International Macroeconomics - Session VI
Global Imbalances

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This session: (Global) Imbalances

- What drives capital flows in the standard model?
- What drove capital flows in the Eurozone prior to 2008?
- What caused the global Imbalances of the 1990s/2000s?
- Were global imbalances responsible for the crisis?

Roadmap

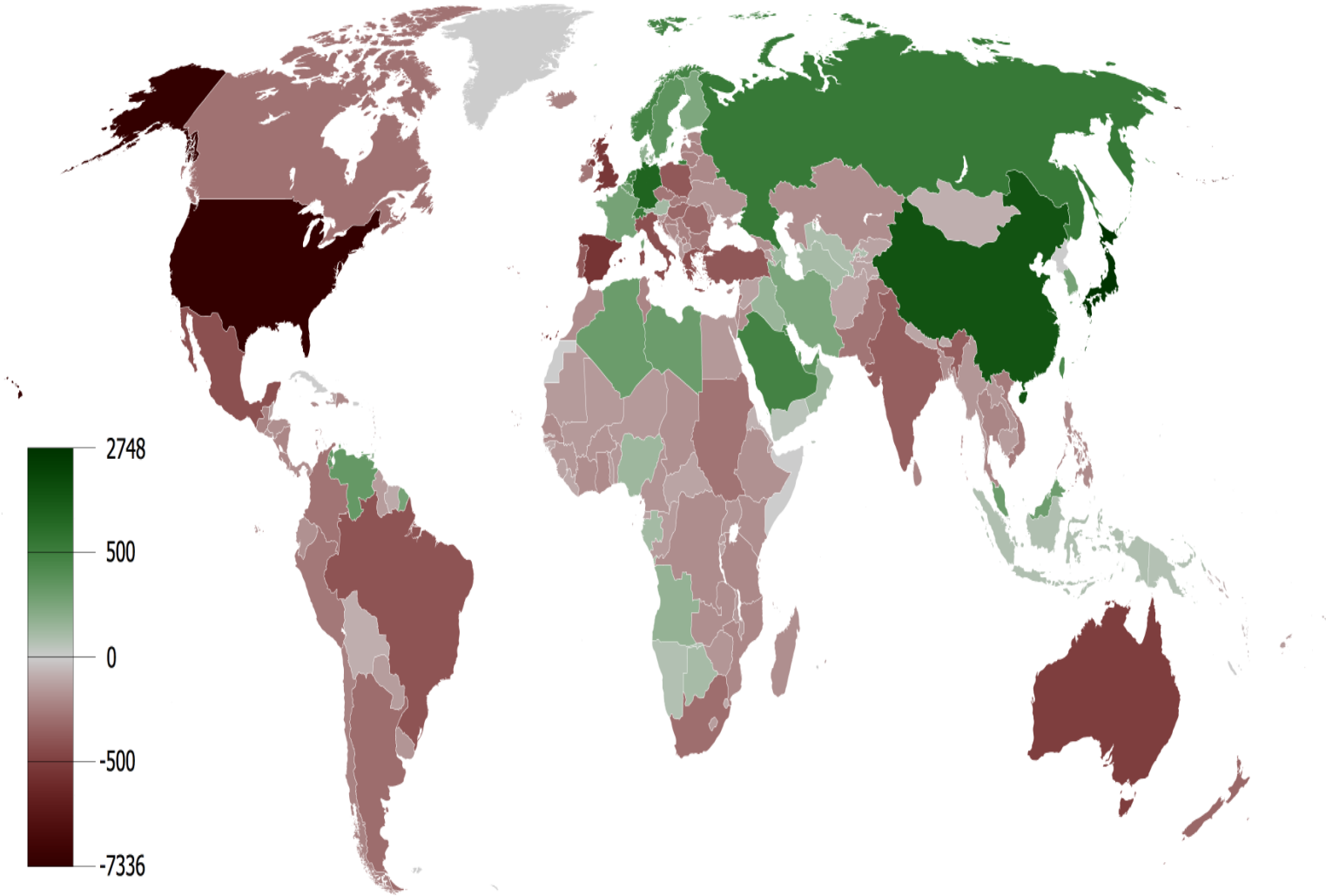
1. Facts
2. Capital Flows in the standard model
3. Application: Eurozone pre-2008
4. Sustainability of the CA deficits
5. Determinants of long-term equilibrium asset positions
6. Global Imbalances and the Crisis

Facts

1. Current accounts
2. Net and gross foreign investment positions
3. Portfolio returns

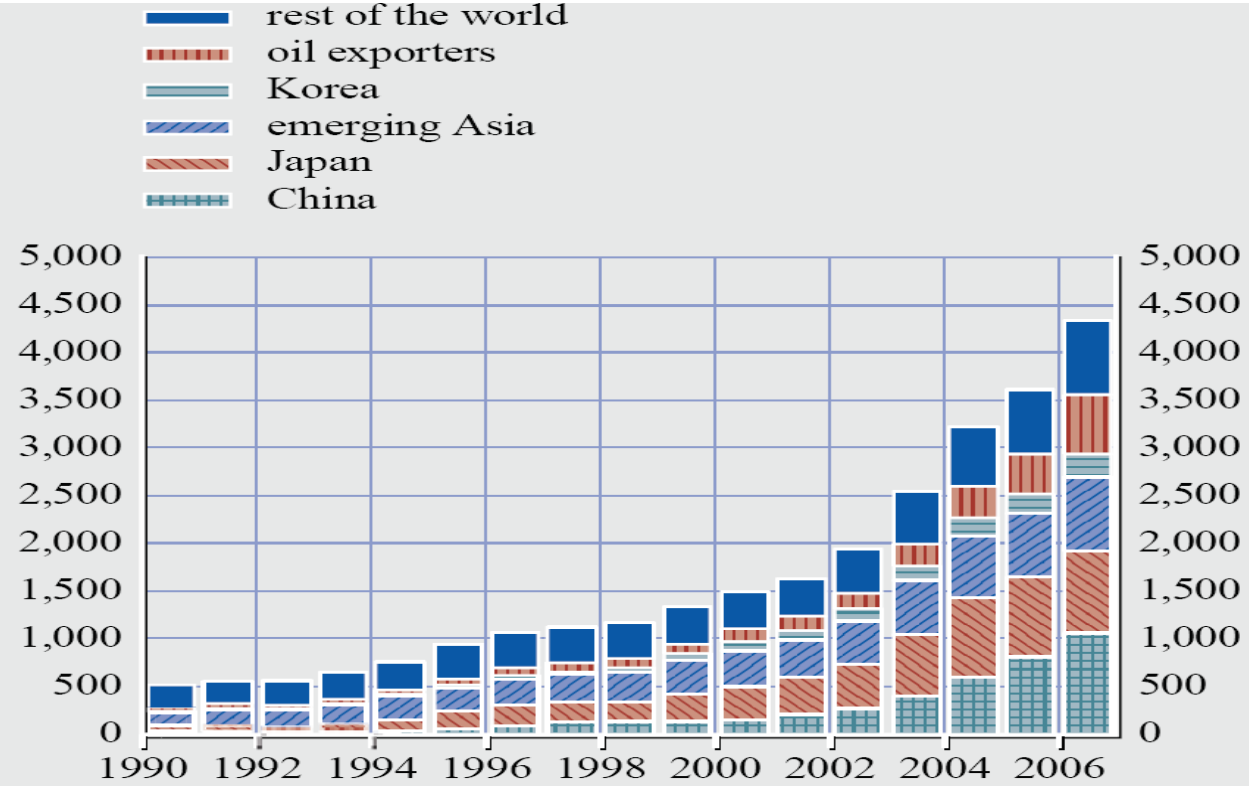
Facts I: Global Imbalances

Cumulative current account balance 1980-2008



Source: Wikipedia

Foreign Exchange Reserves 1990-2006



Source: ECB 2008, IMF WEO

Facts II: Eurozone Imbalances

Table 2 - Cumulated current accounts - 1999-2008, % of GDP

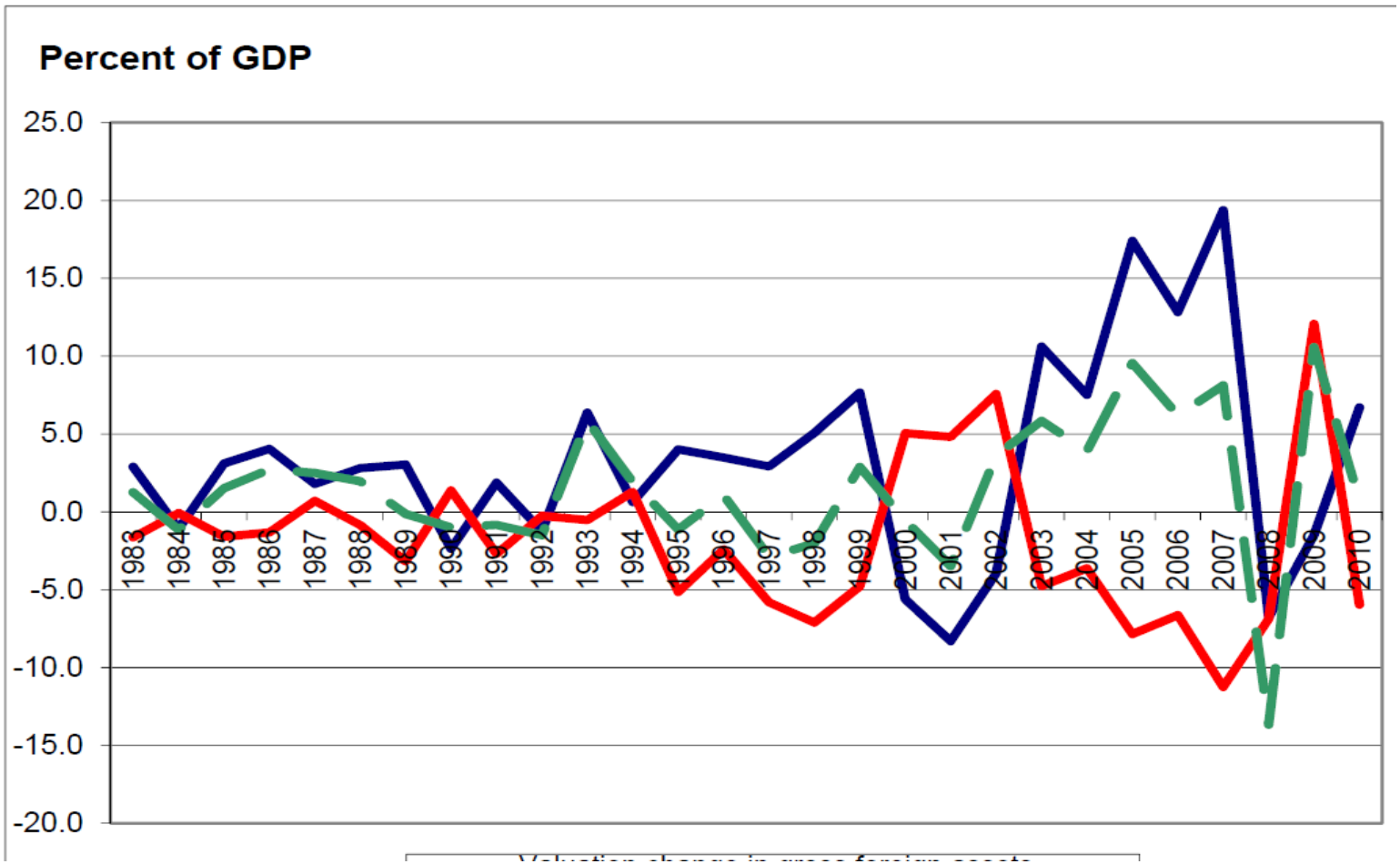
Ireland	-19,2	Germany	31,5
Spain	-59	Netherlands	53,7
Greece	-85,1	Finland	59,1
Italy	-13	France	3,1
Portugal	-90,7	Euroarea	22,2

Source: Eurostat

Source: Giavazzi et al (2011)

Facts III: Valuation Effects and Foreign Assets

Figure 5: Valuation changes of U.S. foreign assets, liabilities, and NIIP, as a percent of GDP

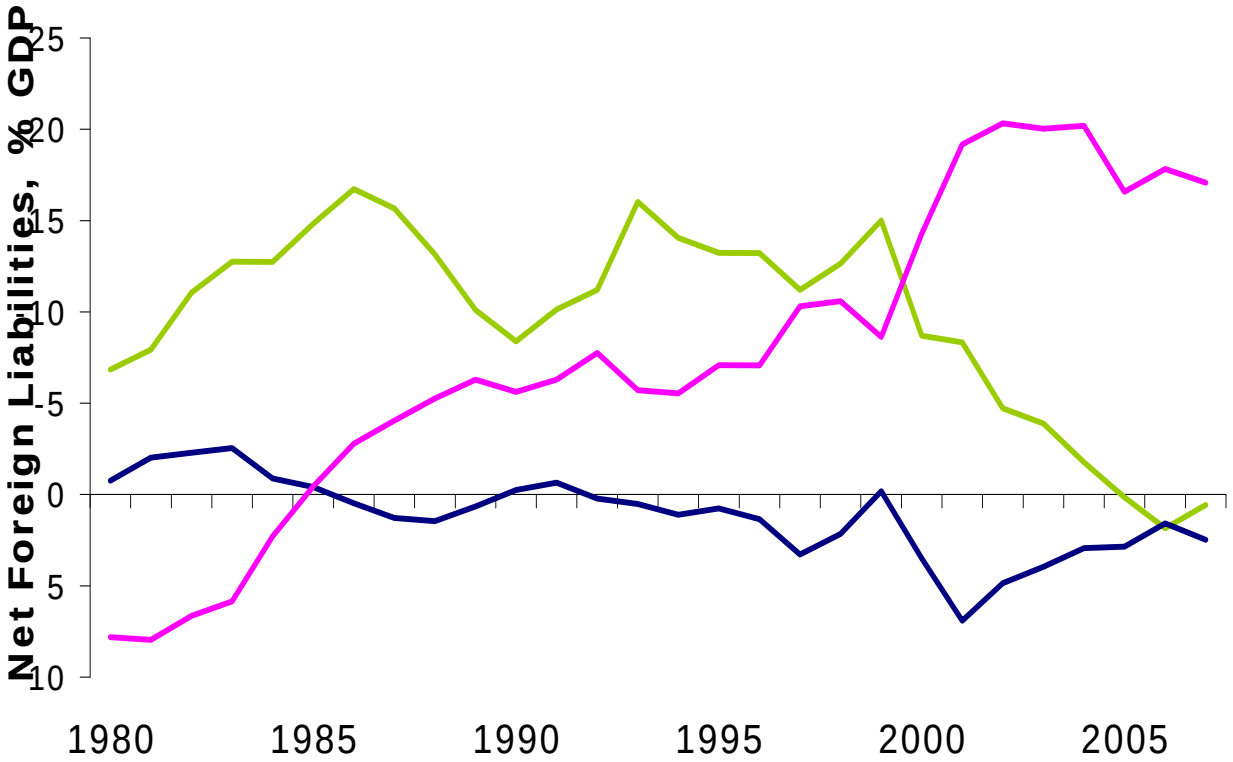


Source: Obstfeld (2011)

Cumulative CA vs NFA

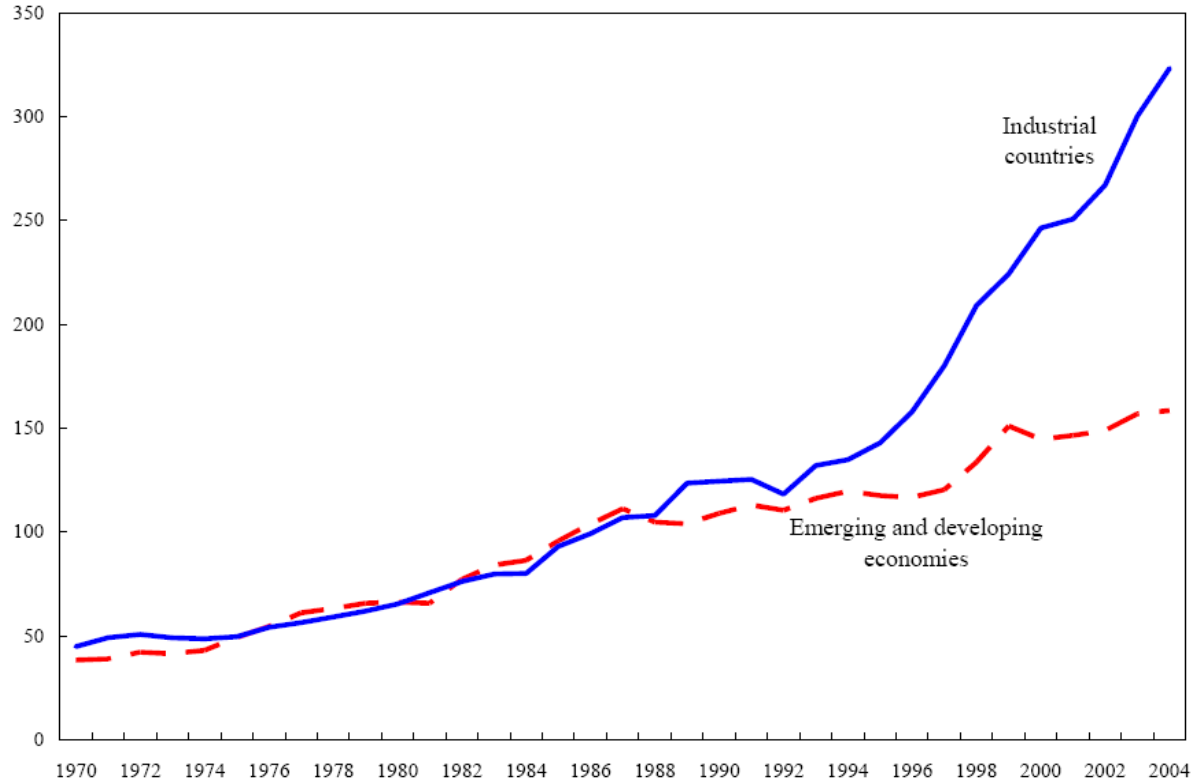
1. Market valuation effects: made fall in US NFA 13.6 percent of 2004 US GDP smaller respective to historical costs (Buiter 2006)
2. Still, in 2009 (2008), NFA position is estimated to be -19 (-24) percent of GDP.

Net Foreign Liability positions 1980-2007



Facts IV: Gross Capital Flows and Assets

Gross Foreign Asset Position 1980-2004

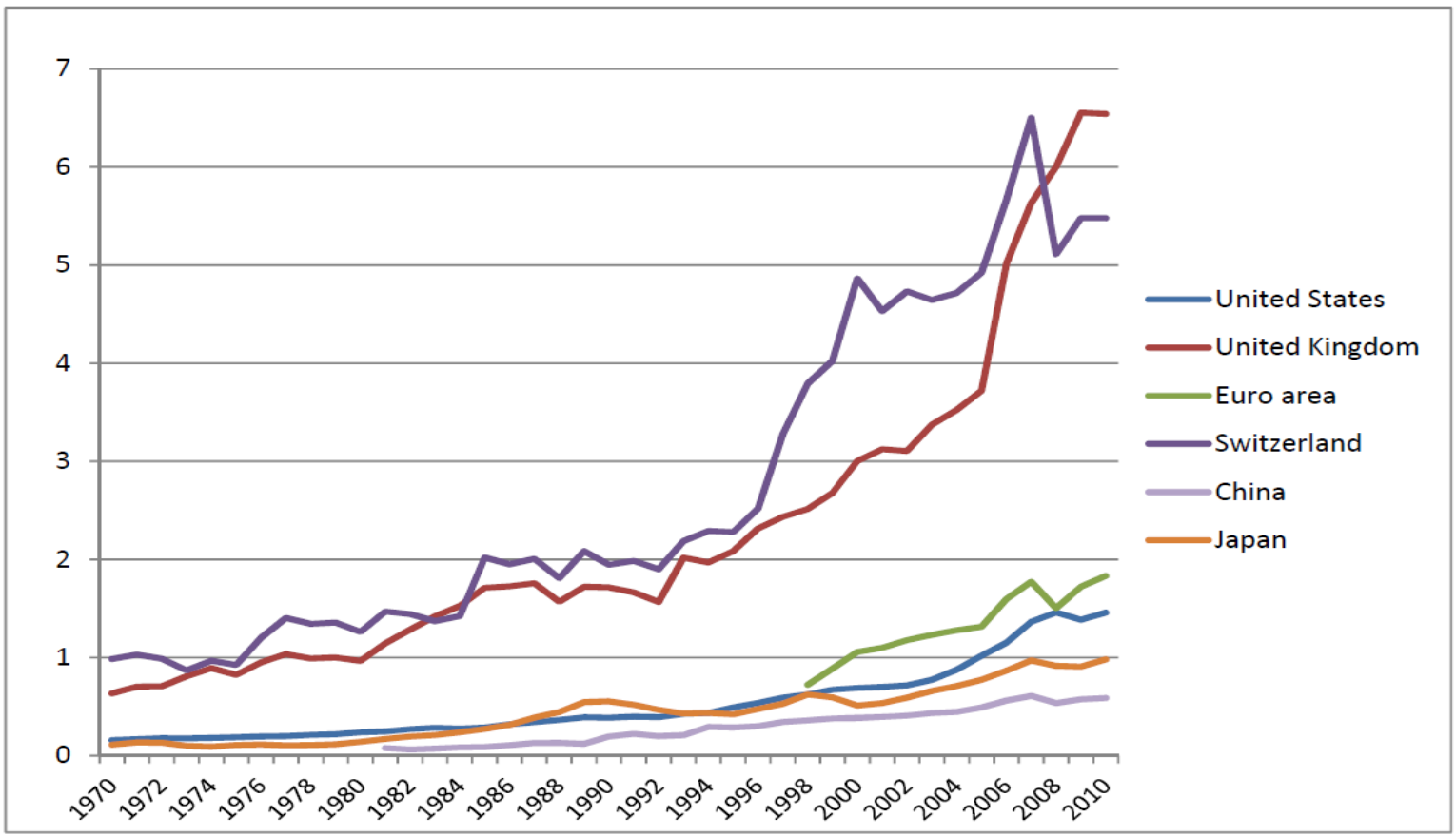


Note: Ratio of sum of foreign assets and liabilities to GDP, 1970-2004.

Source: Lane et al (2006)

Gross Foreign Asset Position 1980-2004

Figure 2: Average of gross foreign assets and liabilities as a ratio to GDP: Selected countries

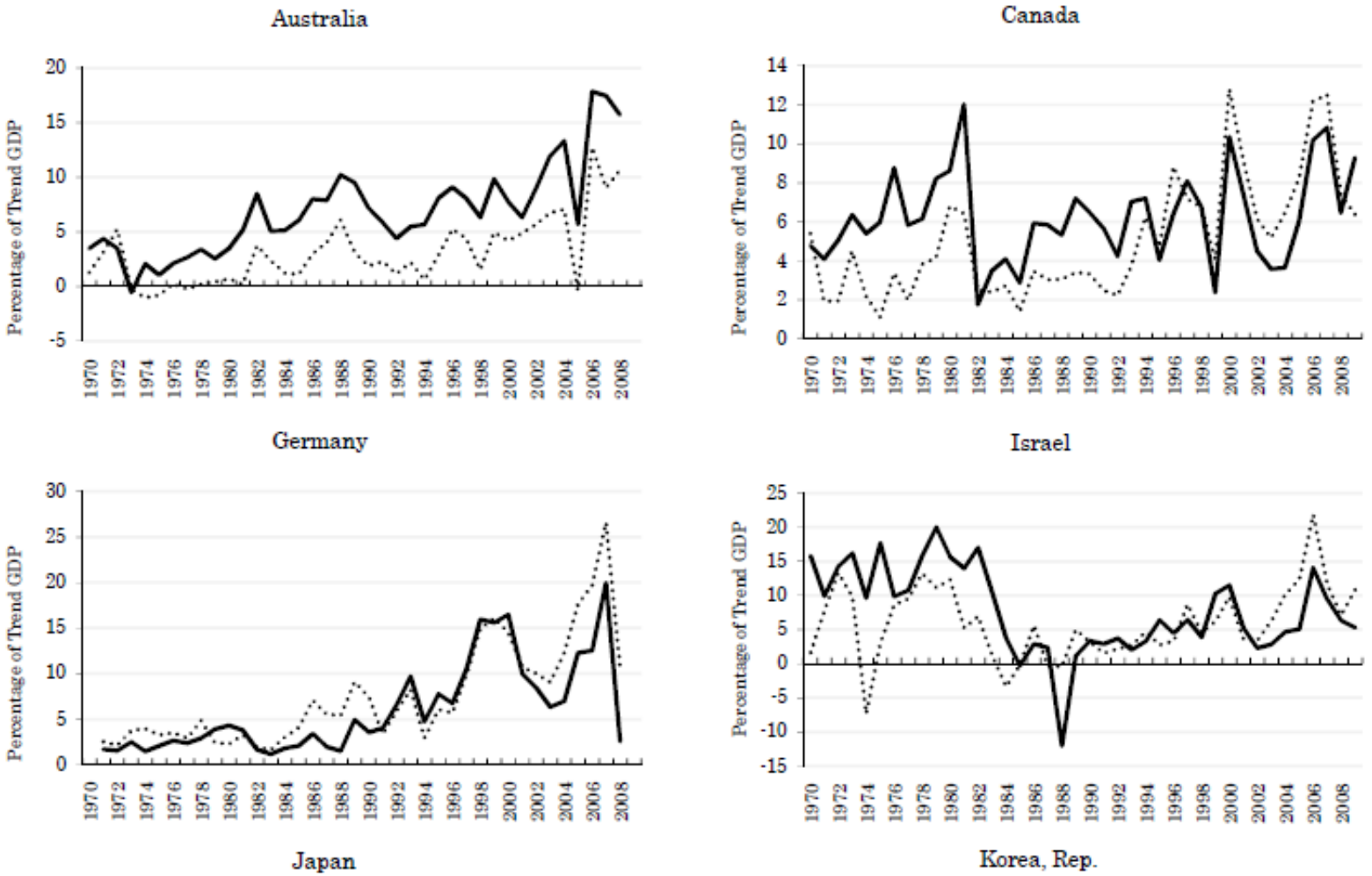


Source: Obstfeld et al (2011)

Cyclicality of Capital flows

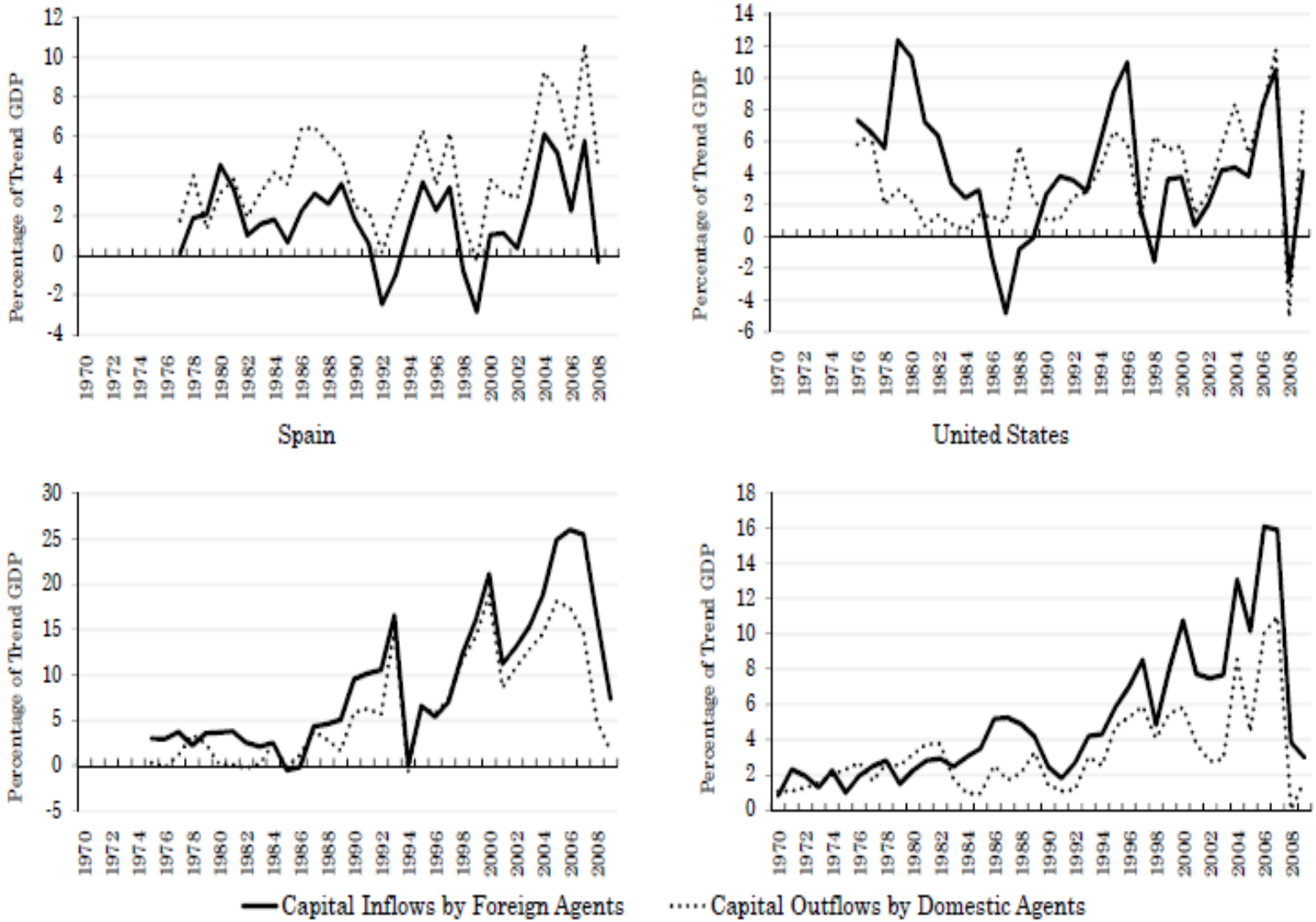
Cyclicality of Capital flows

Figure 1
Capital Flows in High-Income Countries



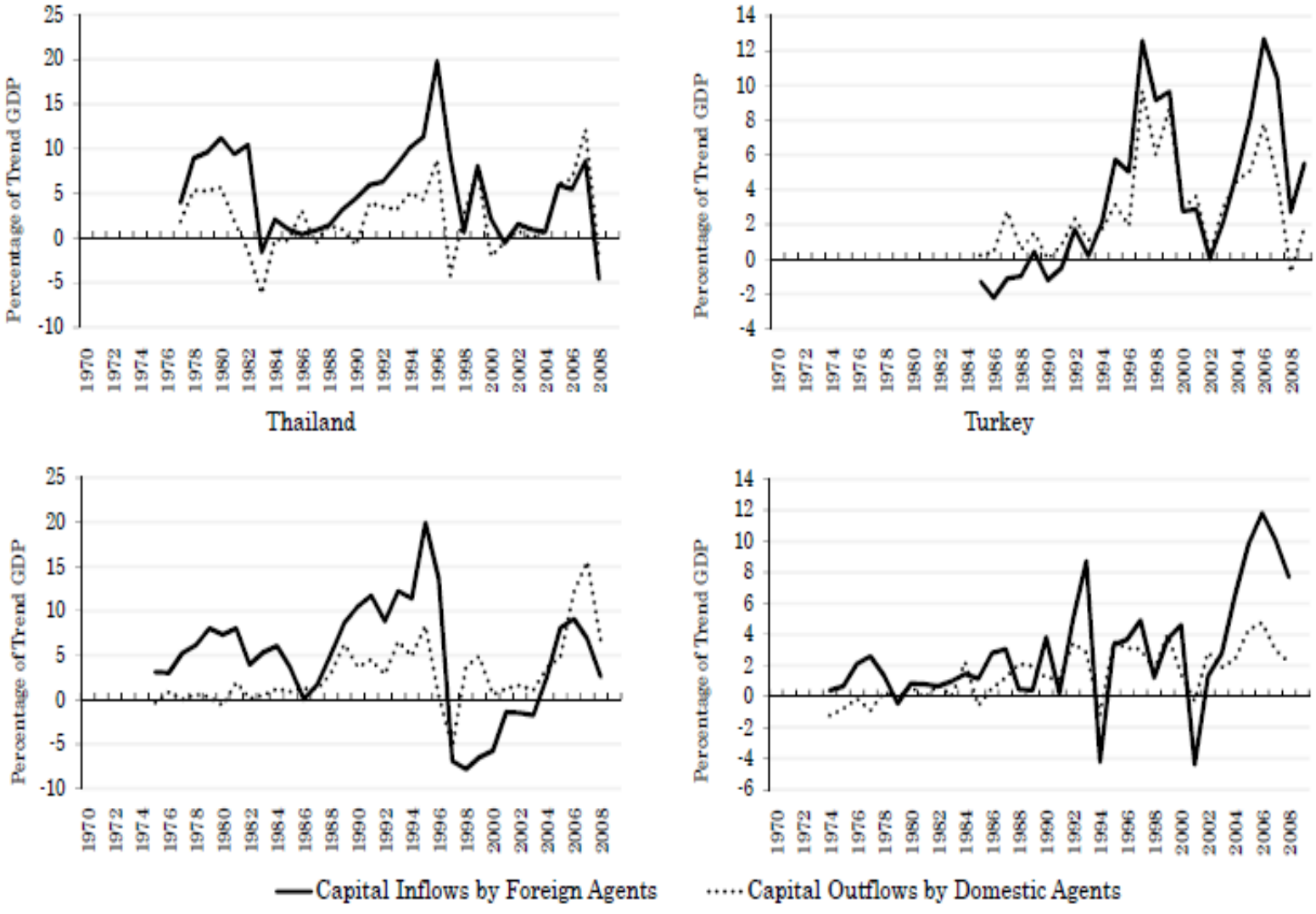
Source: Broner et al (2011)

Cyclicality of Capital flows



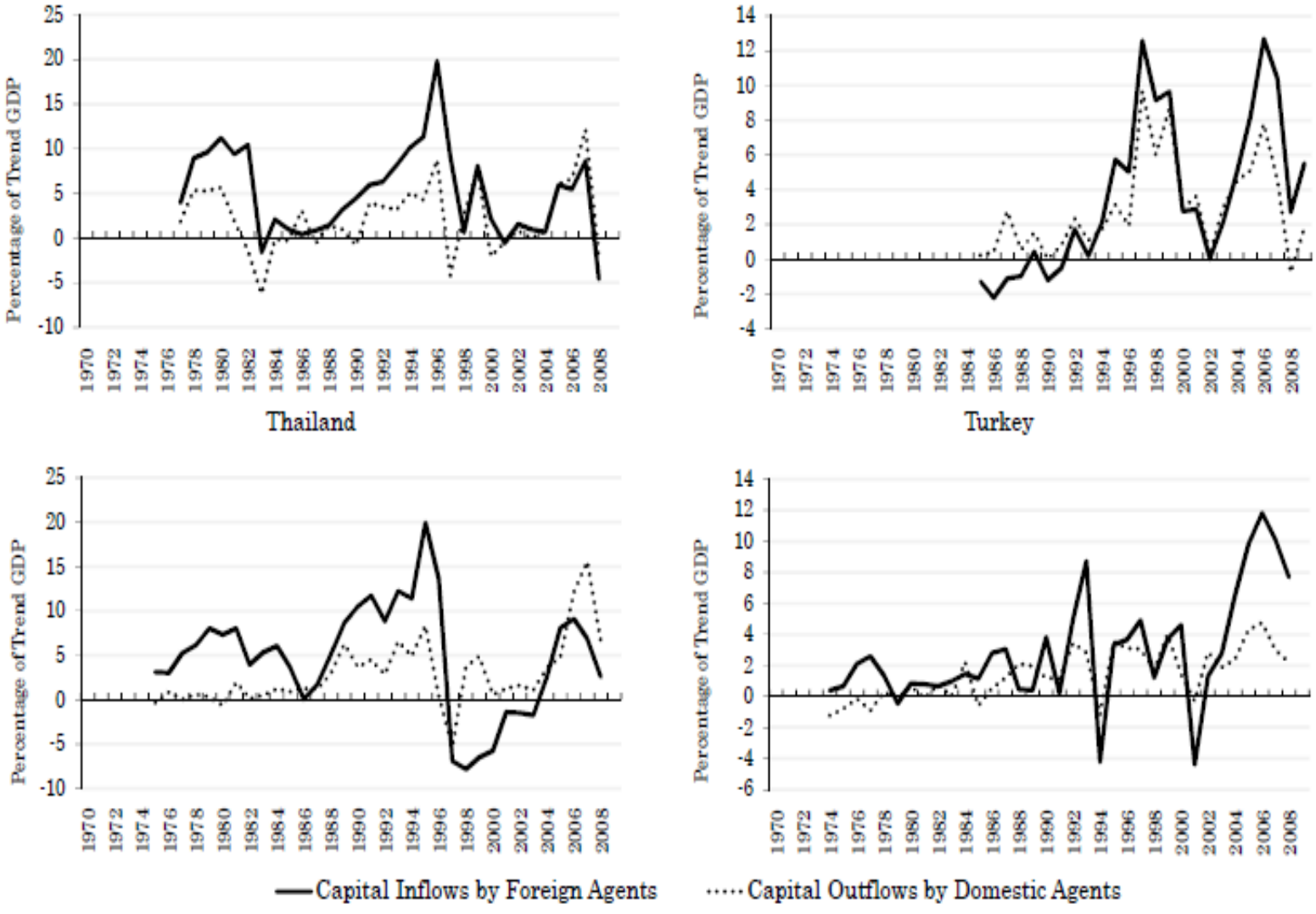
Source: Broner et al (2011)

Cyclicality of Capital flows



Source: Broner et al (2011)

Cyclicality of Capital flows



Source: Broner et al (2011)

Cyclicality of Capital flows

- Both capital outflows from residents and inflows from foreigners are procyclical
- Rise in flows dominated by bank and trade credit for developed countries, by FDI for developing countries

Facts V: Return Differentials and - Dynamics

Returns on country portfolios - the exorbitant privilege or dark matter?

1. US NFA 1980: 236, Net factor income: 35.2, all bn US $
2. US NFA 2004: -2542, Net factor income: 30.4
3. Gourinchas and Rey (2007)
   - Since 1970s, U.S. investors returns on foreign equities (bonds) exceeded foreigners U.S. returns by > 6 (3.5) percent per year
   - Also, US asset share of equities much larger than liability share, so higher premia.
   - "The implication of the exorbitant privilege is that a 2 percent excess return allows the United States to accumulate debt exceeding its gross assets by 30 percent and yet still be a recipient of positive investment income." (p. 20)

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4. More radical: Hausmann and Sturzenegger (2005): Unrecorded "Dark matter" (seignorage premium on foreign-held dollars, insurance premium on holding risky foreign debt, knowledge premium on FDI) offsets the CA deficit

Returns on country portfolios - the exorbitant privilege or dark matter?

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4. More radical: Hausmann and Sturzenegger (2005)
5. Less radical: Warnock et al (2009): Timing effects in investments explain some return differential, but not much

Financial adjustment dynamics: Gourinchas and Rey 2008

Financial adjustment dynamics: Gourinchas and Rey 2008

- Low US NFA relative to trend predicts rises in CA and value of assets
- So can expect part of adjustment to come via valuation effects!

Roundup Facts

1. The dispersion of CA deficits and surpluses has increased substantially post 2002
2. US attracted most of world savings 2004-2007
3. Emerging countries became important creditors, China accumulated vast official dollar reserves.
4. Gross foreign asset positions at unprecedented highs
5. Valuation and portfolio returns benefited the US

Definition of "(Global) Imbalance"

" A process that is (i) unsustainable, (ii) unlikely to be corrected spontaneously without painful adjustment, (iii) requires policy/institutional changes for orderly/least cost correction"
Willem Buiter, 2007

Roadmap

1. Facts
2. Capital Flows in the standard model

The Theory so far...

1. Identical countries, subject to asymmetric shocks
2. But: hard to explain very persistent current accounts

Heterogeneous countries in the standard model

- Assume many small countries
- Traded and non-traded goods T, N
- p_T given
- Preferences

$$U = E \sum_t \beta^{t-1} U(c_t) \tag{1}$$

  for $c_t = c_{Nt}^{\gamma} c_{Tt}^{1-\gamma}$

- Deterministic neoclassical PF
  $F_t^i(K, L) = A_i F(K, L), i \in \{H, T\}$
- Investment in traded goods only
- Countries differ in initial endowment of capital good K

Heterogeneous countries in the standard model

- Efficiency in production

$$A_N f_k(k) p_N = A_T p_T f_k(k) \tag{2}$$

$$p = \frac{p_T}{p_N} = \frac{A_N}{A_T} \tag{3}$$

Heterogeneous countries in the standard model

- Open to capital trade in $t = 1$ at given $R = 1/\beta$
- Countries differ in initial endowment of capital good K_{j0}
- r defines $k_{t\geq 1}$, $Y^N_{t\geq 1}$, $Y^T_{t\geq 1}$
- $t = 1$
  1. Investment x jumps by $\Delta K = K^{\star T} + K^{\star N} - K_0$, concentrated in Traded goods, needed to pay interest
  2. Consumption jumps by rise in Permanent Net Income
  3. Current account deficit
- $t > 1$
  1. Investment falls to $(1 - \delta)[K^{\star T} + K^{\star N}]$
  2. Consumption and output unchanged
  3. Current account surplus of $(R - 1)\Delta K$

Roadmap

1. Facts
2. Capital Flows in the standard model
3. Application: Eurozone pre-2008
    - Giavazzi et al 2011

Roadmap

1. Facts
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4. Sustainability of the CA deficits

Sustainability of the US CA deficit

The simple arithmetic of sustainability

$$B_{t+1} = R_t B_t - CA_t \Longrightarrow b_{t+1}(1+g_{t+1}) = \frac{B_{t+1}}{Y_t} = R_t b_t - ca_t \quad (4)$$

$$\Longrightarrow b_t = \frac{ca_t}{R_t} + b_{t+1}\frac{(1+g_{t+1})}{R_t} = \frac{ca_t}{R_t} + \frac{(1+g_{t+1})}{R_t}[\frac{ca_{t+1}}{R_{t+1}} + b_{t+2}] \quad (5)$$

for $x_t = \frac{X_t}{Y_t}$. Stationary debt b only when

$$b_0 \leq \sum_0^\infty \frac{ca_t}{(1+g_0)\Pi_0^t \frac{R_s}{1+g_s}} \quad (6)$$

or in terms of "permanent values"

$$b_0 \leq \frac{ca}{(1+g)} \sum_{t=0}^{\infty} [\frac{1+g}{R}]^{t+1} \quad (7)$$

$$= \frac{ca\frac{1+g}{R}}{(1+g)(1-\frac{1+g}{R})} = \frac{ca\frac{1+g}{1+r}}{(1+g)\frac{1+r-1+g}{1+r}} = \frac{ca}{r-g} \quad (8)$$

Roadmap

1. Facts
2. Capital Flows in the standard model
3. Application: Eurozone pre-2008
4. Sustainability of the CA deficits
5. Determinants of long-term equilibrium asset positions

Sustainability of the US NFA position - determinants of long-run savings

1. Fogli and Perri (2008)
2. Mendoza et al (2007)
3. Caballero et al (2008)

Fogli and Perri (2008): The Great Moderation and the US External Imbalance

1. Stylised fact: Fall in US CA/NFA came with stronger reduction in Macro-volatility than ROW
2. 2 country Ayagari model w. bond trade, asymmetric fall in US risk acts like rise in impatience
3. ROW invests part of higher precautionary savings in US, permanent $NFA^{US} < 0$, $CA^{US} < 0$ on impact, $CA^{US} > 0$ after transition

Mendoza et al: Financial Integration, Financial deepness and Global imbalances

1. Stylised fact: Fall in US CA/NFA starts when cap account liberalised, US has highest fin devlpmt, and long position in equity/FDI
2. 2 countries; cont of agents, standard prefs, **idiosyncratic** shocks to endowments and productivity in using capital $z_{it}F(k^i)$; **Asym. info** in insurance markets: $(1-\psi)y_{it}$ of income "divertable" from insurance; no aggregate risk
3. Autarky:
   - 3.1 $\psi = 0 \Rightarrow R < \frac{1}{\beta} - 1 < \bar{z}F_k$, $\psi = 1 \Rightarrow R = \frac{1}{\beta} - 1 = \bar{z}F_k$
4. Financial integration and $\psi^1 = 1, \psi^2 = 0$ implies for 1
   - 4.1 $NFA < 0$
   - 4.2 Positive investment in foreign capital, negative position in bonds

Caballero et al (2008): An equilibrium model of global imbalances and low interest rates

1. Stylised fact: Asian crisis lead to rise in savings, fall in US CA and low R
2. 2 countries; representative individuals can pledge fraction δ of output X_t in asset markets, rest goes into saving W; output growth g; consumption θW
3. $r^{aut} = g + \delta\theta$
4. 2 identical countries, 1 experiences a shock to $\delta^1 < \delta^2$
   - 4.1 Relative financial wealth of 1 falls as dividends lower, r falls, so financial wealth abroad rises
   - 4.2 Savings in 1 rises faster than value of assets (why??), so 2 has CA deficit
   - 4.3 Growth means CA deficit in 2 persists as 1 wants always more savings than its own assets

Roadmap

1. Facts and definition
2. Reasons behind the increase in CA dispersion
3. Sustainability of the US CA deficit
4. The process of rebalancing and the role of the exchange rate
5. Determinanst of long-term equilibrium asset positions
6. Global Imbalances and the Crisis

The Crisis that hasn't happened (yet): Obstfeld and Rogoff (2005)'s Dollar crisis

- "Transfer Problem" (Keynes-Ohlin Debate 1920s): What is the likely impact of international transfers (war reparations or debt service) on real exchange rates and ToT
- Current account reduction needs a mixture of expenditure reduction and expenditure switching
- Effect on Exchange rates depends on source of shock

Obstfeld and Rogoff (2005): Model Setup

- 2 country model with country specific traded and non-traded goods
- Focus on goods market equilibrium: output and demand exogenous

Obstfeld and Rogoff (2005): Key equations

- $P_H Y_H = \alpha(\frac{P_H}{P_T})^{1-\nu}(P_H Y_H + iF - CA) + (1-\alpha)(\frac{P_H}{\epsilon P_t^\star})^{1-\nu}(P_F Y_F + iF + CA)$
- $P_N Y_N = \frac{1-\gamma}{\gamma}(\frac{P_N}{P})^{1-\theta} PC = \frac{1-\gamma}{\gamma}(\frac{P_N}{P_T})^{1-\theta} P_T C_T$
- Equivalent expression for F. Given supply $Y_N, Y_H, Y*_N, Y_F$ and demand for tradables $P_i Y_i + iF_i - CA$, can solve for terms of trade, and relative price of non-tradables.
- Key parameters: elasticities of substitution θ, ν; share of traded goods γ

Results

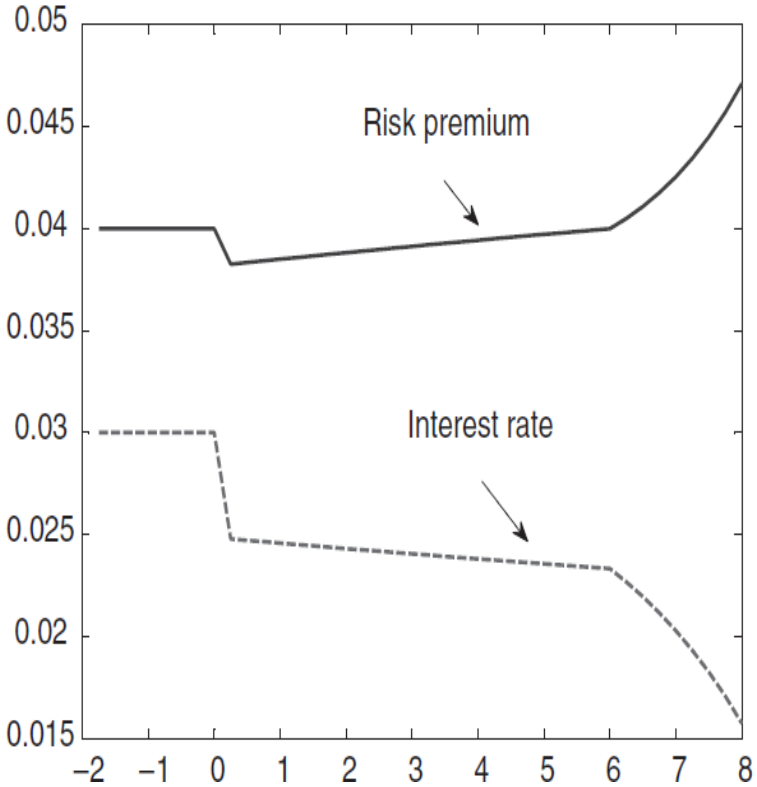
- Benchmark calibration: tradable share 25 percent, foreign NFA -0.2 of GDP, i=5 percent,$\gamma = 0.25$,$\alpha = 0.7$,$\nu = 2$
- $\theta = 1$ ($\theta = 2$):Pure demand-rebalancing to close CA, given output, leads to 27 (19) percent fall in RER and ToT fall of 7 percent
- With revaluation of NFA by depreciation, get slightly lower numbers
- vs. Corsetti et al "Varieties, the transfer problem, and the costs of current account adjustment", mimeo: with endogenous tradeability, required relative price movements much lower.

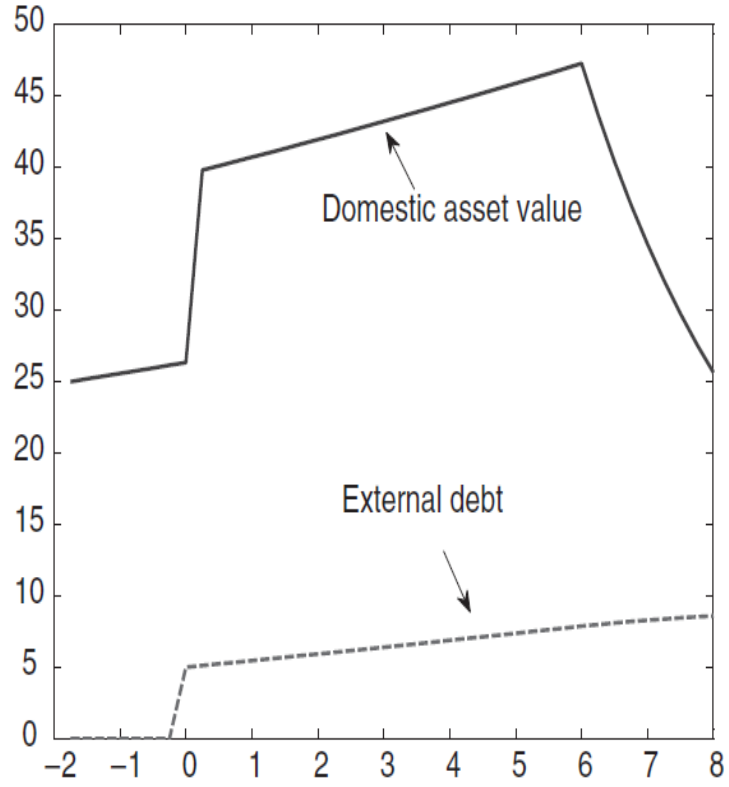
Caballero et al (2009): Global Imbalances and Financial Fragility

1. Claim: International demand for (US) safe assets increased prices of risky assets and securitisation
2. Model: 2 countries, H and RoW, continuous time
   - H investor preferences $E_t \int_t^\infty e^{-\rho(s-t)} ln c^d_{t+s} ds$
   - Risky asset payoffs: $\frac{dX^d_t}{X^d_t} = gdt + \sigma dZ_t$
   - RoW: safe asset demand and consumption: $\frac{dX^f_t}{X^f_t} = gdt + (1-\psi)\sigma dZ_t$, $c^f_t = \rho B^f_t$
   - H: wealth $W_t = V_t - B^f_t$ and consumption: $c^d_t = \rho W_t$
   - Goods market clearing $X^d_t + X^f_t = c^d_t + c^f_t = \rho W_t + \rho B^f_t$
   - $\Rightarrow W_t = \frac{X^d_t}{\rho} + \frac{X^f_t - \rho B^f_t}{\rho}$, $V_t = \frac{X^d_t + X^f_t}{\rho}$
3. Prop 1: $\Delta X^f_t > 0$ raises V_t.
4. Prop 3: If $\psi > 0$, $\Delta X^f_t > 0$ lowers the H risk premium. $\Delta b^f_t = \Delta \frac{\rho B^f_t}{V_t} > 0$ raises it.

Caballero et al (2009): Global Imbalances and Financial Fragility

- Scenario: $t = 0$: "foreign entry ($X_t^f > 0$)
  $t = 6$: "negative shock" (growth of X_t^f, X_t^d drops)





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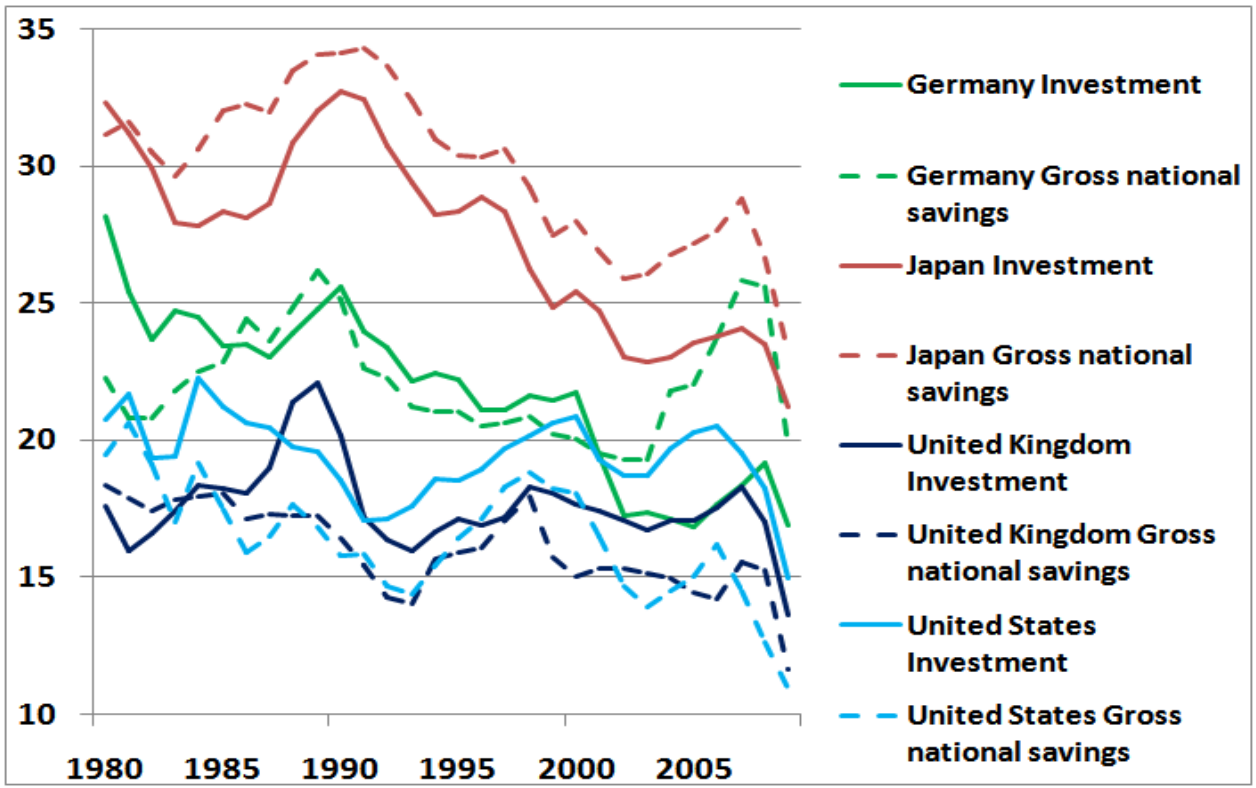
The usual suspects...

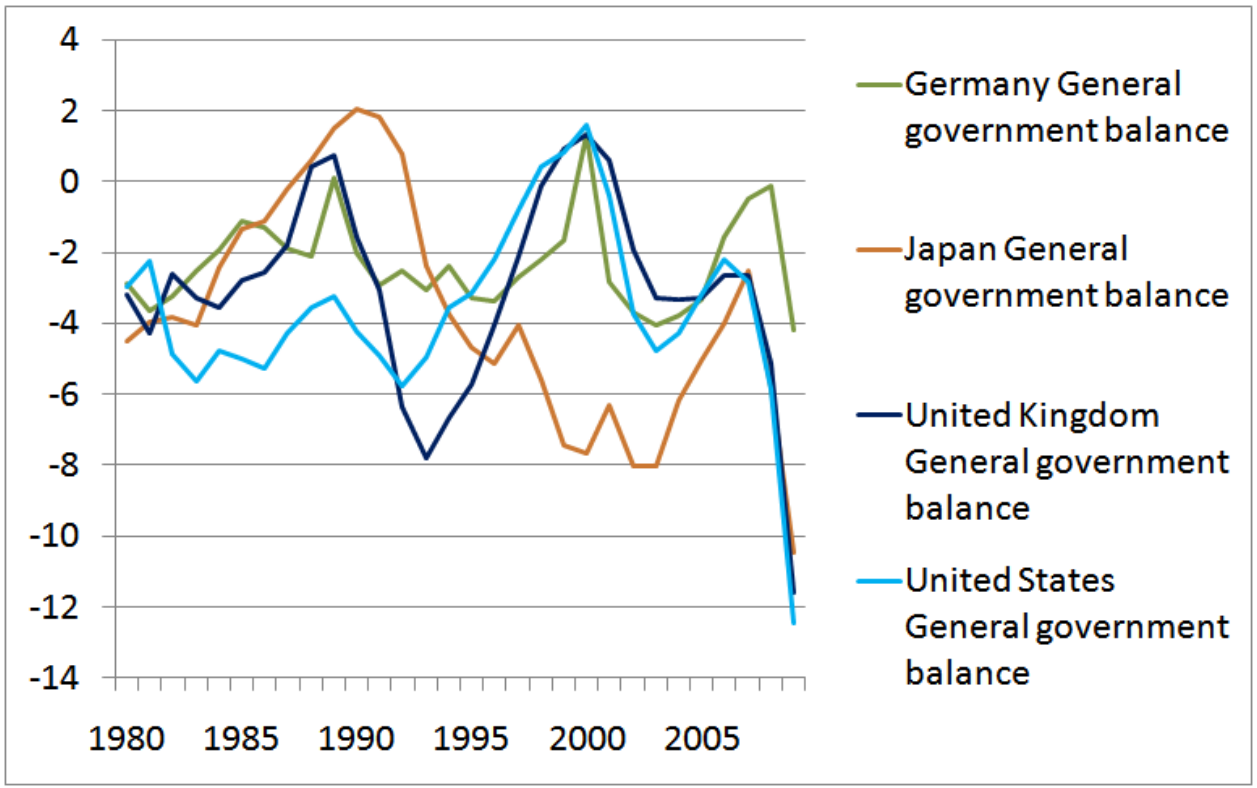
1. A positive productivity shock in the US
2. The "Twin" deficits
3. Wealth effect from housing booms
4. Exchange rate misallignment
5. The post-Asian crisis savings glut

Savings and Investment 1980-2009



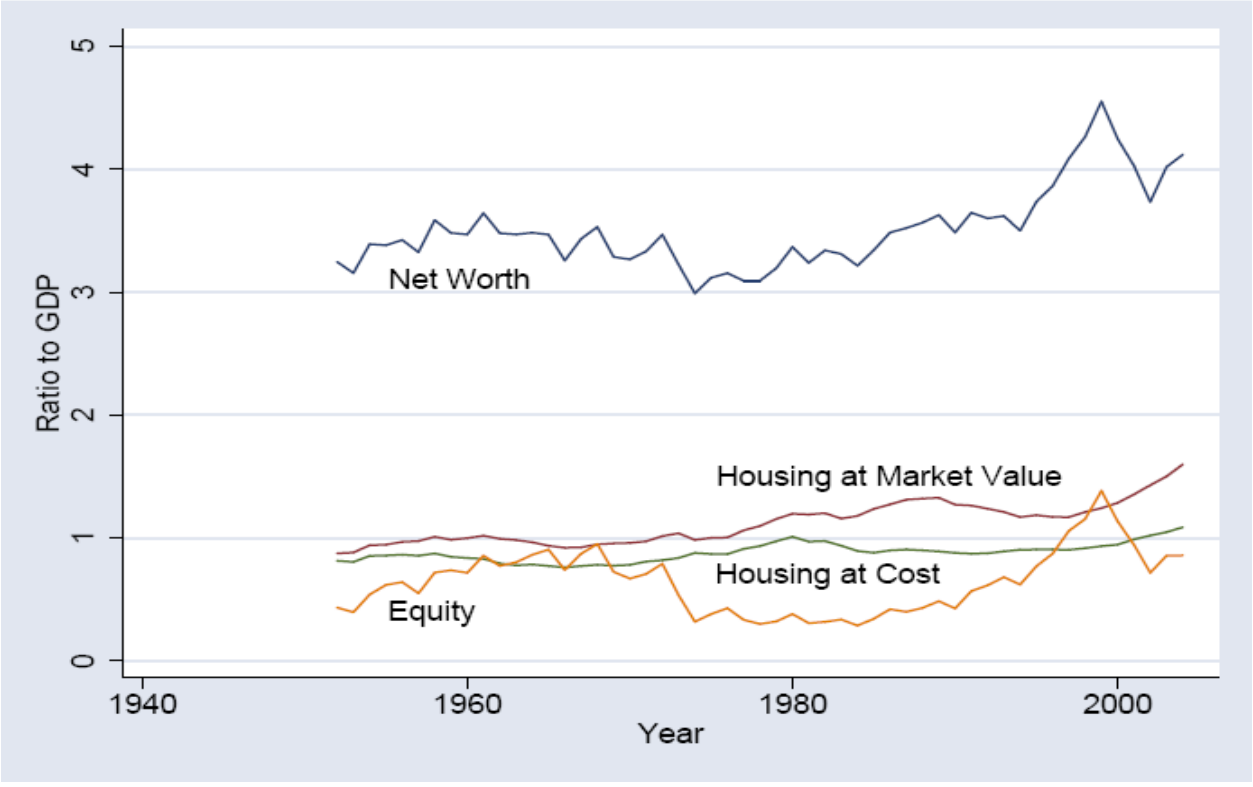
Source: IMF WEO 2009, 2009 Figures IMF Forecast

Government General Budget Balance 1980-2009



Source: IMF WEO 2009, 2009 Figures IMF Forecast

HH net worth 1980-2004



Source: Backus et al 2005