

# Discussion of "International Contagion through Leveraged Financial Institutions" by Eric van Wincoop

Scott Davis<sup>1</sup>

*Federal Reserve Bank of Dallas*

June 21, 2012

---

<sup>1</sup>The views presented here are solely those of the presenter and should not be interpreted as representing the views of the Federal Reserve Bank of Dallas or the Federal Reserve System.

# International Contagion through Leveraged Financial Institutions

- For what was primarily a U.S. housing and subprime crisis, what explains the high degree of international asset price correlation in the recent crisis.

# International Contagion through Leveraged Financial Institutions

- For what was primarily a U.S. housing and subprime crisis, what explains the high degree of international asset price correlation in the recent crisis.
  - Between 2004 and August 2008, the correlation between daily returns of the U.S. and European markets was about 0.5.

# International Contagion through Leveraged Financial Institutions

- For what was primarily a U.S. housing and subprime crisis, what explains the high degree of international asset price correlation in the recent crisis.
  - Between 2004 and August 2008, the correlation between daily returns of the U.S. and European markets was about 0.5.
  - Since September 2008, the correlation has been about 0.7

# International Contagion through Leveraged Financial Institutions

- For what was primarily a U.S. housing and subprime crisis, what explains the high degree of international asset price correlation in the recent crisis.
  - Between 2004 and August 2008, the correlation between daily returns of the U.S. and European markets was about 0.5.
  - Since September 2008, the correlation has been about 0.7
  - The 100 day moving average correlation sometimes topped 0.8. (one time was in August 2011)

# International Contagion through Leveraged Financial Institutions

- This high correlation of asset prices is hard to square with the low degree of cross-border asset holding that we see in the data.

# International Contagion through Leveraged Financial Institutions

- This high correlation of asset prices is hard to square with the low degree of cross-border asset holding that we see in the data.
- One possible explanation is that if assets are held by leveraged financial institutions, then a fall in asset value (from defaults) has a magnified effect on net worth, and thus asset demand.

# What does this paper do?

- Construct a simple three period (period 0, period 1, period 2) model with:



# What does this paper do?

- Construct a simple three period (period 0, period 1, period 2) model with:
  - 2 countries, with a long term and a short term asset in each country.

# What does this paper do?

- Construct a simple three period (period 0, period 1, period 2) model with:
  - 2 countries, with a long term and a short term asset in each country.
  - Leveraged and non-leveraged institutions in each country hold both home and foreign, short and long term assets. (shares are calibrated)

# What does this paper do?

- Construct a simple three period (period 0, period 1, period 2) model with:
  - 2 countries, with a long term and a short term asset in each country.
  - Leveraged and non-leveraged institutions in each country hold both home and foreign, short and long term assets. (shares are calibrated)
    - Short term assets pay off in period 1, long term assets pay off in period 2.

# What does this paper do?

- Construct a simple three period (period 0, period 1, period 2) model with:
  - 2 countries, with a long term and a short term asset in each country.
  - Leveraged and non-leveraged institutions in each country hold both home and foreign, short and long term assets. (shares are calibrated)
    - Short term assets pay off in period 1, long term assets pay off in period 2.
    - Institutions start with an endowment of both types of assets, in period 1 they can buy more long-term assets.

# What does this paper do?

- In period 1, there is an exogenous increase in defaults of short term assets, this affects the net worth of institutions.

# What does this paper do?

- In period 1, there is an exogenous increase in defaults of short term assets, this affects the net worth of institutions.
- There is no borrowing in period 1, so net worth in period 1 determines the demand for long-term assets in period 1.

# What does this paper do?

- In period 1, there is an exogenous increase in defaults of short term assets, this affects the net worth of institutions.
- There is no borrowing in period 1, so net worth in period 1 determines the demand for long-term assets in period 1.
- Exogenous increase in the default rate of home short term assets in period 1 →

# What does this paper do?

- In period 1, there is an exogenous increase in defaults of short term assets, this affects the net worth of institutions.
- There is no borrowing in period 1, so net worth in period 1 determines the demand for long-term assets in period 1.
- Exogenous increase in the default rate of home short term assets in period 1 →
- Reduction in the net worth of home and foreign leveraged and non-leveraged institutions →



# What does this paper do?

- In period 1, there is an exogenous increase in defaults of short term assets, this affects the net worth of institutions.
- There is no borrowing in period 1, so net worth in period 1 determines the demand for long-term assets in period 1.
- Exogenous increase in the default rate of home short term assets in period 1 →
- Reduction in the net worth of home and foreign leveraged and non-leveraged institutions →
- Reduction in the demand for home and foreign long-term assets in period 1 →

# What does this paper do?

- In period 1, there is an exogenous increase in defaults of short term assets, this affects the net worth of institutions.
- There is no borrowing in period 1, so net worth in period 1 determines the demand for long-term assets in period 1.
- Exogenous increase in the default rate of home short term assets in period 1 →
- Reduction in the net worth of home and foreign leveraged and non-leveraged institutions →
- Reduction in the demand for home and foreign long-term assets in period 1 →
- The prices of home and foreign long-term assets fall.

# What does this paper do?

- Leverage magnifies the effect of defaults on net worth, and thus asset demand.

# What does this paper do?

- Leverage magnifies the effect of defaults on net worth, and thus asset demand.
- The cross-border holding of short and long-term assets determines the extent to which an increase in home defaults affects foreign asset prices.

# What does this paper do?

- Leverage magnifies the effect of defaults on net worth, and thus asset demand.
- The cross-border holding of short and long-term assets determines the extent to which an increase in home defaults affects foreign asset prices.
  - Following an increase in home defaults, home institutions have lower net worth, so demand fewer foreign long-term assets.

# What does this paper do?

- Leverage magnifies the effect of defaults on net worth, and thus asset demand.
- The cross-border holding of short and long-term assets determines the extent to which an increase in home defaults affects foreign asset prices.
  - Following an increase in home defaults, home institutions have lower net worth, so demand fewer foreign long-term assets.
  - Following an increase in home defaults, foreign institutions have a lower net worth, so demand fewer foreign long-term assets.

# What does this paper do?

- **This paper derives closed-form solutions for the demand and prices of assets.**

# What does this paper do?

- **This paper derives closed-form solutions for the demand and prices of assets.**
- With a closed-form solution for home and foreign asset prices, the author can take a derivative of the price with respect to defaults to calculate a closed-form solution for the extent of international contagion and find the contribution of individual channels.



# What does this paper do?

- **This paper derives closed-form solutions for the demand and prices of assets.**
- With a closed-form solution for home and foreign asset prices, the author can take a derivative of the price with respect to defaults to calculate a closed-form solution for the extent of international contagion and find the contribution of individual channels.
- When the parameters in the model are calibrated to match the degree of cross-border asset holding that we observe in the data, the model cannot replicate the extent of international contagion in equity markets that we observed in the recent crisis.

# Issues with the paper's main result

Payoff to asset unaffected by defaults

- The payoff in period 2 of the long term asset is stochastic and centered around  $D$

# Issues with the paper's main result

Payoff to asset unaffected by defaults

- The payoff in period 2 of the long term asset is stochastic and centered around  $D$
- The mean or the variance of the pay-off in the second period is unaffected by defaults in the first period

# Issues with the paper's main result

## Payoff to asset unaffected by defaults

- The payoff in period 2 of the long term asset is stochastic and centered around  $D$
- The mean or the variance of the pay-off in the second period is unaffected by defaults in the first period
- Defaults affect the asset price simply by affecting net worth and thus demand

# Issues with the paper's main result

## Payoff to asset unaffected by defaults

- The payoff in period 2 of the long term asset is stochastic and centered around  $D$
- The mean or the variance of the pay-off in the second period is unaffected by defaults in the first period
- Defaults affect the asset price simply by affecting net worth and thus demand
  - There is no sort of feedback loop where falling asset prices affect future asset payoffs, leading to falling asset prices.

# Issues with the paper's main result

Case with no borrowing constraints still has borrowing constraints

- The paper goes through 3 cases:

# Issues with the paper's main result

Case with no borrowing constraints still has borrowing constraints

- The paper goes through 3 cases:
  - no borrowing constraints,

# Issues with the paper's main result

Case with no borrowing constraints still has borrowing constraints

- The paper goes through 3 cases:
  - no borrowing constraints,
  - collateral constraints,



# Issues with the paper's main result

Case with no borrowing constraints still has borrowing constraints

- The paper goes through 3 cases:
  - no borrowing constraints,
  - collateral constraints,
  - and margin requirements (basically lead to forward looking collateral constraints)

# Issues with the paper's main result

Case with no borrowing constraints still has borrowing constraints

- The paper goes through 3 cases:
  - no borrowing constraints,
  - collateral constraints,
  - and margin requirements (basically lead to forward looking collateral constraints)
- One of the most interesting results from the paper is how the author shows how the contagion and the overall depth of the asset price fall depends on the borrowing constraint.

# Issues with the paper's main result

Case with no borrowing constraints still has borrowing constraints

- The paper goes through 3 cases:
  - no borrowing constraints,
  - collateral constraints,
  - and margin requirements (basically lead to forward looking collateral constraints)
- One of the most interesting results from the paper is how the author shows how the contagion and the overall depth of the asset price fall depends on the borrowing constraint.
- When there are no borrowing constraints, contagion is proportional to cross-border asset holding, when there are collateral constraints, contagion is greater.

# Issues with the paper's main result

Case with no borrowing constraints still has borrowing constraints

- But the case of no borrowing constraints is not a pure 'Miller and Modigliani' (MM) world.

# Issues with the paper's main result

Case with no borrowing constraints still has borrowing constraints

- But the case of no borrowing constraints is not a pure 'Miller and Modigliani' (MM) world.
- Leveraged institutions can't borrow in period 1, that is a borrowing constraint in every version of the model.

# Issues with the paper's main result

Case with no borrowing constraints still has borrowing constraints

- But the case of no borrowing constraints is not a pure 'Miller and Modigliani' (MM) world.
- Leveraged institutions can't borrow in period 1, that is a borrowing constraint in every version of the model.
  - In period 1, the leveraged financial institution facing borrowing constraints may have to sell assets in order to maintain a certain leverage ratio after a default shock,

# Issues with the paper's main result

Case with no borrowing constraints still has borrowing constraints

- But the case of no borrowing constraints is not a pure 'Miller and Modigliani' (MM) world.
- Leveraged institutions can't borrow in period 1, that is a borrowing constraint in every version of the model.
  - In period 1, the leveraged financial institution facing borrowing constraints may have to sell assets in order to maintain a certain leverage ratio after a default shock,
  - where as a leveraged financial institution that doesn't face borrowing constraints doesn't have to sell assets following a shock

# Issues with the paper's main result

Case with no borrowing constraints still has borrowing constraints

- But the case of no borrowing constraints is not a pure 'Miller and Modigliani' (MM) world.
- Leveraged institutions can't borrow in period 1, that is a borrowing constraint in every version of the model.
  - In period 1, the leveraged financial institution facing borrowing constraints may have to sell assets in order to maintain a certain leverage ratio after a default shock,
  - where as a leveraged financial institution that doesn't face borrowing constraints doesn't have to sell assets following a shock
- In a pure MM world, the net worth of leveraged institutions should not affect their asset demand in period 1.



# Issues with the paper's main result

Case with no borrowing constraints still has borrowing constraints

- But the case of no borrowing constraints is not a pure 'Miller and Modigliani' (MM) world.
- Leveraged institutions can't borrow in period 1, that is a borrowing constraint in every version of the model.
  - In period 1, the leveraged financial institution facing borrowing constraints may have to sell assets in order to maintain a certain leverage ratio after a default shock,
  - where as a leveraged financial institution that doesn't face borrowing constraints doesn't have to sell assets following a shock
- In a pure MM world, the net worth of leveraged institutions should not affect their asset demand in period 1.
- If they could borrow in period 1, their demand in the case with no borrowing constraints should depend on discounted future payoff, and nothing more.

# Issues with the paper's main result

Borrowing constraints don't lead to a 'fire sale'

- Related to the last point, in the model with borrowing constraints,

# Issues with the paper's main result

Borrowing constraints don't lead to a 'fire sale'

- Related to the last point, in the model with borrowing constraints,
  - where there is a shock to defaults,

# Issues with the paper's main result

Borrowing constraints don't lead to a 'fire sale'

- Related to the last point, in the model with borrowing constraints,
  - where there is a shock to defaults,
  - leveraged institutions must sell assets (or at least buy fewer) in order to maintain a leverage ratio

# Issues with the paper's main result

Borrowing constraints don't lead to a 'fire sale'

- Related to the last point, in the model with borrowing constraints,
  - where there is a shock to defaults,
  - leveraged institutions must sell assets (or at least buy fewer) in order to maintain a leverage ratio
  - this would lead to lower asset prices, leading to greater leverage ratios and forcing more asset sales

# Issues with the paper's main result

Borrowing constraints don't lead to a 'fire sale'

- Related to the last point, in the model with borrowing constraints,
  - where there is a shock to defaults,
  - leveraged institutions must sell assets (or at least buy fewer) in order to maintain a leverage ratio
  - this would lead to lower asset prices, leading to greater leverage ratios and forcing more asset sales
- We see that in this model, but quantitatively this feedback channel is weaker than it would be in a dynamic model with some sort of adjustment cost.

# Issues with the paper's main result

Borrowing constraints don't lead to a 'fire sale'

- Related to the last point, in the model with borrowing constraints,
  - where there is a shock to defaults,
  - leveraged institutions must sell assets (or at least buy fewer) in order to maintain a leverage ratio
  - this would lead to lower asset prices, leading to greater leverage ratios and forcing more asset sales
- We see that in this model, but quantitatively this feedback channel is weaker than it would be in a dynamic model with some sort of adjustment cost.
  - This would essentially look like a liquidity channel and lead to fire sale reactions to asset prices.

# Issues with the paper's main result

Constant risk aversion (or rather constant market risk premium)

- The author mentions how some sort of variable coefficient of risk aversion, that has multiple equilibria, and is countercyclical is needed to explain what we see in the data.



# Issues with the paper's main result

Constant risk aversion (or rather constant market risk premium)

- The author mentions how some sort of variable coefficient of risk aversion, that has multiple equilibria, and is countercyclical is needed to explain what we see in the data.
- The country-specific coefficient of relative risk aversion enters into the required rate of return on holding assets

# Issues with the paper's main result

Constant risk aversion (or rather constant market risk premium)

- The author mentions how some sort of variable coefficient of risk aversion, that has multiple equilibria, and is countercyclical is needed to explain what we see in the data.
- The country-specific coefficient of relative risk aversion enters into the required rate of return on holding assets
  - It enters into the market risk premium from the CAPM.

# Issues with the paper's main result

Constant risk aversion (or rather constant market risk premium)

- The author mentions how some sort of variable coefficient of risk aversion, that has multiple equilibria, and is countercyclical is needed to explain what we see in the data.
- The country-specific coefficient of relative risk aversion enters into the required rate of return on holding assets
  - It enters into the market risk premium from the CAPM.
- An international coordinated increase in coefficients of risk aversion will push up required rates of return, and thus push down asset prices, internationally.

# Issues with the paper's main result

Constant risk aversion (or rather constant market risk premium)

- Geanakoplos (2009) discusses what he calls special bad news,

# Issues with the paper's main result

Constant risk aversion (or rather constant market risk premium)

- Geanakoplos (2009) discusses what he calls special bad news,
  - bad news that not only lowers the expectation of future payouts, but increases the variance of those payouts

# Issues with the paper's main result

Constant risk aversion (or rather constant market risk premium)

- Geanakoplos (2009) discusses what he calls special bad news,
  - bad news that not only lowers the expectation of future payouts, but increases the variance of those payouts
- Davis (2010) uses a model where leveraged financial institutions hold assets that could possibly default,

# Issues with the paper's main result

Constant risk aversion (or rather constant market risk premium)

- Geanakoplos (2009) discusses what he calls special bad news,
  - bad news that not only lowers the expectation of future payouts, but increases the variance of those payouts
- Davis (2010) uses a model where leveraged financial institutions hold assets that could possibly default,
  - if there is some heterogeneity across leveraged institutions with regard to exposure to loan losses,

# Issues with the paper's main result

Constant risk aversion (or rather constant market risk premium)

- Geanakoplos (2009) discusses what he calls special bad news,
  - bad news that not only lowers the expectation of future payouts, but increases the variance of those payouts
- Davis (2010) uses a model where leveraged financial institutions hold assets that could possibly default,
  - if there is some heterogeneity across leveraged institutions with regard to exposure to loan losses,
  - then an exogenous increase in defaults lowers the expected value of the value of a financial institution's assets, but also the variance.