- leveraged institutions are usually modeled as holding domestic and foreign securities and loans on the asset side of their balance sheet and facing various borrowing constraints on the liability side
- a typical question is what happens when banks in a Home country are hit by a negative balance sheet shock
- you can think of this for example as mortgage defaults or a drop in the valuation of asset backed securities

Motivation

- many papers find strong transmission, but this is a result of either one of two highly unrealistic assumptions

Unrealistic Assumption #1: financial markets are perfectly integrated and leveraged institutions are perfectly diversified across the globe

- if banks are perfectly diversified across countries (or there is one global bank), obviously transmission is one for one
- but that is just highly unrealistic given the strong home bias in international finance (including banks)

Recent Literature

Unrealistic Assumption #2: leveraged institutions are the only investors holding risky assets

- a typical model has households, which hold risk-free bonds or deposits, and leveraged institutions that invest these deposits in risky domestic and foreign assets
- borrowing constraints imply that the leveraged institutions cannot arbitrage between the risk-free asset (on the liability side of balance sheet) and the risky assets; nor can households
- when the borrowing constraints become more binding it implies a higher premium on the risky assets
- this is due to the lack of arbitrage (leveraged institutions like to borrow more, but they can't); not a risk premium

Recent Literature

- but leveraged institutions can perfectly arbitrage between Home and Foreign risky assets on their balance sheet
- this implies that the higher premium on risky assets reduces Home and Foreign asset prices equally (to first-order)
- there are two odd things about this transmission story:
 1. it is completely unrealistic, even in the midst of the crisis, to assume that nobody could arbitrage between stocks and bonds
 2. data from the U.S. Flow of Funds Accounts show that leveraged financial hold only 19% of risky assets (sum of corporate bonds, bank loans, other loans, mortgages, consumer credit, corporate equities)

Objectives

1. *teaching paper*

- simple model, with all the transmission channels identified in the DSGE literature, but in a more transparent way

2. *protest paper*

- protests the common view that transmission through leveraged institutions was key
- show that transmission is limited under a reasonable calibration of parameters, particularly regarding portfolio diversification and the fraction of risky assets held by leveraged institutions

The Model

- 2 countries (H and F), 3 periods (0, 1 and 2)
- leveraged institutions and non-leveraged investors in each country
- leveraged institutions purchase assets, financed through their net worth and borrowing
- will consider different types of borrowing or leverage constraints: no constraint at all, a constant maximum leverage constraint and margin constraints (collateralized borrowing)
- first describe the general setup that applies independent of these constraints

Leveraged Institutions

- some simplifications on the borrowing side
- leveraged institutions issue a bond with a constant interest rate R
- think of this as an interest rate target of the central bank, which accommodates any excess supply or demand of bonds
- as in the DSGE literature mentioned before, I abstract from default
- this is a shortcoming that I will get back to at the end
- it is a reasonable assumption with collateralized borrowing as the whole point of margin constraints is to make the risk of non-payment small
- but there may be additional transmission channels when we combine unsecured lending with the possibility of default

Leveraged Institutions

- period 0 balance sheet of leveraged institutions:

Assets	Liabilities
L_0 (short-term assets)	W_0 (net worth)
$W_0 + B_0 - L_0$ (long-term assets)	B_0 (borrowing)

- short terms assets are loans that come due in period 1 (introduced to investigate implications of partial default)
- long-term assets have a payoff in period 2

Leveraged Institutions

- assume that of the assets (both short and long-term) held in period 0, a fraction $\alpha > 0.5$ are domestic assets and a fraction $1-\alpha$ are foreign assets
- leveraged institutions in each country therefore invest a larger fraction of their assets domestically
- let the payment on the short term assets in period 1 be $(1+R)L_0$ in the absence of defaults
- the “shock” that we will consider is where there is default on a fraction δ of the Home short-term assets
- think of this for example as defaults on mortgages in the Home country

Leveraged Institutions

- the price of the long-term assets is Q_0 in period 0 (which is given) and respectively Q_H and Q_F for Home and Foreign assets in period 1
- given these assumptions, the period 1 net worth of Home leveraged institutions is

$$W_H = \frac{1}{Q_0} (W_0 + B_0 - L_0)(\alpha Q_H + (1 - \alpha) Q_F) + (1 + R)((1 - \alpha \delta) L_0 - B_0)$$

- similar for Foreign leveraged institutions, but they have less exposure to Home assets

Information Asymmetry

- the period 2 payoff on the Home and Foreign (long-term) assets is respectively D_H and D_F
- expected payoffs are D
- I introduce an information asymmetry τ that gives rise to portfolio home bias
- the perceived variance of D_H is σ^2 from the perspective of Home leveraged institutions and $\sigma^2 / (1-\tau)$ from the perspective of Foreign leveraged institutions
- analogously, the perceived variance of D_F is σ^2 from the perspective of Foreign leveraged institutions and $\sigma^2 / (1-\tau)$ from the perspective of Home leveraged institutions

On Nature of the Assets

- will refer to the Home and Foreign long-term assets simply as Home and Foreign assets
- these assets can be standard securities (stocks, bonds), asset backed securities, or loans
- in the latter case the interest rates on the loans are connected to the asset prices
- think of \bar{D} as an upper bound on the asset payoffs
- a payoff below that involves partial default on the loans
- the 2-period interest rate at time 0 is then \bar{D} / Q_0
- the 1-period interest rate at time 1 is \bar{D} / Q_H for the Home assets and \bar{D} / Q_F for the Foreign assets

Portfolio Allocation

- let K_{HH} and K_{HF} be purchases of Home and Foreign assets by Home leveraged institutions in period 1
- their portfolio return is then

$$R_H^P = 1 + R + \frac{K_{HH}}{W_H} (D_H - (1 + R)Q_H) + \frac{K_{HF}}{W_H} (D_F - (1 + R)Q_F)$$

- Home leveraged institutions maximize a simple mean-variance utility

$$E(R_H^P) - 0.5\gamma \text{var}(R_H^P)$$

- optimal portfolios are the same if we take a linear expansion of FOCs for standard CRRA expected utility preferences

Non-leveraged investors

- non-leveraged investors are assumed to start period 1 with a given wealth W_{NL}
- also consider a generalization that allows for a feedback from asset prices to the wealth of non-leveraged investors (virtually no effect on results)
- they invest in Home and Foreign assets in period 1 and in the bond
- same utility as leveraged investors, but with higher risk-aversion γ_{NL} (which makes them non-leveraged)
- same information asymmetry as for leveraged investors

Equilibrium without Borrowing Constraints

- without borrowing constraints the optimal portfolios are

$$K_{HH} = \frac{D - (1 + R)Q_H}{\gamma\sigma^2} W_H$$

$$K_{HF} = (1 - \tau) \frac{D - (1 + R)Q_F}{\gamma\sigma^2} W_H$$

- analogously for Foreign leveraged institutions and non-leveraged investors
- market clearing Home assets:

$$\frac{D - (1 + R)Q_H}{\gamma\sigma^2} \left(\frac{1}{\gamma} (W_H + (1 - \tau)W_F) + \frac{1}{\gamma_{NL}} (2 - \tau)W_{NL} \right) = K$$

Equilibrium with Constant Leverage Constraints

- leverage constraints for Home and Foreign leveraged institutions:

$$Q_H K_{HH} + Q_F K_{HF} \leq \kappa W_H$$

$$Q_H K_{FH} + Q_F K_{FF} \leq \kappa W_F$$

- these can also be written as borrowing constraints

$$B_H \leq \frac{\kappa - 1}{\kappa} (Q_H K_{HH} + Q_F K_{HF})$$

- only impact of these constraints (when binding) is to raise the effective borrowing rates (to R_H and R_F for Home and Foreign banks)

Equilibrium with Margin Constraints

- constraint: probability that the value of the assets (the collateral) next period is less than what is owed on the debt should be no greater than π :

$$\text{Prob}(K_{HH}D_H + K_{HF}D_F < (1+R)(K_{HH}Q_H + K_H Q_F - W_H)) \leq \pi$$

- this can be written as a borrowing constraint ($z = -\Psi^{-1}(\pi)$):

$$B_H \leq \frac{1}{1+R} \left((K_{HH} + K_{HF})D - z \left(K_{HH}^2 \sigma^2 + K_{HF}^2 \frac{\sigma^2}{1-\tau} \right)^{0.5} \right)$$

- only impact of these constraints (when binding) is to raise the effective rates of risk-aversion (to γ_H and γ_F for Home and Foreign banks)

Marginal Home Defaults

- starting from a symmetric equilibrium where $\delta=0$ (no defaults in period 1), we consider the impact on asset prices of marginal defaults $d\delta>0$
- this is done by differentiating the two market clearing conditions (for Home and Foreign assets) around the symmetric equilibrium
- three key parameters are α , SHARE and LEV
 - set $\alpha=1/(1-\tau)$, so that the fraction invested in Home assets is the same in period 1 as in period 0 in the symmetric equilibrium
 - we choose parameters such that leverage is the same in period 1 as in period 0, called LEV
 - SHARE is the fraction of the risky assets that is held by leveraged institutions in the symmetric equilibrium

Marginal Home Defaults

- 5 transmission channels
- will only describe them verbally here
- after that I consider the impact of a large default shock under realistic assumptions about the key parameters

Five Transmission Channels

1. *direct exposure channel*

- Foreign leveraged institutions have direct exposure to Home short-term assets on which defaults occur
- balance sheet losses lower the net worth of leveraged institutions, which lower their demand for risky assets, and lowers asset prices
- contagion is partial because of portfolio home bias
- Foreign leveraged institutions experience smaller losses from Home defaults than Home leveraged institutions
- Foreign asset prices therefore drop less than Home asset prices

Five Transmission Channels

2. *balance sheet valuation channel*

- apart from the asset on which defaults take place, Foreign leveraged institutions also have exposure to the “good” Home asset, the long-term asset
- a decline in the Home price leads to a further drop in the net worth of Foreign leveraged institutions
- this leads to further contagion
- this transmission channel is again limited by portfolio Home bias

Five Transmission Channels

3. *portfolio growth or lending channel*

- a drop in the net worth of Home leveraged institutions reduces demand by Home leveraged institutions of the Foreign asset or reduces lending by the Home leveraged institutions to the Foreign country
- again limited by portfolio home bias

Five Transmission Channels

4. *borrowing constraint channel*

- the drop in asset prices increases expected returns and therefore optimal leverage, including for Foreign leveraged institutions
- under constant leverage constraints this increases the effective borrowing rate (for both Home and Foreign leveraged institutions)
- under margin constraints this increases the effective rate of risk-aversion (both Home and Foreign leveraged institutions)
- this further reduces demand for both assets and leads to further transmission

Five Transmission Channels

5. *arbitrage channel*

- this only applies in an extension we consider where asset returns are positively correlated
- a lower Home asset price increases the Home expected excess return
- this lowers demand for Foreign assets when the returns are positively correlated
- this transmission channel is not specifically related to leveraged institutions

On Magnitude of the Impact

- before considering a specific calibration, two general points can be made about the magnitude of asset price changes and contagion
 1. asset prices changes are third (and higher) order, which tends to be small
 - a first-order drop in net worth leads to a first-order drop in asset demand
 - third-order drop in asset price is sufficient to clear the market
 - it leads to a third-order rise in the expected excess return
 - this leads to a first-order increase in asset demand as expected returns are divided by a second-order variance in optimal portfolios

On Magnitude of the Impact

2. transmission depends critically on α and SHARE
 - all transmission channels depend critically on the parameter α that measures portfolio home bias
 - with borrowing constraints transmission also depends critically on the share of assets held by leveraged financial institutions
 - borrowing constraints naturally have less impact when the share of risky assets held by leveraged institutions is smaller; only the leveraged institutions face borrowing constraints
 - we find that as SHARE becomes very large (close to 1), transmission becomes perfect; this is the unrealistic case discussed earlier where arbitrage between risky and riskfree assets breaks down

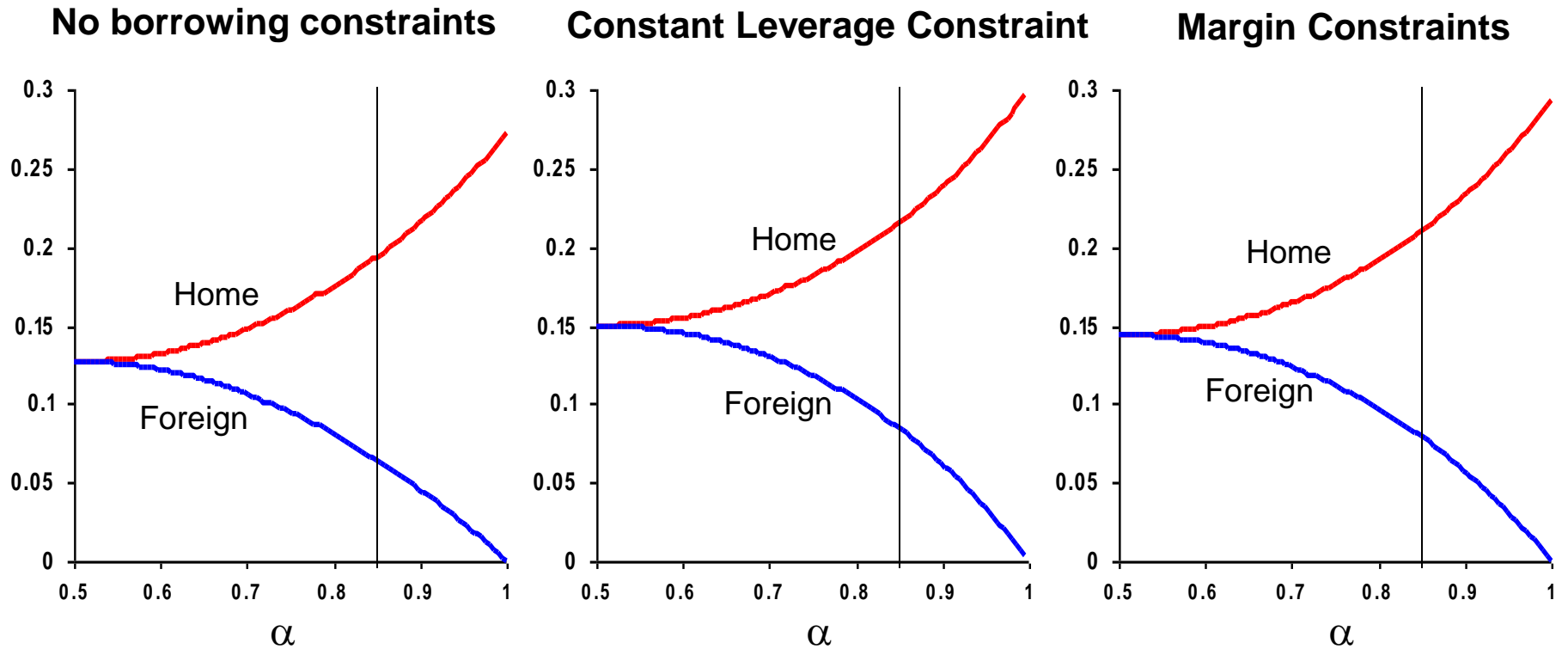
Calibration

- α is set at 0.85
 - Fidora, Fratzscher and Thimann (2007): U.S. invests 86% in domestic equity and 95% in domestic debt securities
 - Buch, Driscoll and Ostergaard (2010): 89% of assets of U.S. banks are domestic (in 2004)
 - is also consistent with estimates by Kamin and Pounder Demarco (2010) and Greenlaw et.al. (2010) of foreign exposure to U.S. asset backed securities in 2007
- SHARE is set at 0.2
 - calibrated to U.S. Flow of Funds data
 - leveraged institutions are commercial banks, savings institutions, credit unions, finance companies, brokers/hedge funds and GSEs

Calibration

- LEV is set at 12 based on an estimate by Greenlaw et al. (2008) for the same definition of leveraged institutions
- consider a shock of $\delta=0.565$, which under the benchmark parameterization implies that the net worth of leveraged financial institutions in the Home country is cut in half
- if anything this is a significant overstatement of the losses; reasonable for brokers and dealers, but losses were much smaller for other leveraged institutions

Figure 1 % Drop in Asset Prices Due to Home Defaults



Size of Impact and Transmission

- both the size of the impact and the transmission are small
- drop in the Home asset price is at most 0.2% when $\alpha=0.85$ (with constant leverage constraint)
- if we think of the assets as loans, then the interest rate on the loans rises by at most 20 basis points in the Home country and one third of that in the Foreign country
- in reality there was a 300 basis points increase in the lending rate to U.S. non-financial firms
- contagion is 33% without borrowing constraints, 40% with constant leverage constraint and 38% with margin constraints

Figure 2 % Drop in Asset Prices when Leveraged Institutions Own Half of all Assets

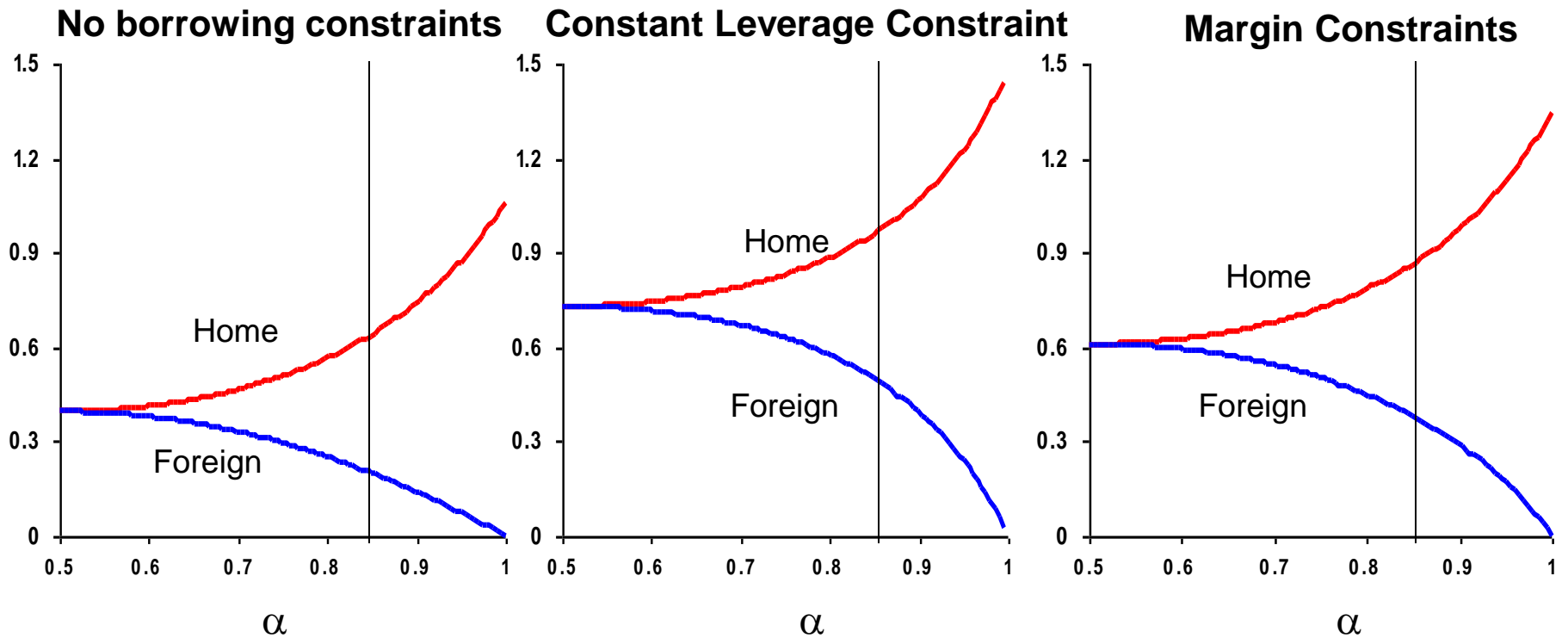
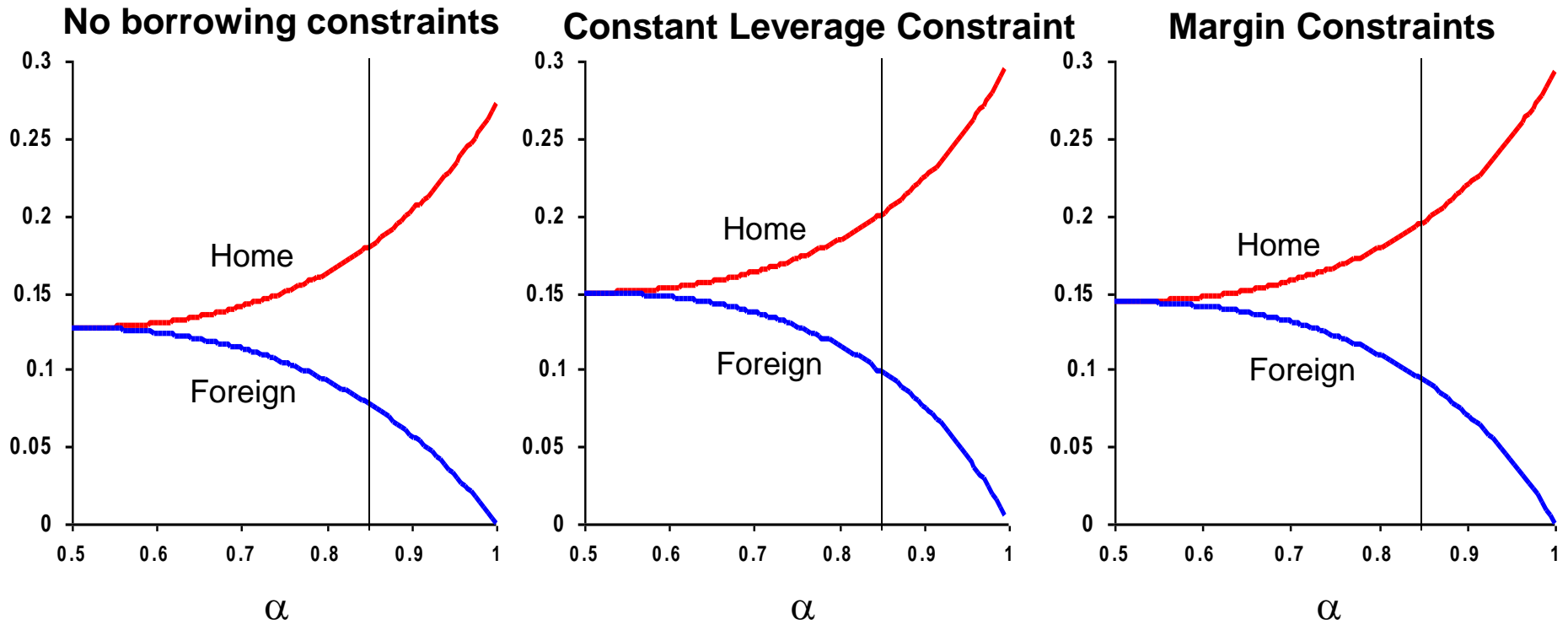


Figure 3 % Drop in Asset Prices with Correlated Asset Returns



Bottom Line

- the impact on asset prices or lending rates is tiny
- transmission is at most 50%, so well below one-to-one
- transmission is even smaller if we calibrate the Home country to be the U.S. and Europe combined
- almost all of the foreign exposure to U.S. ABS was in Europe
- U.S.+Europe accounts for 50% of world GDP, so fits well into the framework of the model with two equally sized countries
- we then calibrate α to be 0.93
- this implies a maximum transmission of only 25%
- in reality the rest of the world experienced a drop in asset prices and output that was at least as big as in U.S./Europe

Other Potential Transmission Channels Overlooked in the Model

- there may be important additional transmission channels that are absent from our model and more generally from recent open economy DSGE models with leveraged institutions
- one limitation of the literature is that leveraged institutions in the models do not default
- once you allow for default, then there may be additional transmission channels associated with unsecured lending
- default of one bank can lead to default of other banks that lend to it, etc.
- Allen and Gale (2000) have a very stylized model of this type, where a bank run starting in one region or country can lead to a domino effect

Other Potential Transmission Channels Overlooked in the Model

- unsecured lending and the possibility of default can lead to additional transmission effects when introducing information issues
- with collateralized borrowing the extent to which a bank can borrow depends on the quality of the collateral that it can offer and therefore on its actual exposure to toxic assets
- with unsecured interbank lending this is not the case
- even if a bank does not hold any toxic assets, there is a “lemons” problem as potential lenders do not know what’s on the books; this can cause interbank lending to freeze up around the world

Empirical Doubts about Transmission through Leveraged Institutions

- there are good reasons though to be highly skeptical on empirical grounds that the global contraction was the result of transmission through leveraged financial institutions
- there is a variety of evidence that all points in a different direction

Empirical Doubts about Transmission through Leveraged Institutions

- Rose and Spiegel (2010) and Kamin and Pounder (2010) find that there is little relationship between financial linkages of countries with the U.S. and the decline in their growth and asset prices
- Hebling, Huiddrom, Kose and Otrok (2010) find that the decline in global credit can account for only about 10% of the decline in global GDP
- Kahle and Stulz (2011) document that during the crisis there was no relationship between the drop in investment by firms and their bank dependence

Empirical Doubts about Transmission through Leveraged Institutions

- Chari, Christiano and Kehoe (2008) find that during the height of the crisis (last two quarters of 2008), when asset prices and GDP growth fell sharply, both consumer loans and commercial and industrial loans actually increased
- Adrian, Colla and Shin (2012) find that there was a decline in bank credit to firms in 2009, but this was made up by an equal increase in bond financing; this is consistent with our model: as leveraged institutions pull out of risky assets, the other investors enter

Conclusion

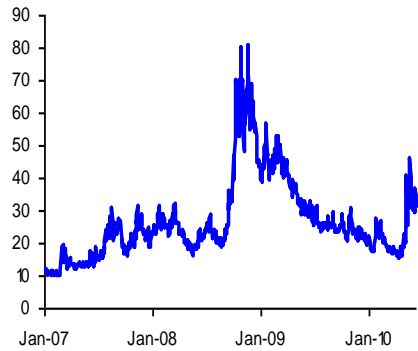
- we considered various global transmission channels associated with leveraged financial institutions in a simple model
- we found that for realistic assumptions large balance sheet losses have only a small impact on asset prices and transmission is weak
- future work should focus on other transmission channels that we have overlooked here
- however, at least as important is to understand what caused the global common spike in risk as this gives an important clue about why the crisis was global in the first place

VIX S&P 500

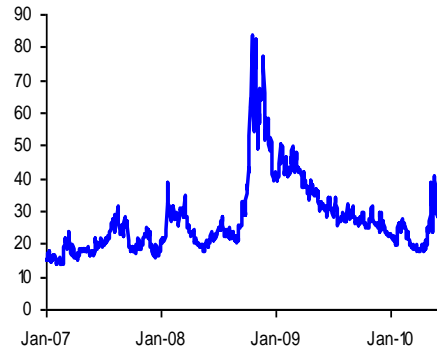


Figure 1: Implied Volatility Indices

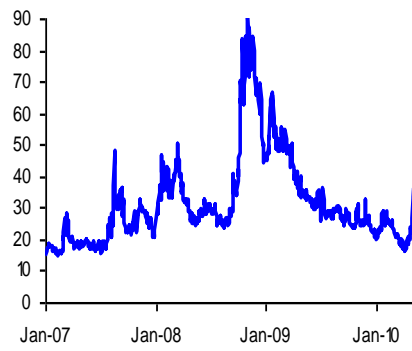
U.S.A.



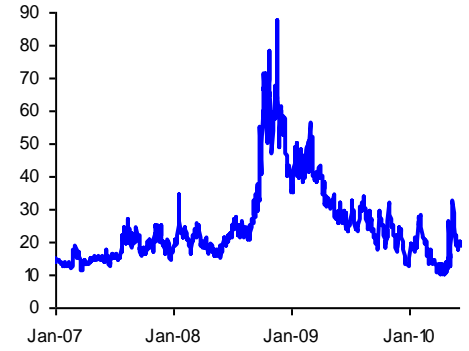
GERMANY



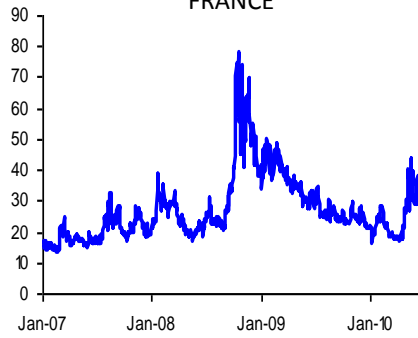
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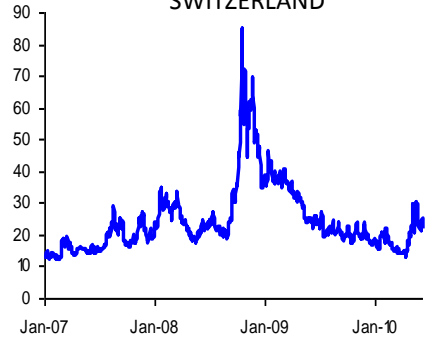
CANADA



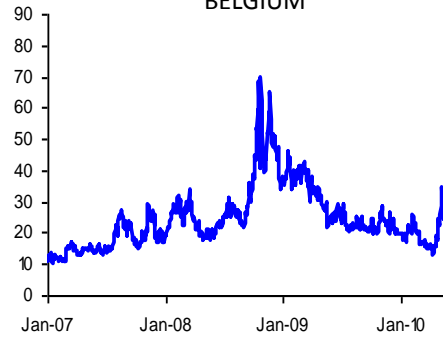
FRANCE



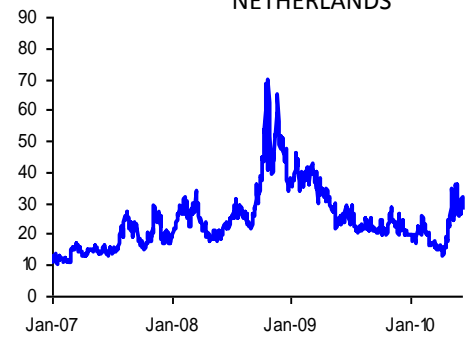
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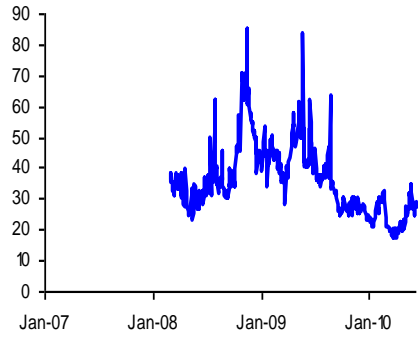
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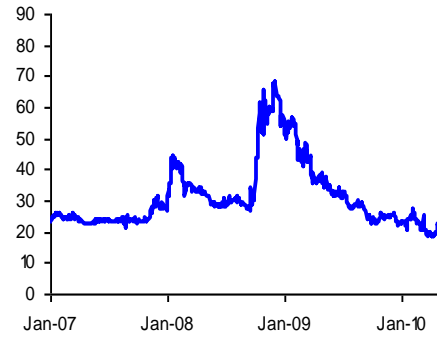
NETHERLANDS



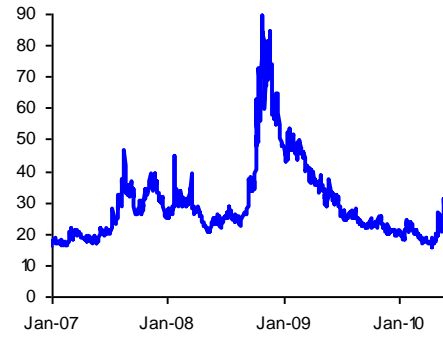
INDIA



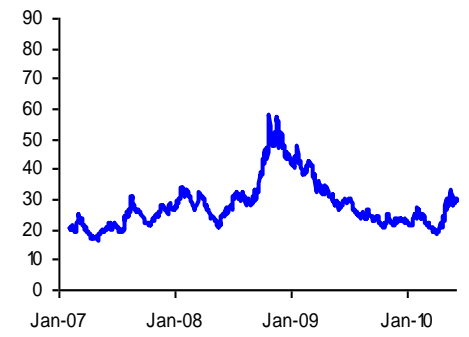
MEXICO



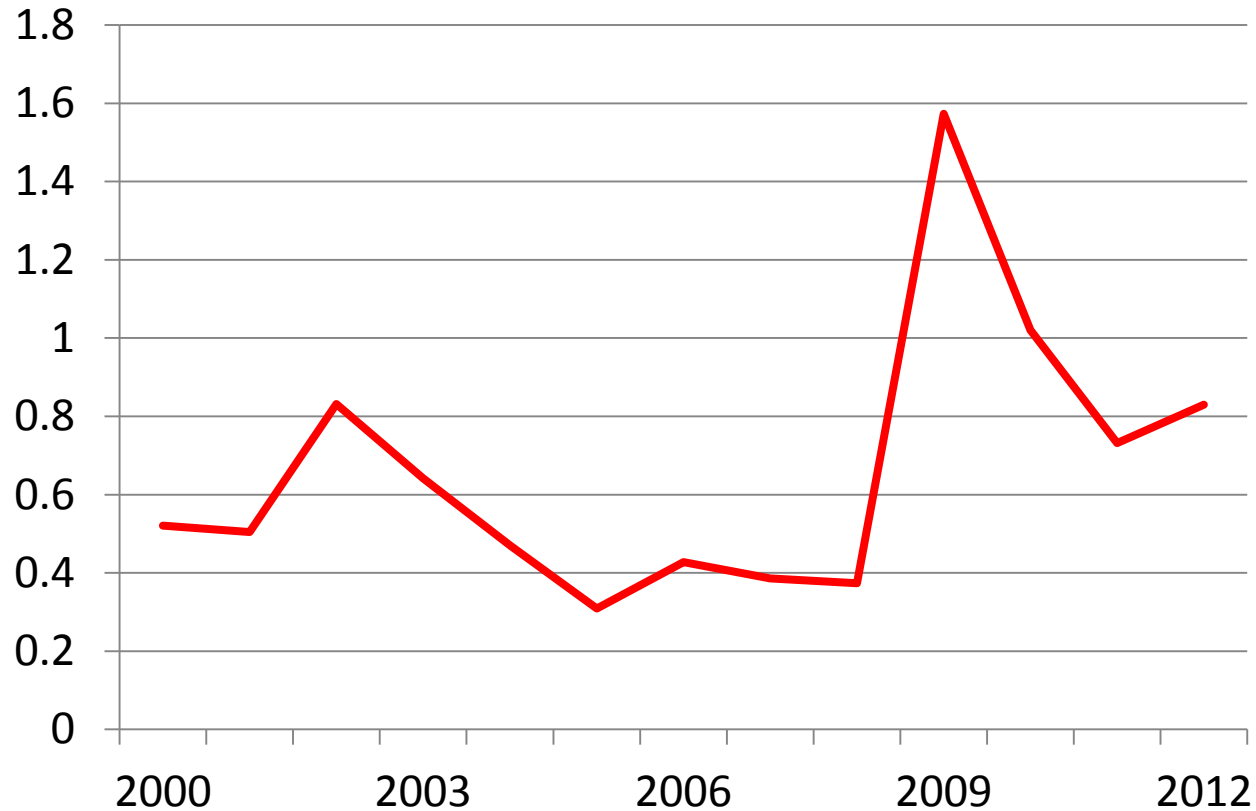
SOUTH KOREA



SOUTH AFRICA



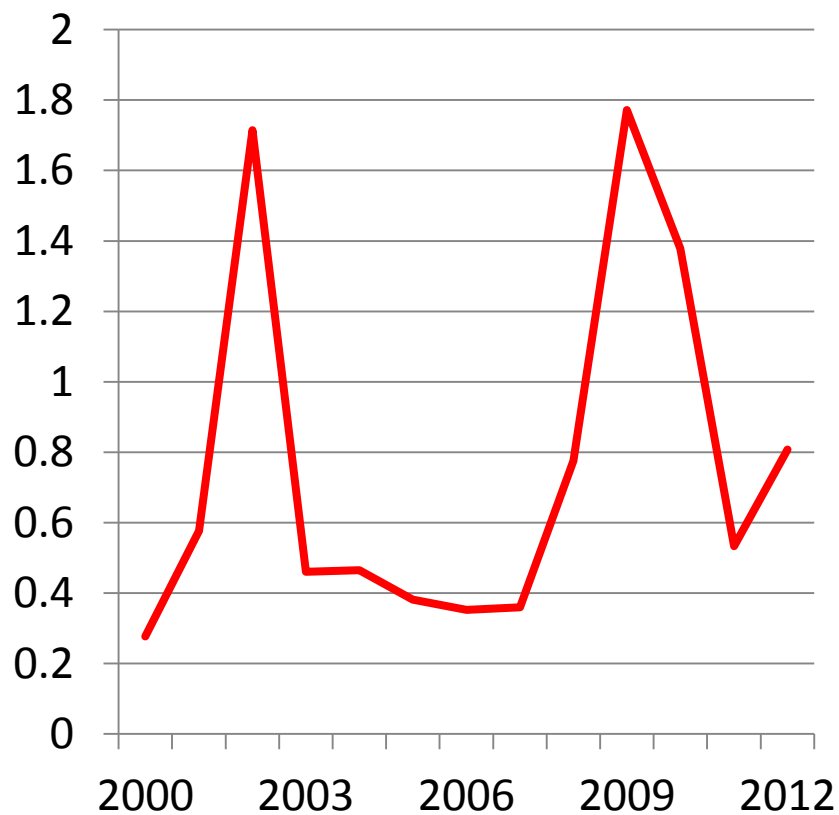
Average Variance 1-year ahead GDP growth forecast



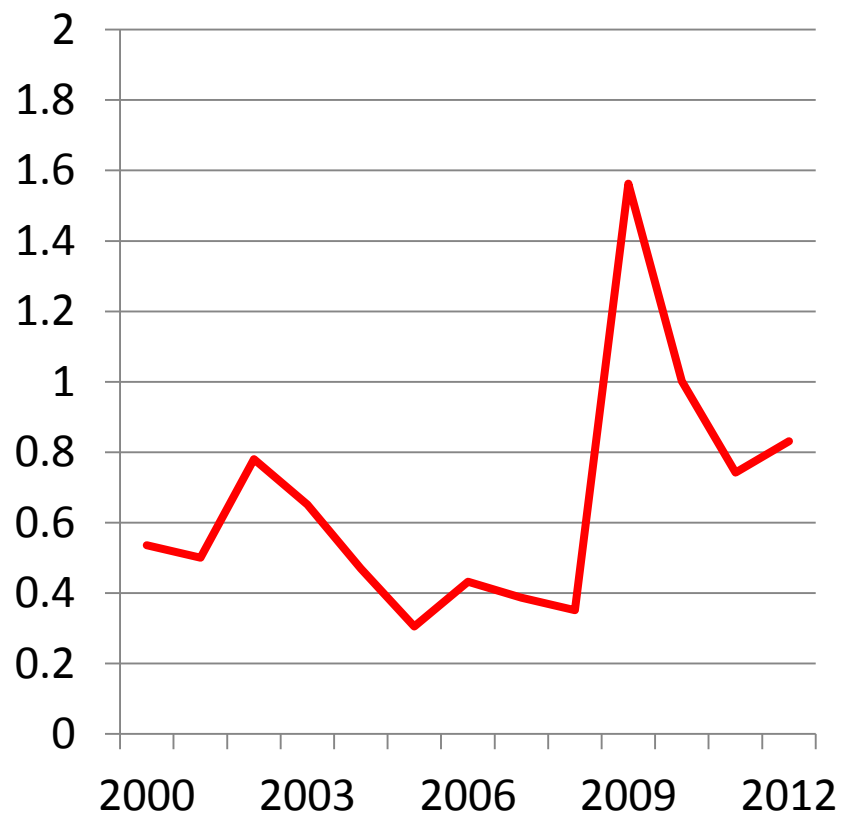
Data from Consensus Forecasts. Countries: Australia, China, Hong Kong, India, Indonesia, Malaysia, New Zealand, Philippines, Singapore, South Africa, Taiwan, Thailand, U.S., Japan, Germany, France, U.K., Italy, Canada

Average Variance 1-year ahead GDP growth forecast

United States



All Countries except U.S.



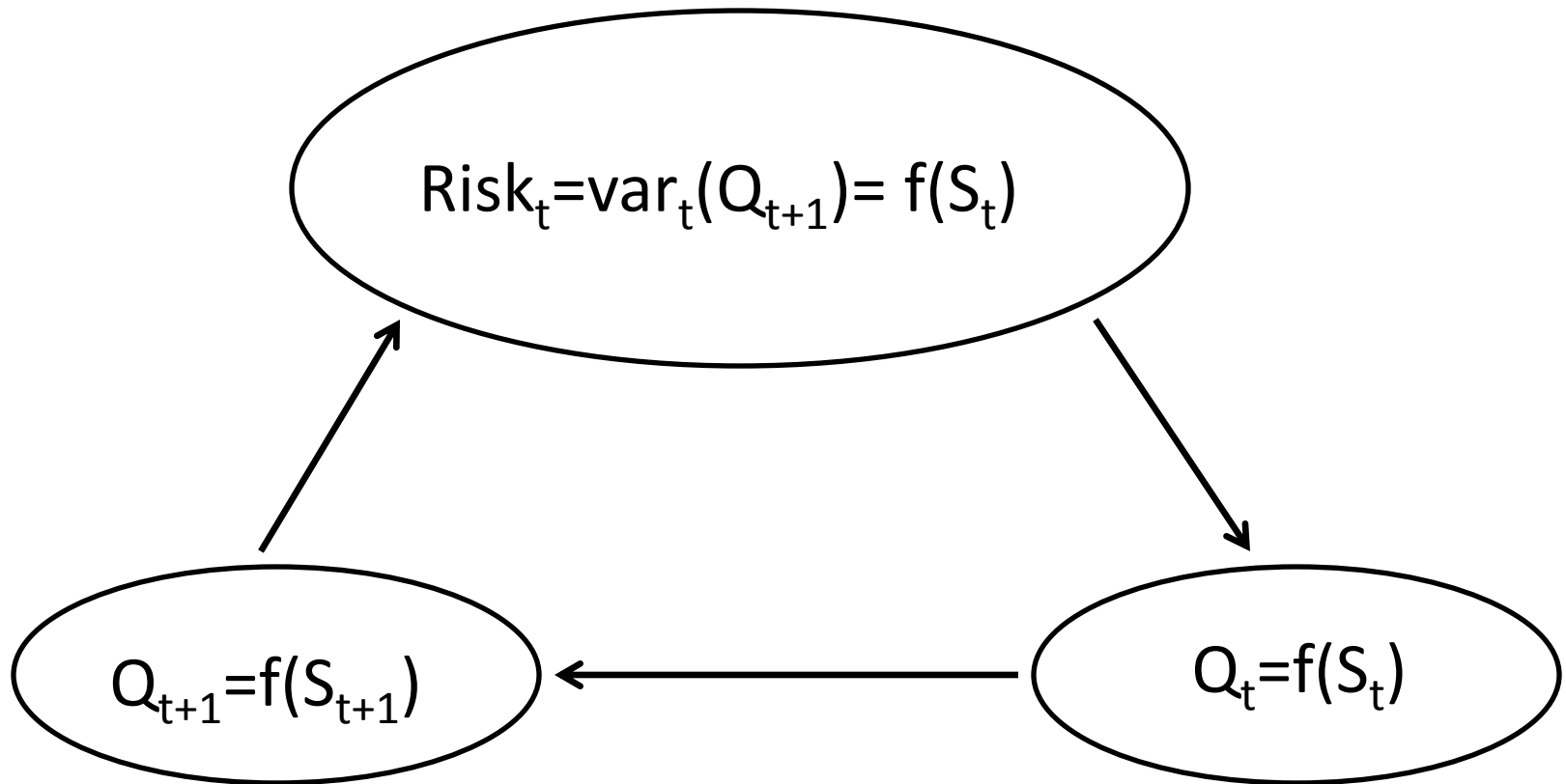
Risk

- with or without banks, there currently do not exist macro models that can account for the spike in risk of a magnitude that we saw during recent crises (quadrupling during the 2008 panic and tripling in May 2010 and August 2011 during the ongoing European debt crisis)
- in addition we need to understand why this spike in risk was similar across the globe
- there is by now a large literature, starting with Bloom (2009), which shows that uncertainty shocks can have a big impact on business cycles

Risk

- this is not surprising as higher risk lowers asset prices, reduces liquidity, raises precautionary saving and reduces investment
- the literature though focuses on exogenous changes in risk
- in recent work with Philippe Bacchetta and Cedric Tille we have developed a theory for self-fulfilling shifts in beliefs about risk
- to the extent that these are large we refer to them as risk panics, which involve a large spike in risk and sharp drop of asset prices

Self-Fulfilling Beliefs about Risk Caused by a Circular Relationship Between Stochastic Process of Asset Price Risk and Asset Price



Nature of Risk Panics

- there can be self-fulfilling shifts in risk coordinated around a sunspot or a macro fundamental
- in the latter case the macro fundamental takes on a role completely separate from its regular fundamental role by becoming a variable around which agents coordinate their perceptions of risk
- possible to have equilibria where a trigger event (Lehman Brothers failure) leads to a switch from regular fundamental equilibrium to equilibrium where a macro fundamental (net worth financial institutions or Greek debt) becomes a self-fulfilling barometer of fear

Nature of Risk Panics

- the trigger event leads to a sharp spike in risk that is bigger the weaker is the fundamental that becomes a gauge of fear
- after the panic the market becomes very sensitive to news about this fundamental
- in another paper Philippe and I have shown that such panics can be global as well
- in that case there is no transmission, but the weak fundamental becomes a focal point for fear all around the world, leading to strong asset price co-movement as the same events are observed everywhere in the world at the same time

Nature of Risk Panics

- this story has the advantage that it does not rely on financial linkages or trade linkages to explain the strong co-movement across countries
- it is hard to explain for example why the VIX in the U.S. moves almost perfectly with that in Europe during the current European debt crisis
- even recognizing linkages between U.S. and European banks, surely European banks are far more exposed to sovereign European debt than U.S. banks
- what appears to be going on is that sharp shifts in the VIX in the U.S. based on any information about Greek debt or bailout packages is driven by fear rather than the fundamental role of such variables

Other Self-Fulfilling Risk Story

- such self-fulfilling changes in beliefs about risk can occur in other ways as well
- one example, which is more closely related to business cycles than asset prices, goes as follows
- assume that some trigger event makes people scared and they believe that the future is more uncertain: more uncertainty about future wages and employment
- it is then optimal to increase precautionary saving
- this may be good for the individual household, but is bad for the aggregate economy
- it leads to a drop in output and lower profits

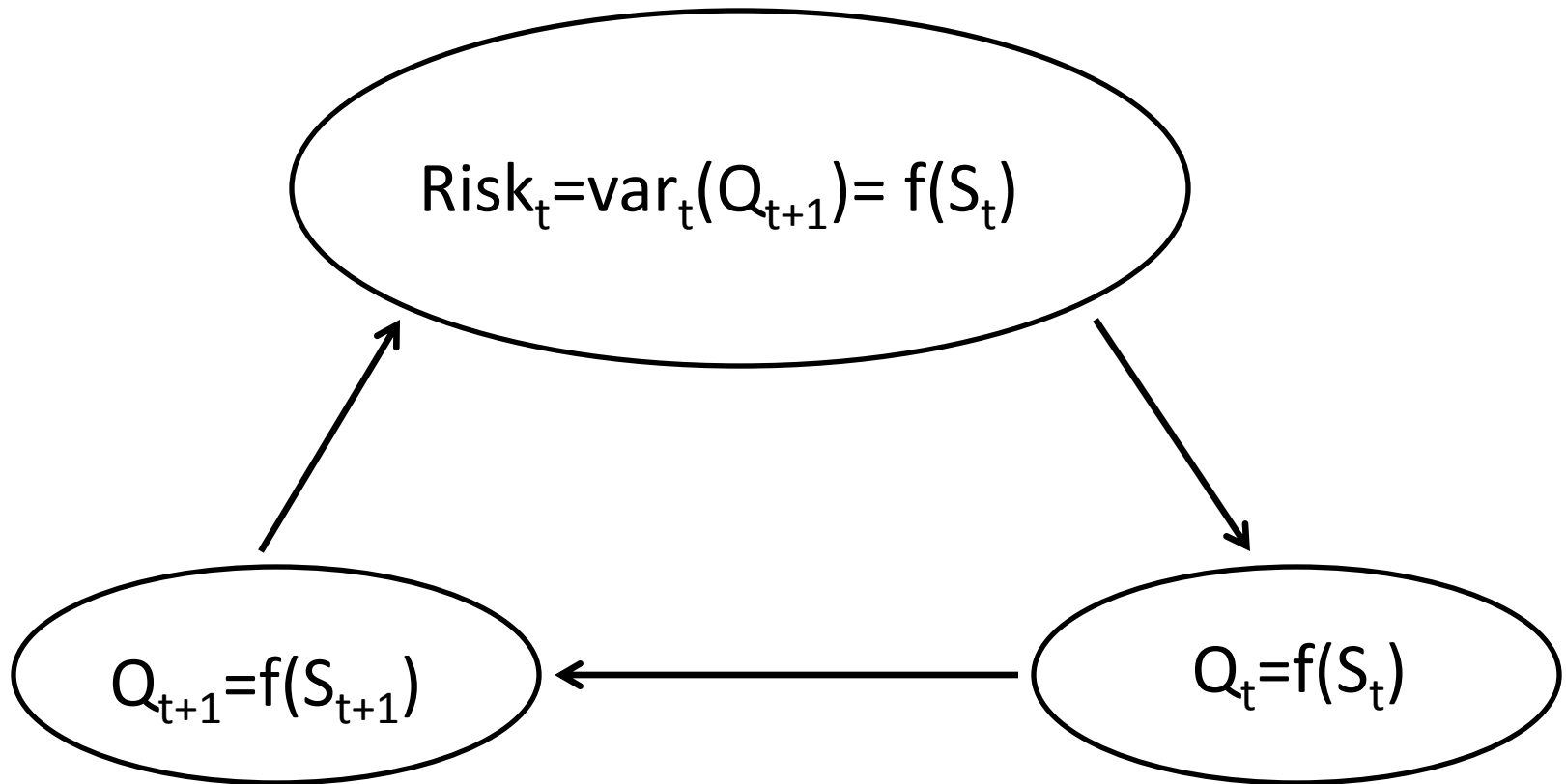
Other Self-Fulfilling Risk Stories

- firms then become more vulnerable (e.g. in response to liquidity shocks)
- this increases the risk of bankruptcies and associated declines in labor demand
- the increase in beliefs about risk then becomes self-fulfilling
- all that is needed is some trigger event to set this off
- the events in the Fall of 2008 offered plenty of ammunition
- such spikes in risk can account for the sharp drop in consumption and drop in investment (independent of the bank dependence of firms)
- it is consistent with the behavior of firms documented by Kahle and Stulz

Risk

- this is not surprising as higher risk lowers asset prices, reduces liquidity, raises precautionary saving and reduces investment
- the literature though focuses on exogenous changes in risk
- in recent work with Philippe Bacchetta and Cedric Tille we have developed a theory for self-fulfilling shifts in beliefs about risk
- to the extent that these are large we refer to them as risk panics, which involve a large spike in risk and sharp drop of asset prices

Self-Fulfilling Beliefs about Risk Caused by a Circular Relationship Between Stochastic Process of Asset Price Risk and Asset Price



Nature of Risk Panics

- there can be self-fulfilling shifts in risk coordinated around a sunspot or a macro fundamental
- in the latter case the macro fundamental takes on a role completely separate from its regular fundamental role by becoming a variable around which agents coordinate their perceptions of risk
- possible to have equilibria where a trigger event (Lehman Brothers failure) leads to a switch from regular fundamental equilibrium to equilibrium where a macro fundamental (net worth financial institutions or Greek debt) becomes a self-fulfilling barometer of fear

Nature of Risk Panics

- the trigger event leads to a sharp spike in risk that is bigger the weaker is the fundamental that becomes a gauge of fear
- after the panic the market becomes very sensitive to news about this fundamental
- in another paper Philippe and I have shown that such panics can be global as well
- in that case there is no transmission, but the weak fundamental becomes a focal point for fear all around the world, leading to strong asset price co-movement as the same events are observed everywhere in the world at the same time

Nature of Risk Panics

- this story has the advantage that it does not rely on financial linkages or trade linkages to explain the strong co-movement across countries
- it is hard to explain for example why the VIX in the U.S. moves almost perfectly with that in Europe during the current European debt crisis
- even recognizing linkages between U.S. and European banks, surely European banks are far more exposed to sovereign European debt than U.S. banks
- what appears to be going on is that sharp shifts in the VIX in the U.S. based on any information about Greek debt or bailout packages is driven by fear rather than the fundamental role of such variables

Other Self-Fulfilling Risk Story

- such self-fulfilling changes in beliefs about risk can occur in other ways as well
- one example, which is more closely related to business cycles than asset prices, goes as follows
- assume that some trigger event makes people scared and they believe that the future is more uncertain: more uncertainty about future wages and employment
- it is then optimal to increase precautionary saving
- this may be good for the individual household, but is bad for the aggregate economy
- it leads to a drop in output and lower profits

Other Self-Fulfilling Risk Stories

- firms then become more vulnerable (e.g. in response to liquidity shocks)
- this increases the risk of bankruptcies and associated declines in labor demand
- the increase in beliefs about risk then becomes self-fulfilling
- all that is needed is some trigger event to set this off
- the events in the Fall of 2008 offered plenty of ammunition
- such spikes in risk can account for the sharp drop in consumption and drop in investment (independent of the bank dependence of firms)
- it is consistent with the behavior of firms documented by Kahle and Stulz