Spillovers or Scapegoats?
Why Small Countries Should Not Fear Center-Country Monetary and Financial Policy

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Two Approaches

1. Real
   - Center countries engage in unconventional monetary policy
     - Quantitative Easing, Negative Nominal Interest Rates, Forward Guidance …
   - Part of Motivation may be exchange rate depreciation
   - Such "beggar-thy-neighbor" policies *could* raise center exports
   - Is there evidence of "Currency Wars"?

Two Approaches, cont.

2. Financial (joint with Cerutti, Claessens)
   - Center countries engage in (monetary) policy for domestic reasons
   - This creates a "global financial cycle" (Rey)
   - GFC spills over to developing countries and financial periphery in capital flows, asset prices, credit growth
     - Rey: exchange rate regime has little effect (dilemma, not trilemma)
     - Only capital controls provide insulation
   - Is there evidence that GFC quantitatively important for capital flows?

Trade Effects of Unconventional Central Monetary Policy: Motivation

"I heard two related complaints at international meetings and through the media: First, that the United States was engaging in 'currency wars' – a phrase used most prominently by Brazilian finance minister Guido Mantega in 2010, following the Fed's introduction of a second round of quantitative easing – by choosing policies that would weaken the dollar and thereby unfairly increase US competitiveness at the expense of trading partners ..."

" 'Currency wars' is a colorful synonym for the familiar concept of competitive depreciation of exchange rates, with the goal of diverting world demand toward one's own exports while suppressing imports ..."

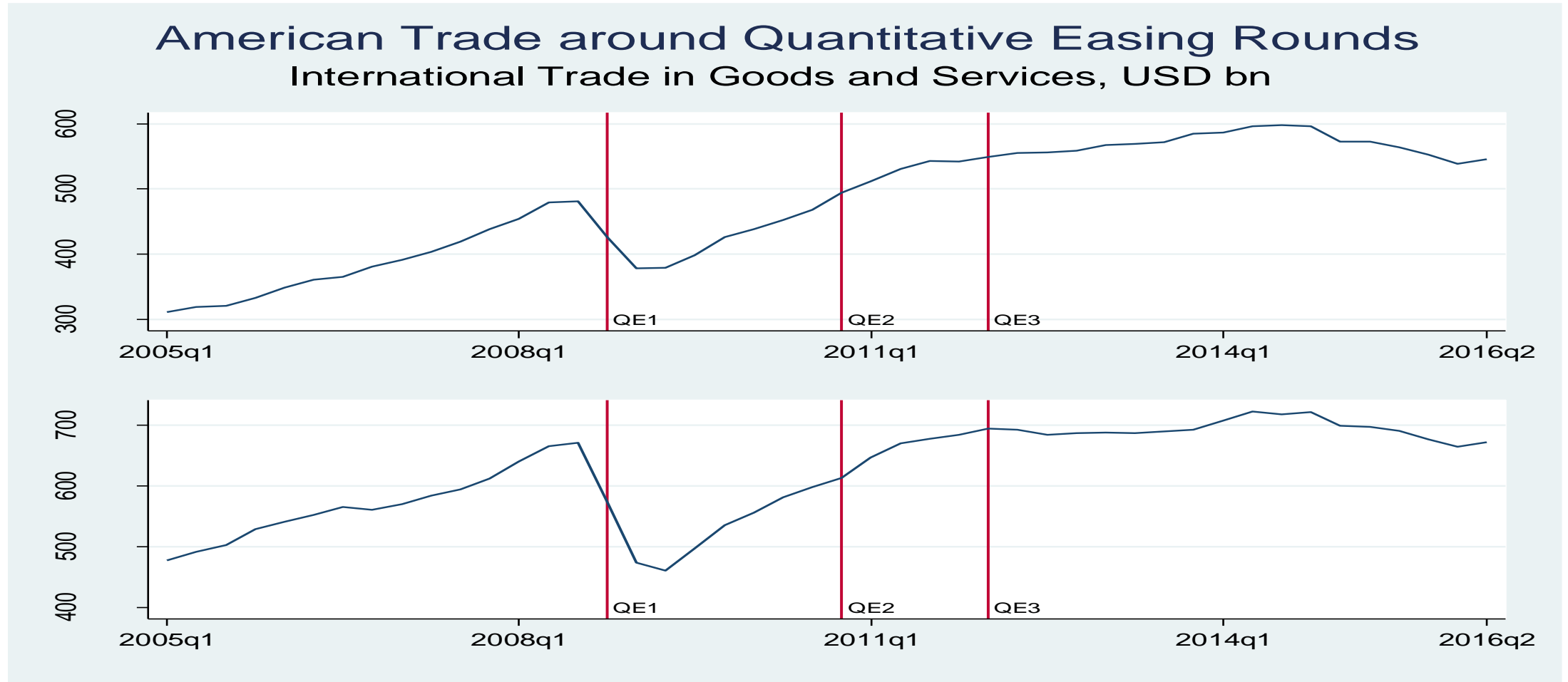- Bernanke (2015 Mundell-Fleming lecture)

Quantitative Evidence?

- Little/No evidence in literature
- Three Currency Wars Characterizations/Assumptions
    1. Result from Unconventional Monetary Policy (UMP) of Center Countries
    2. Bilateral: involve economies engaged in UMP ("aggressors") and those not ("victims")

        "The advanced countries are seeking to devalue their currencies in order to increase exports, naming the United States, Europe and Japan ..."
        - Mantega (2010)
    3. If successful, should raise exports

Naïve Look at US Trade around QE

American Trade around Quantitative Easing Rounds
International Trade in Goods and Services, USD bn

No clear pattern

- Both exports, imports continue to drop after QE1
- QE2 makes little difference
- QE3 followed by trade flattening

- But … Superficial!
  - Only one country examined
  - Data multilateral (some US partners engaged in UMP)
  - No attempt at *ceteris paribus*

Easy to Correct with Gravity Model

- Plain vanilla LSDV technique (Head-Mayer):

$$\ln(X_{ijt}) = \gamma UMP_{ijt} + \beta Z_{ijt} + \{\lambda_{it}\} + \{\psi_{jt}\} + \{\phi_{ij}\} + \varepsilon_{ijt}$$

- Links exports (X) to controls (RTA, CU), time-varying exporter/importer fixed effects
- Long history of success as empirical model of trade
- Key coefficient (γ) on UMP dummy
  - 1 if i has UMP and j does not, 0 ow

Estimation Minutiae

- Conventional data sources
  - Quarterly DoTS data 2000Q1-2016Q2, >200 countries, >1.3 million obs.
- Key to model: over 50,000 fixed effects
- Hold constant all dyadic time-invariant phenomena
  - Language, distance, colonial history, common geography, …
- Hold constant all country-specific phenomena
  - Time-invariant (land area, sea access, …)
  - Time-varying (business cycle, financial distress, protectionism, …)

Notes

- *Not* estimating effect of (ex) QE1 on American exports
  - All common "monadic" effects absorbed in FE
    - Likely causes of UMP (stimulate insufficient American demand …)
  - Rather: estimating *additional* effect of UMP by exporter on an importer not engaged in UMP
- γ is effect of current war by a particular belligerent on particular defenders, *after* sweeping out effect of war on belligerent.

Unconventional Monetary Policy Measures

- Quantitative Easing
  - 1 for any quarter where CB engages in balance sheet operations, 0 ow (flows)
  - Variant with outstanding assets on balance sheet (stocks)
- Negative Nominal Interest Rates
  - 1 for any quarter with negative market rates, 0 ow
  - Variant uses official policy (not market) rates
- Data from central bank websites

Unconventional Monetary Policy thru 2016Q2

	Quantitative Easing	Negative Nominal Interest Rates
USA, QE1	2008Q4-2010Q1	
USA, QE2	2010Q4-2011Q2	
USA, QE3	2012Q3-2014Q4	
UK, QE1	2009Q1-2010Q1	
UK, QE2	2011Q4-2012Q2	
UK, QE3	2012Q3-2012Q4	
Switzerland		2011Q3-
Denmark		2012Q3-
Sweden	2015Q1-	2015Q1-
Japan	2001Q1-2006Q1	
Japan	2010Q4-	2016Q1-
EMU	2015Q1-	2014Q2-

Rose: Peripheral Effects of Center-Country Monetary Policy

Results

- QE has small *negative* effect on exports, *ceteris paribus*
  - Reduces exports ≈ 11%
  - Statistically significant (|t statistic| >5)
- Ditto NNIR
- Can't reject hypothesis of equality (p-value ≈.7)
  - Reduces effect to ≈6%
- (No effect of state-contingent forward guidance)

	1	2	3	4
Exporter (not Imp) QE (2.4%)		-.11** (.02)		-.07** (.02)
Exporter (not Imp) NNIR (2.5%)			-.09** (.02)	-.05* (.02)
Currency Union	.35** (.02)	.33** (.02)	.32** (.02)	.32** (.02)
RTA	.04** (.01)	.04** (.01)	.04** (.01)	.04** (.01)
λ_{it} (>11k)	Yes	Yes	Yes	Yes
ψ_{jt} ($\approx$13k)	Yes	Yes	Yes	Yes
ϕ_{ij} ($\approx$26k)	Yes	Yes	Yes	Yes
R^2	.89	.89	.89	.89
RMSE	1.37	1.37	1.37	1.37

Results Insensitive

	Quantitative Easing by Exporter, not Importer	Neg. Nom. Int. Rate in Exporter, not Importer	Test for Equality (p-value)
Default	-.11** (.02)	-.09** (.02)	.66
UMP Variants (Stock QE, Official NNIR)	-.14** (.02)	-.10** (.02)	.09
First lag of UMP	-.10** (.02)	-.08** (.02)	.59
Fourth lag of UMP	-.12** (.03)	-.07** (.02)	.24
First lead of UMP	-.10** (.02)	-.09** (.02)	.66
After 2011	-.06** (.02)	-.04* (.02)	.21
Before 2016	-.08** (.02)	-.06** (.02)	.71
Drop US as exporter	-.11** (.02)	-.08** (.02)	.57
Drop UK as exporter	-.11** (.02)	-.09** (.02)	.70

	Quantitative Easing by Exporter, not Importer	Neg. Nom. Int. Rate in Exporter, not Importer	Test for Equality (p-value)
Drop Japan as exporter	-.11** (.02)	-.08** (.02)	.75
Drop Denmark as exporter	-.11** (.02)	-.09** (.02)	.50
Drop Sweden as exporter	-.09** (.02)	-.07** (.02)	.84
Drop Switzerland as exporter	-.11** (.02)	-.08** (.02)	.16
Drop Germany as exporter	-.10** (.02)	-.08** (.02)	.67
Drop China, HK as exporter	-.10** (.02)	-.08** (.02)	.58
Drop Advanced Countries as Importers	-.08* (.04)	-.12** (.04)	.06
Drop Asians DCs as importers	-.12** (.02)	-.09** (.02)	.51
Drop Africans as importers	-.09** (.02)	-.07** (.02)	.34
Drop Latin/Caribbean as importers	-.12** (.02)	-.10** (.02)	.87
Drop 3σ outliers	-.07** (.02)	-.06** (.01)	>.99

Summary

- Evidence Quite Clear

- Any Currency Wars have been lost!

- Countries using Quantitative Easing and/or Negative Nominal Interest Rates have *not* experienced export booms

- Unanswered Question: Why do exports actually decline?
  - Possibility: negative domestic productivity shocks lower exports, induce UMP, coincide with comparable positive foreign shocks
  - Another: expectations of lower foreign demand?
  - Awaits more research

Next: Financial Effects of Central Monetary Policy because of *Global Financial Cycle*

"Risky asset prices around the globe, from stocks to corporate bonds, have a strong common component. So do capital flows … Global financial cycles are associated with surges and retrenchments in capital flows, booms and busts in asset prices and crises. The picture emerging is that of a world with powerful global financial cycles characterized by large common movements in asset prices, gross flows, and leverage … The global financial cycle can be related to monetary conditions in the centre country and to changes in risk aversion and uncertainty … capital flows, especially credit flows, are largely driven by a global factor … "

      -- Rey at Jackson Hole (2013, pp 1-2)

Motivation, continued

 "Large gross cross-border flows are moving in tandem across countries regardless of the exchange rate regime, they tend to rise in periods of low volatility and risk aversion and decrease in periods of high volatility and risk aversion, as measured by the VIX ... There is a global financial cycle."

     -Passari and Rey (2015, p 693)

Also, work by Forbes and Warnock, Bruno and Shin, Ghosh et al …

The GFCycle *Should* Matter for Small Countries, especially Emerging Markets

- *If* GFCycle explains *most* variation in capital flows, then
- Difficult for policy-makers to do much more than insulate economies with capital controls, macro-prudential instruments and the like

"As capital flows respond to US monetary policy, they may not be appropriate for the cyclical conditions of many economies. For some countries, the Global Financial Cycle can lead to excessive credit growth in boom times and excessive retrenchment in bad times. … The Global Financial Cycle can be associated with surges and dry outs in capital flows, booms and busts in asset prices and crises…"

-- Rey (2015, pp 9-10)

But ... Suppose GFCycle is *not* that important

- Onus shifts back from the center

- Responsibility for creating and handling capital flows is properly domain of the policy authorities in small and/or poor countries.

- Inappropriate for policy-makers in emerging markets to blame America for their domestic woes if American financial shocks simply do not explain many fluctuations in capital flows and the like.

So ... How Important is the Global Financial Cycle?

- Literature leads one to believe: VERY!

- But informal (interpretations of plots)

- Here: focus on quantifying the importance of GFCycle for capital flows

- GFCycle, *if significant*, should be manifest in *strong commonality* of capital flows

  - Hence use dynamic factor model to extract common factor (from biggest eigenvalue)

Measuring Global Financial Cycle via Observable Fundamentals

VIX: Consensus Measurable "Fundamental" of Global Financial Cycle

- USA typically viewed as center-country, but perhaps EMU? UK?
- Other measures of Uncertainty/Fear (VDAX/VSTOXX/IVI)?
- Other fundamentals (nominal and *ex post* real interest rates, TED spread, yield curve slope, GDP growth, M2 growth)

VIX standard in literature

- Passari and Rey (2015): VIX is "*our proxy for the global financial cycle* … Large gross cross-border flows are moving in tandem across countries regardless of the exchange rate regime, they tend to rise in periods of low volatility and risk aversion and decrease in periods of high volatility and risk aversion, *as measured by the VIX*…"

- Rey (2013): "There is a global financial cycle in capital flows, asset process, and in credit growth. *This cycle co-moves with the VIX*, a measure of uncertainty and risk aversion of the markets."

- VIX used by: Advjiev et al. (2016); Bruno and Shin (2015a, b); Cerutti et al. (2014); Fratzscher (2012)

- Forbes and Warnock (2012) use closely correlated predecessor (VXO)

VIX: uncorrelated with raw capital flows

Capital Flows and the VIX

Capital Flows, %GDP (y) against VIX (x); 63 small countries 1990Q1-2015Q4
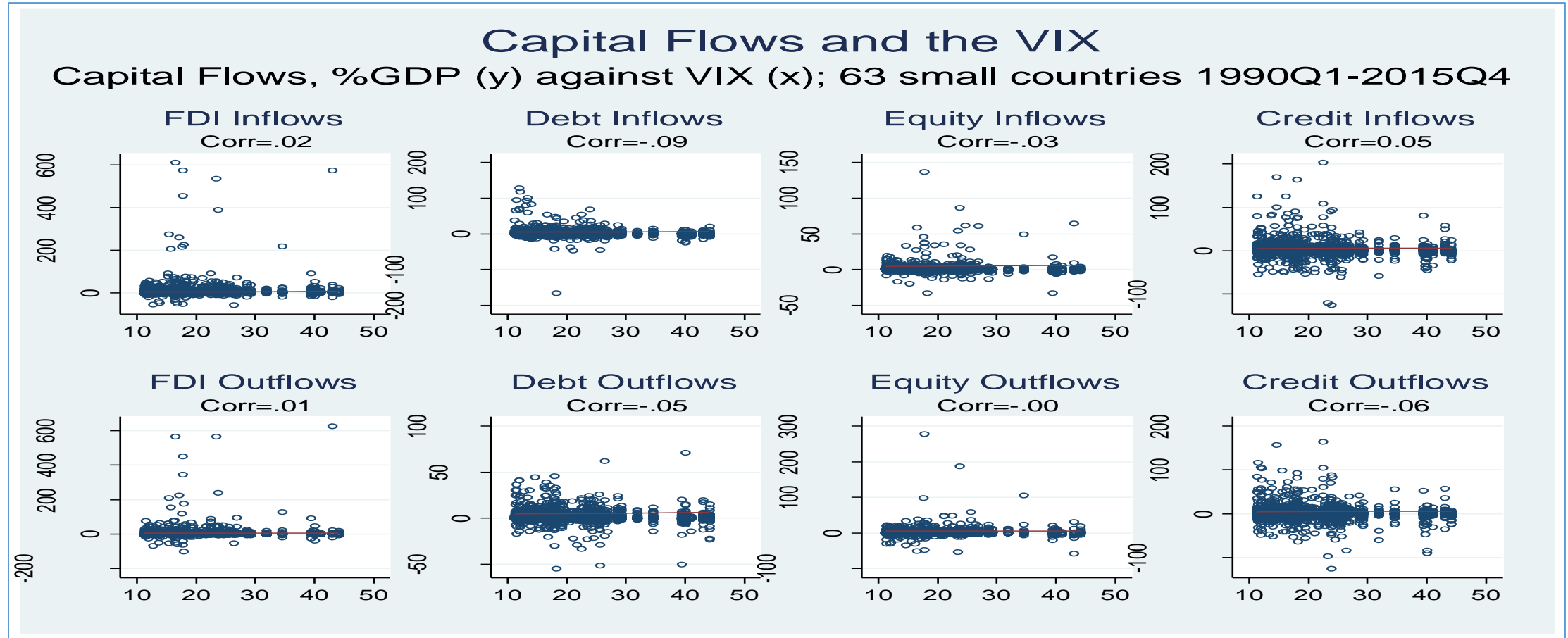
Ditto with Dynamic Capital Flow Factors
(And … Different Types of Capital Flows Little Correlated)

Capital Flow Factors and the VIX
Dynamic factors (1 lag) 1990Q1-2015Q4, Advanced Economies
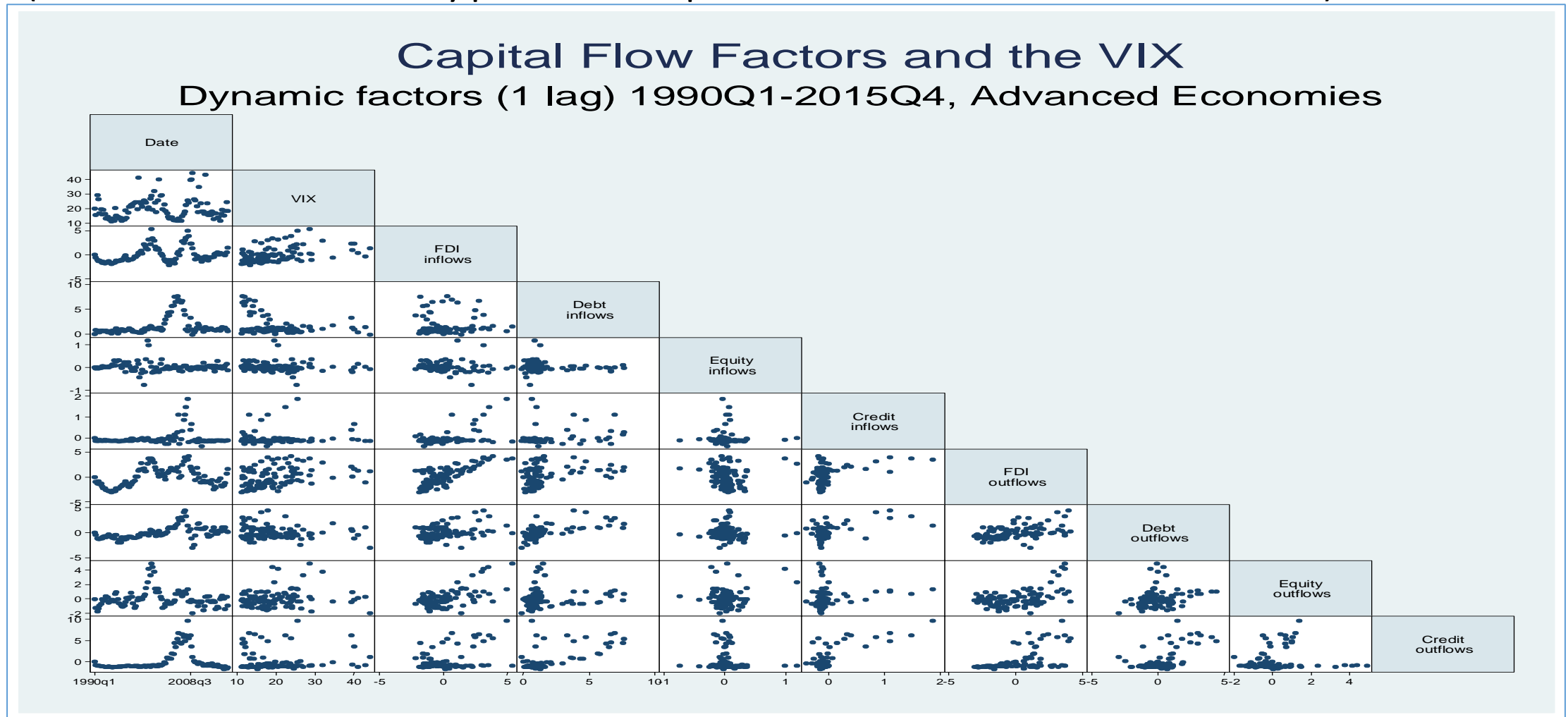
Do Center-Country Fundamentals Drive Capital Flows?

Investigate by estimating (a slew of) national capital flow equations:

$$CAPFLOW_{d,e,i,t} = \Sigma\beta_i^j USFUND_t^j + \Sigma\gamma^k FAC_{d,e}{}^k{}_t + \phi_i + \varepsilon_{d,e,i,t} \qquad \text{across } t$$

- $CAPFLOW_{d,e,i,t}$ is capital flow direction d, type e, country i, quarter t
- $USFUND_t^i$ are 8 US fundamentals indexed by j
  - 1) VIX; 2) nominal policy interest rate; 3) *ex post* real rate; 4) TED spread (3m LIBOR-gov't); 5) yield curve slope (10y-3m gov't rate); 6) GDP growth; 7) M2 growth); 8) change in REER (CPI).
- FAC are factors (matched to d,e) for advanced and emerging countries

Many Equations, hence Many Estimates!

- Estimate a t/s capital flow equation for each direction/type/country
  - 2 directions (in/out), 4 types (FDI, equity, debt, bank credit), 63 countries
  - So hundreds of equations
- Analyze histograms of goodness of fit for each equation
- Use $\overline{R}^2$ to provide familiar statistic, (modest) over-fitting penalty

- Histograms indicated generically poor fit

Fit of Country Time-Series Capital Flow Regressions
Histograms of (up to 598) adjusted R^2s, small countries 1990Q1-2015Q4
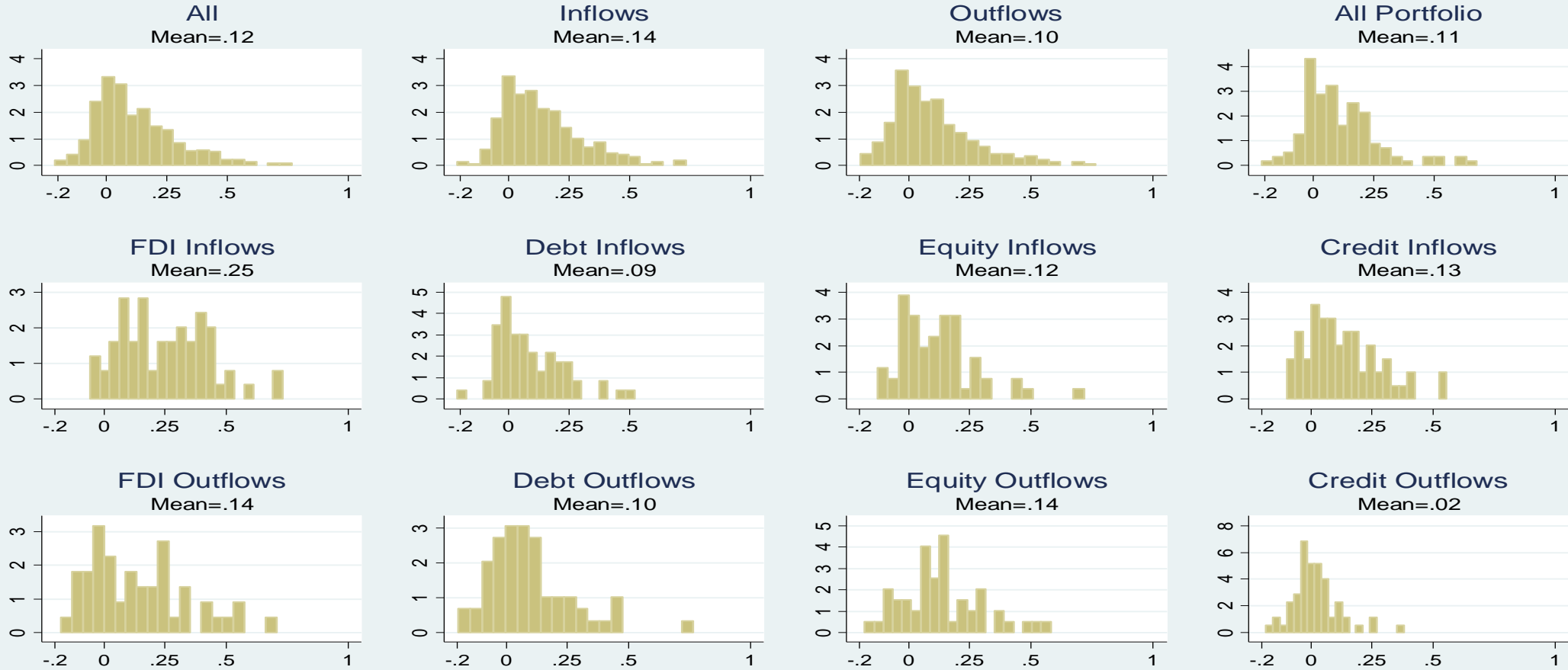
Regressors: Adv/EM 26-yr dyn factors, 8 US var's (VIX/TED/yield/policy/real/growth/REER chg/M2 growth)

Box Plots: Same Information, More Efficient

- Distribution of $\overline{R}^2$ portrayed with horizontal box plots
- Box: 25th to 75th percentiles
  - Median marked by a vertical bar
- Whiskers extend out to "adjacent values"
  - Defined as most extreme values within 150% of the interquartile range of nearest quartile
- Outliers individually marked
- Note vertical line at .25!

Fit of Country Time-Series Capital Flow Regressions
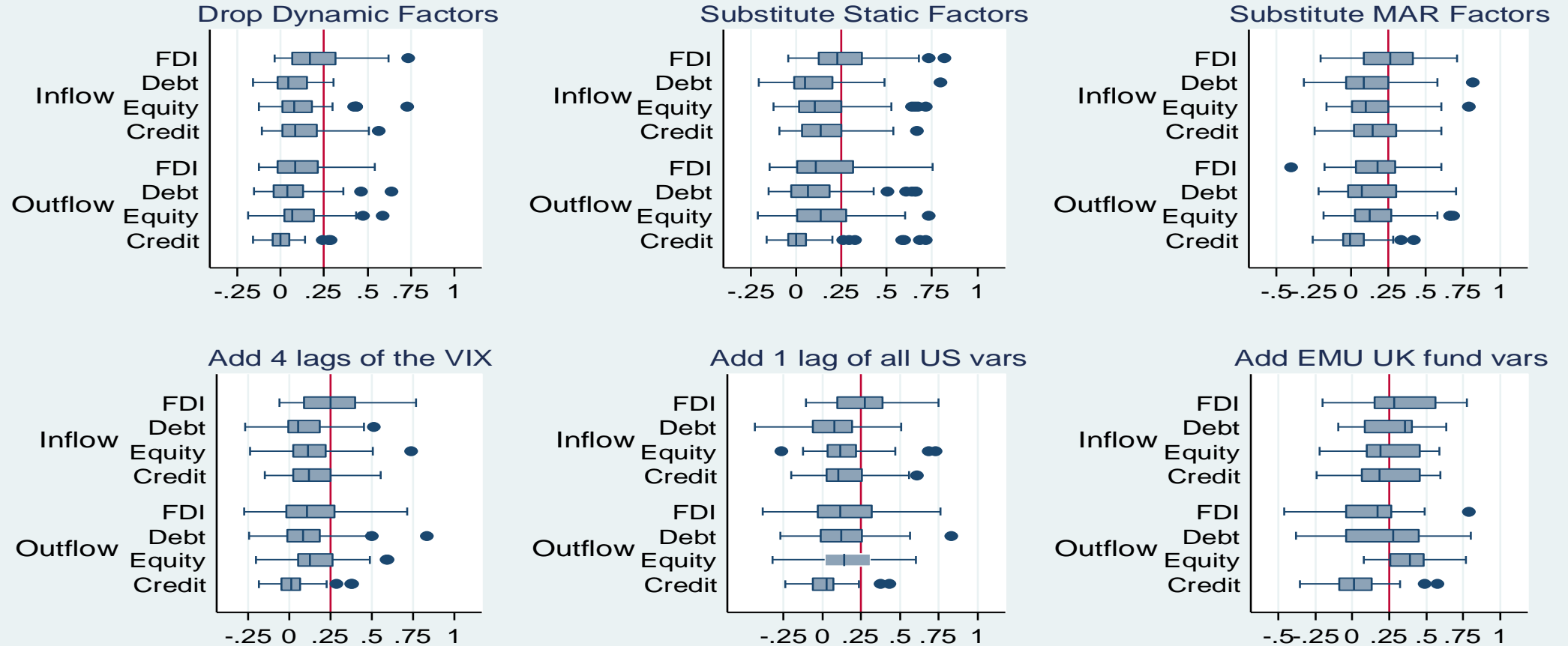
Box-Plots of Adjusted/Raw R^2s, Different Samples/Specifications
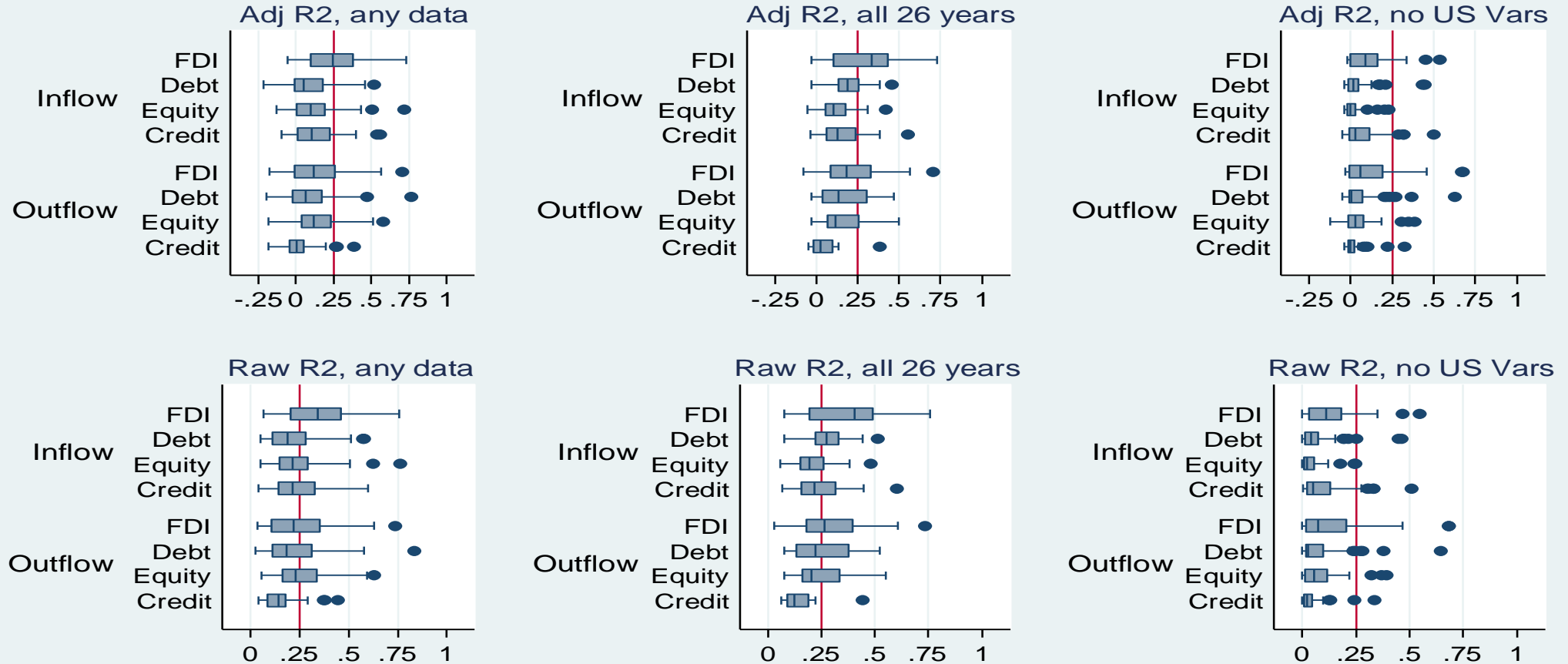
Easy to Establish Robustness

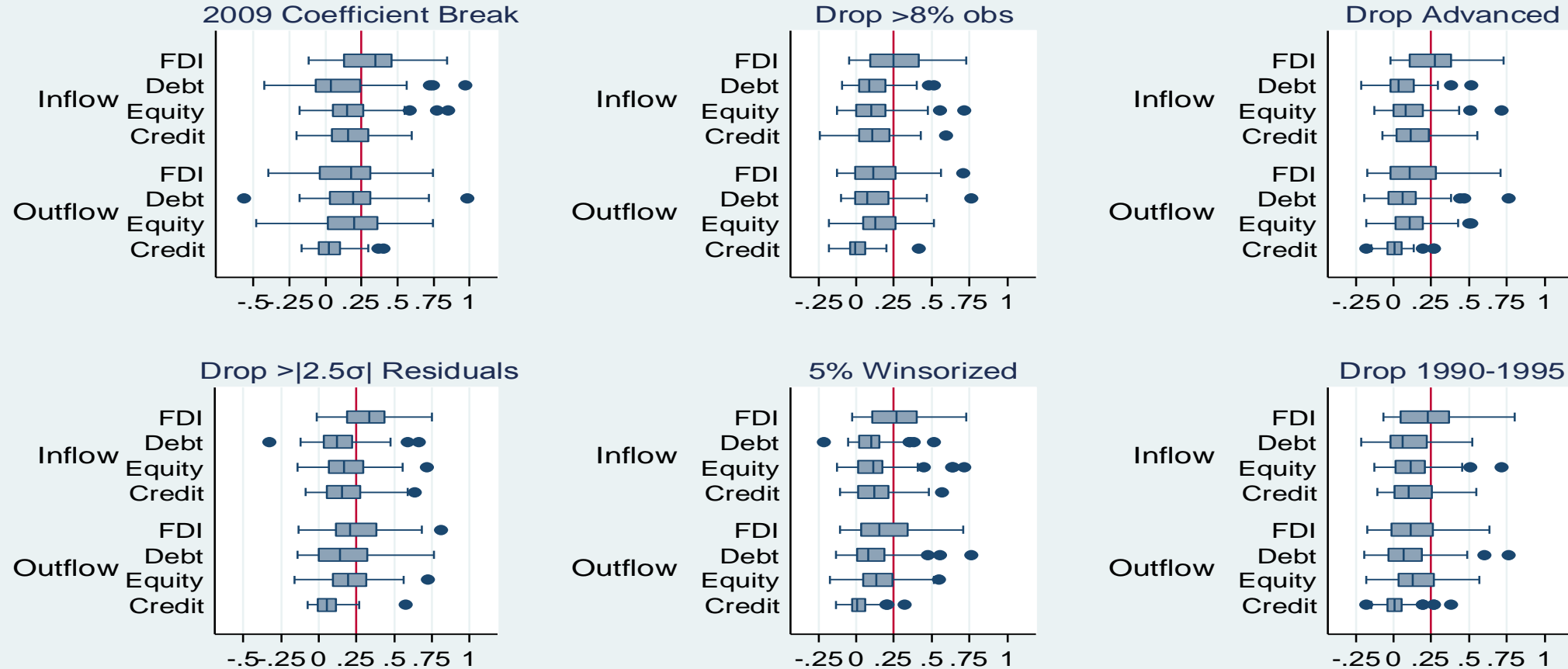# Fit of Country Time-Series Capital Flow Regressions
Box-Plots of Adjusted R^{2}s, Different Samples/Specifications

Default: 8 US vars, Adv/EM 26-yr dynamic factors, intercept; small countries 1990Q1-2015Q4

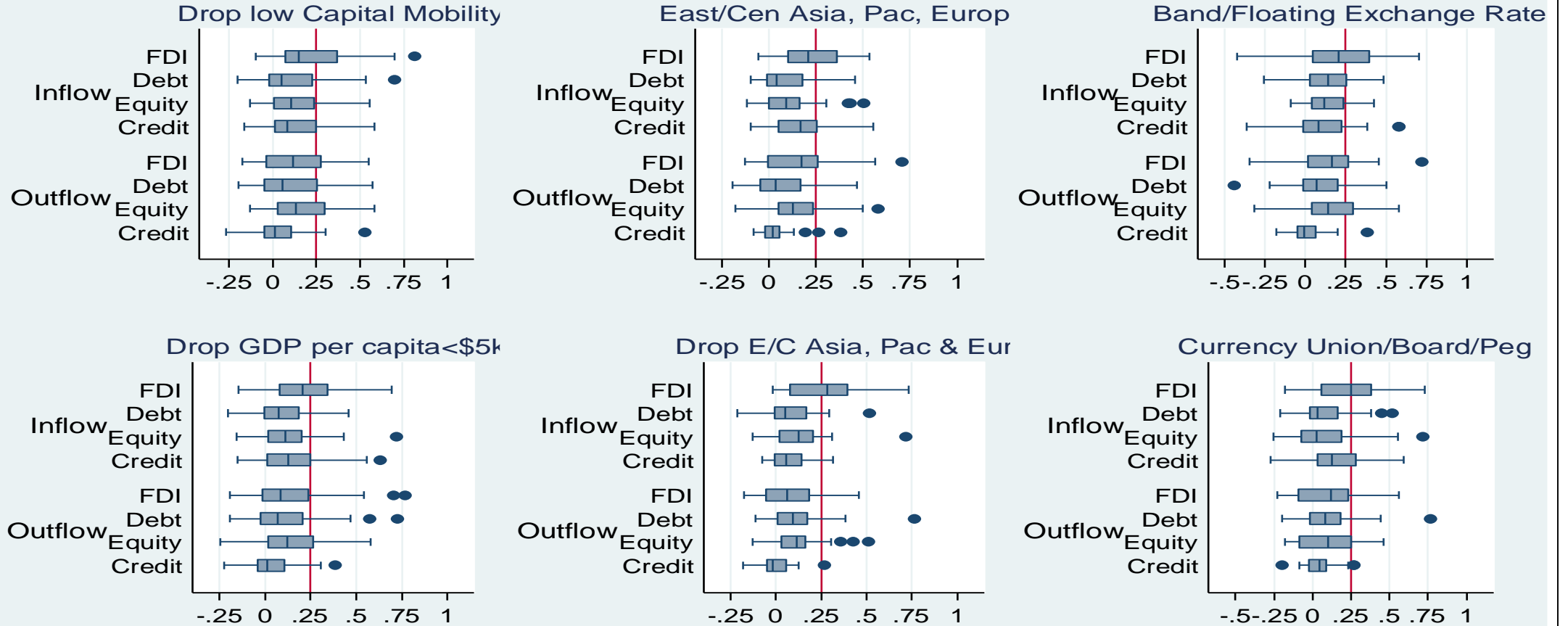# Fit of Country Time-Series Capital Flow Regressions
Box-Plots of Adjusted R^2s, Different Samples

8 contemporary US vars, Adv + EM 26-yr dynamic factors, intercept; small countries 1990Q1-2015Q4

Fit of Country Time-Series Capital Flow Regressions
## Box-Plots of Adjusted R^2s, Different Samples

8 contemporary US vars, Adv + EM 26-yr dynamic factors, intercept; small countries 1990Q1-2015Q4

Perhaps GFCycle a Crisis (not Tranquility) Phenomenon?

- Examine capital flows during periods of crisis
  - Define crisis as high VIX values

- No indication of systematic movement around crises
  - Sensitivity analysis indicates robustness

Capital Flows (%GDP) around quarters when VIX close>30
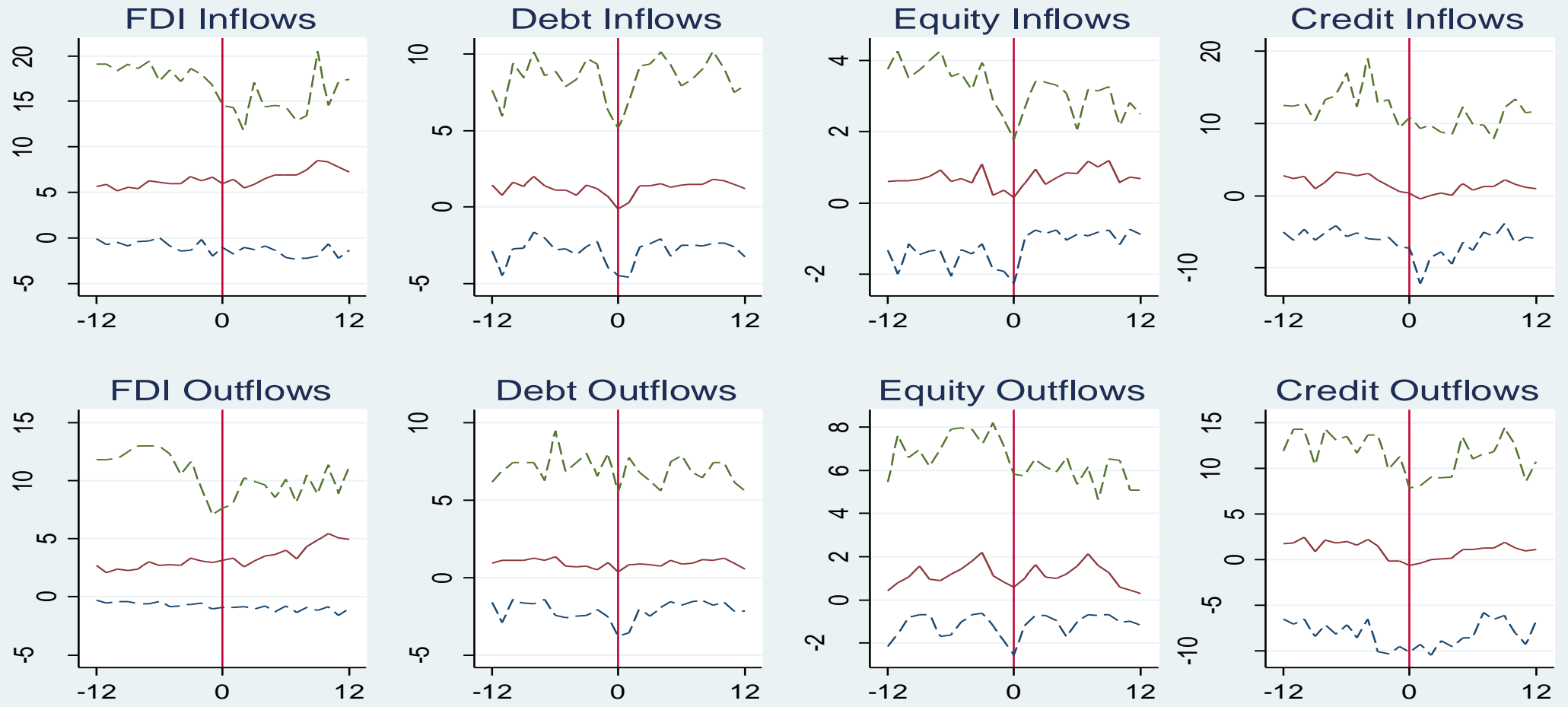
Means with (5,95) confidence interval. 1990Q1-2015Q4 data, 63 small countries.

GFCycle: Summary

- Hard to find GFCycle!
  - VIX (and other fundamentals) not correlated with capital flows
  - Capital flows have *very* limited comovement!
- Capital flows not much driven by center-country phenomena *or* commonality embedded in capital flows
  - GFCycle rarely explains 25% of capital flows
- So small economies can't blame vagaries of GFCycle (US monetary policy?) for capital flows

Conclusion

- Fed/Northern monetary policy a convenient scape-goat
    - Easier to blame outsiders for domestic woes
- But … little evidence that woes of EMs due to Northern monetary policy
    - Southern exports *grew* during periods of unconventional monetary policy
    - No sign that capital flows much affected by GFCycle
        - GFCycle hard to detect! Odd for supposedly pervasive common element
- Responsibility for troubles in EMs does *not* lie in Washington!