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Fiscal Policy, the Trade Balance, and the Real Exchange Rate: Implications for International Risk Sharing

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Fiscal Policy, the Trade Balance and the Real Exchange Rate: Implications for International Risk-Sharing

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- What is the effect of a variation in **government spending** on the **(real) exchange rate**?

- **Two** opposite views

1. **IS-LM-Mundell-Fleming**

$\uparrow$ aggregate demand

$\uparrow$ interest rate (IS curve effect)

$\longrightarrow$nominal + real **appreciation**

2. **Obstfeld and Rogoff (NOEM)**

$\uparrow G \rightarrow \downarrow$consumption (wealth effect on L supply)

$\downarrow$ money demand

$\rightarrow$need rise in P level (since M supply given)

$\rightarrow$(nominal) **depreciation** (via PPP)

$$(\uparrow)p = (\uparrow)\ e\ +\ \overline{p}^*$$

- IS-LM and OR have opposite implications on exchange rate

- Also: IS-LM $\longrightarrow$ consumption **rises**

  OR $\longrightarrow$ consumption **falls**

- This paper in a nutshell

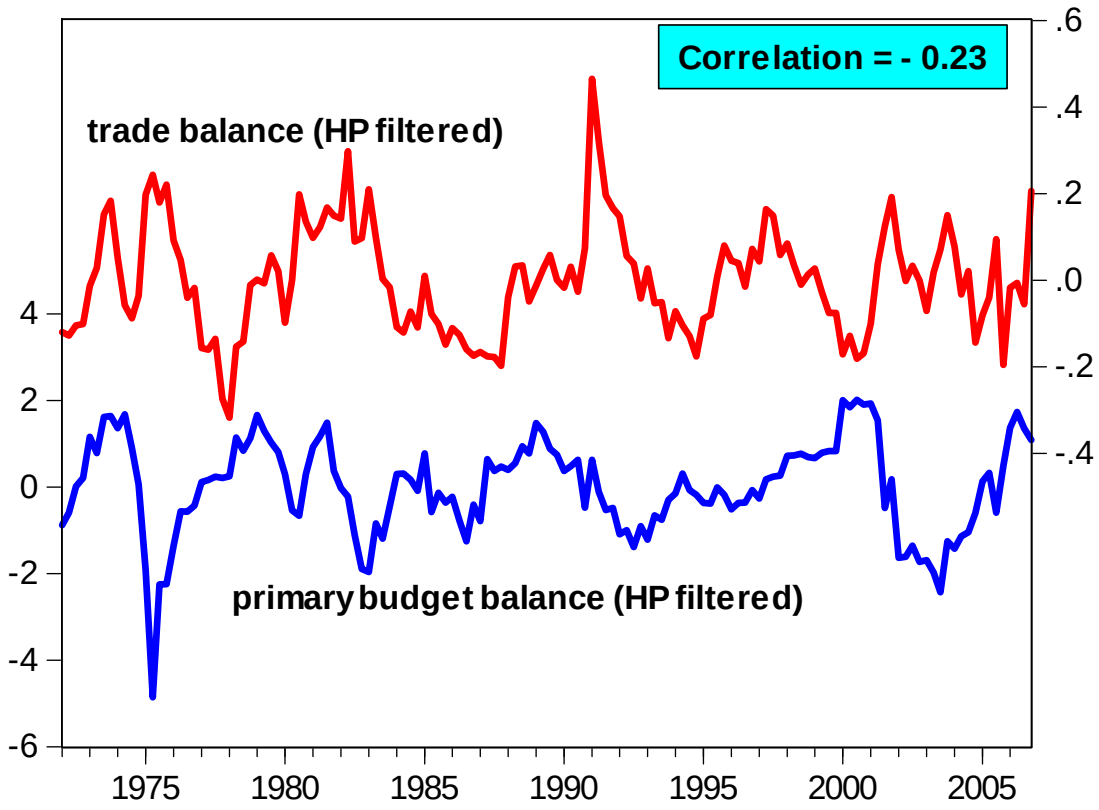
OR are **right**, but for the **"wrong"** reason

- Related issue: what is the effect on the **trade balance?**

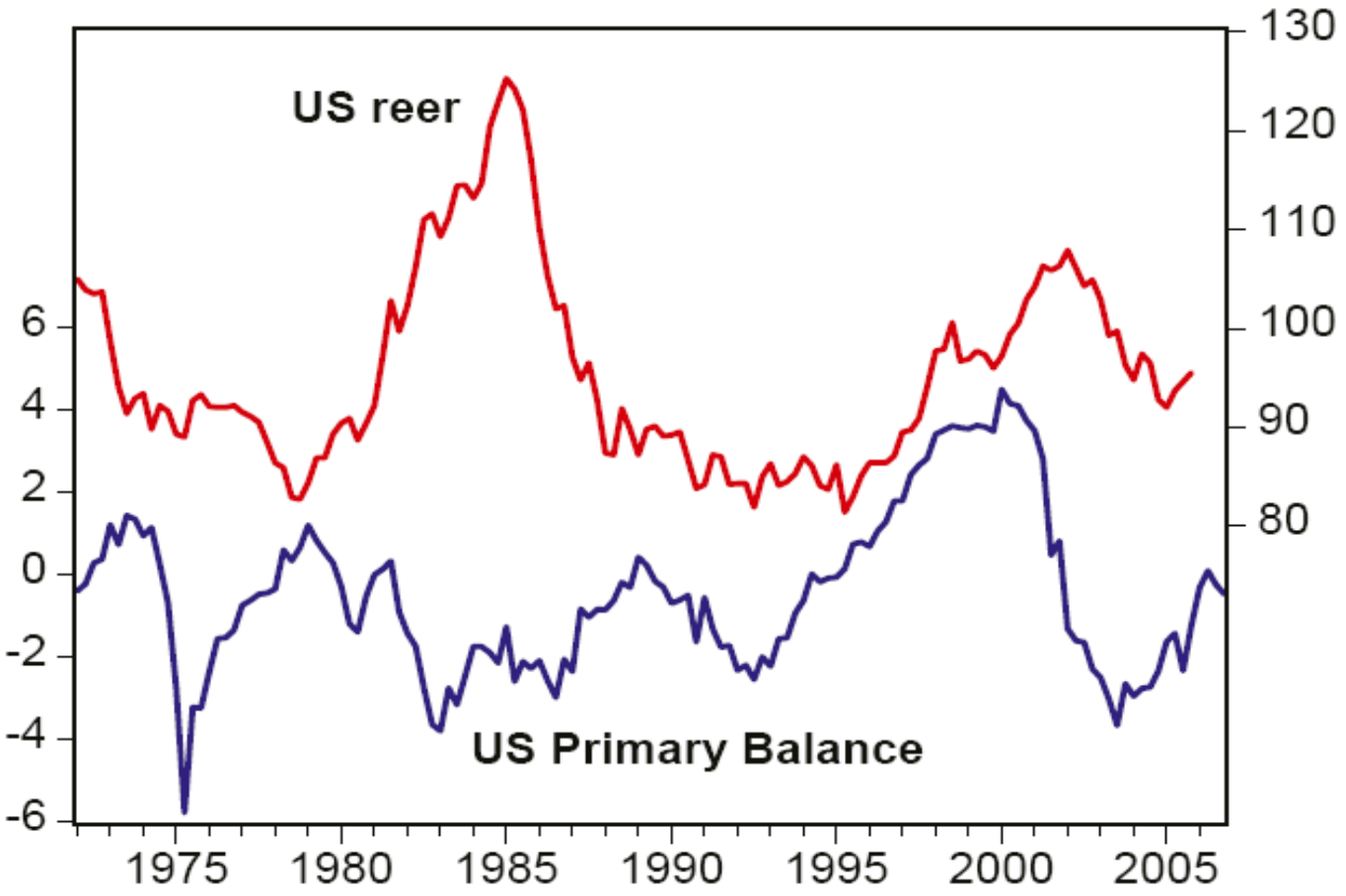
Recently: "**twin deficits**" vs "**savings glut**" as alternative theories of US current account deficit

- At business cycle frequency not much evidence of "twin deficits"

- **Unconditionally**, primary budget balance and trade balance **negatively correlated**


Correlation = - 0.23
trade balance (HP filtered)
primary budget balance (HP filtered)
4
2
0
-2
-4
-6
.6
.4
.2
.0
-.2
-.4
1975
1980
1985
1990
1995
2000
2005

- What about the **real exchange rate** and the **fiscal balance?**


US reer
US Primary Balance
130
120
110
100
90
80
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2
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-2
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1975
1980
1985
1990
1995
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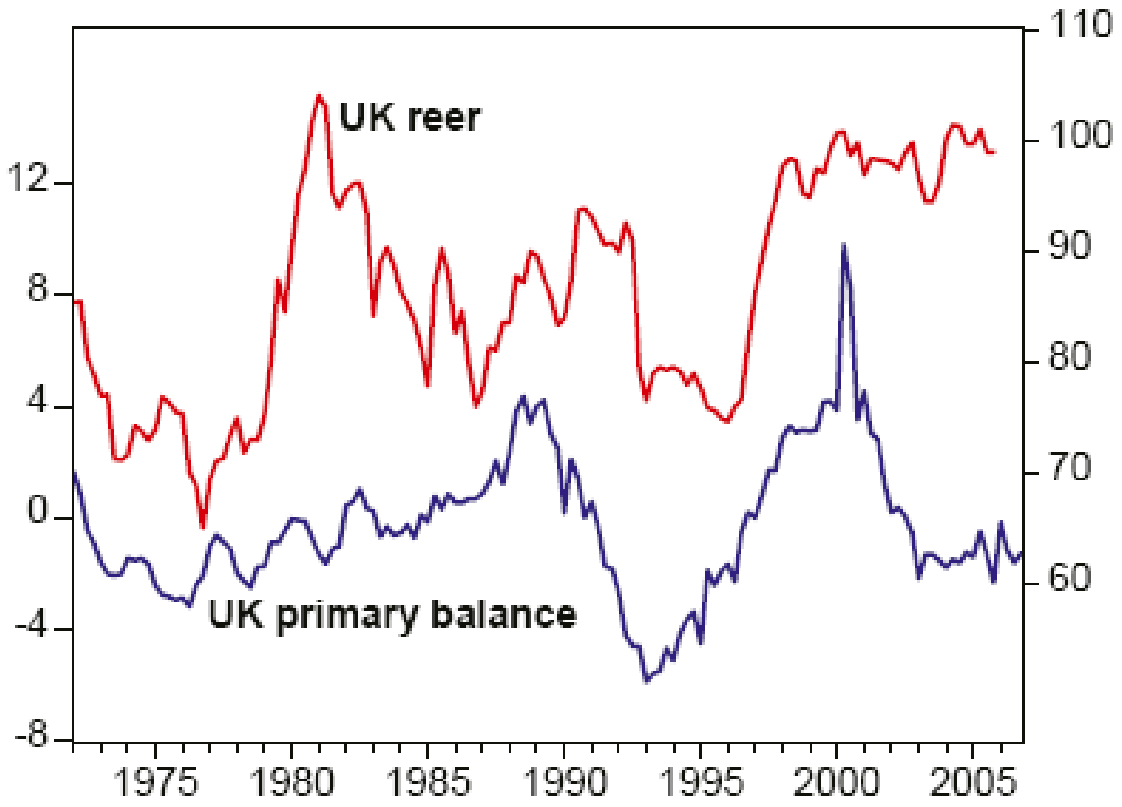
2005


UK reer
UK primary balance
12
8
4
0
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-8
110
100
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80
70
60
1975
1980
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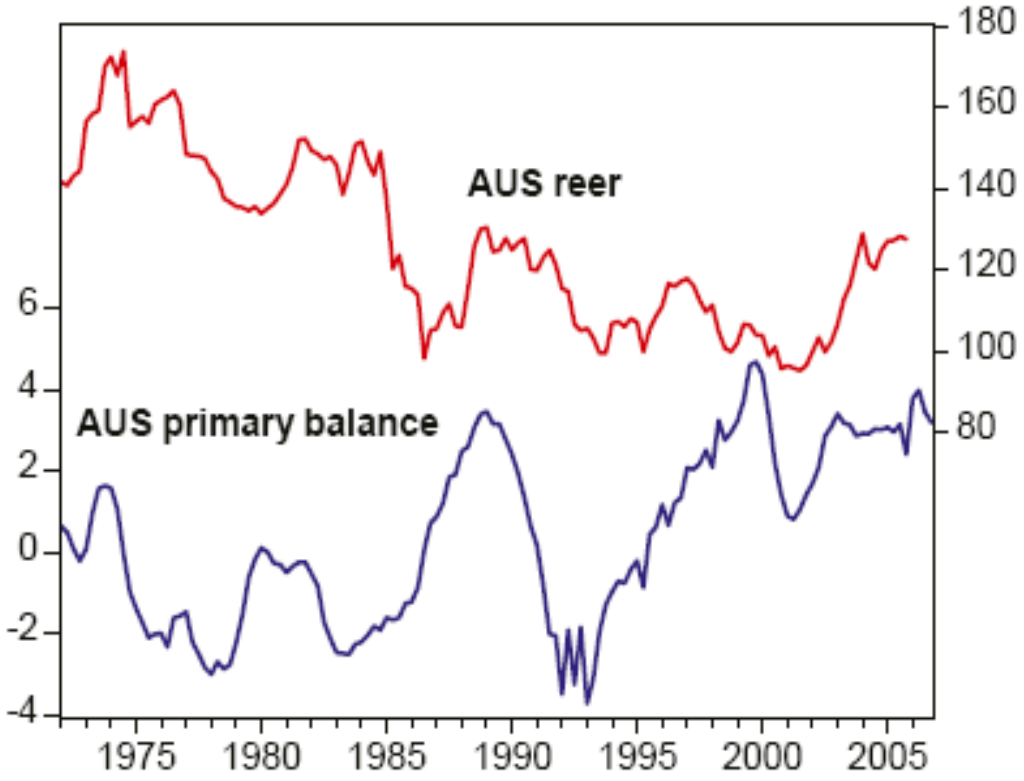
2005


AUS reer
AUS primary balance
180
160
140
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1975
1980
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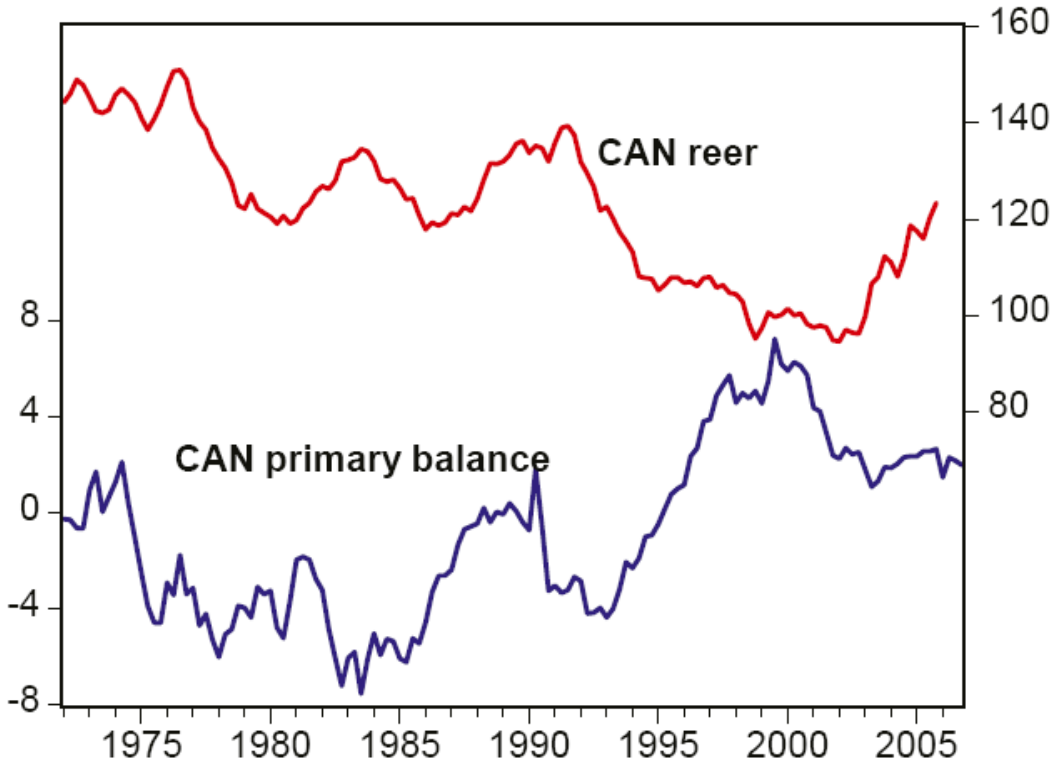
2000
2005


CAN reer
CAN primary balance
160
140
120
100
80
8
4
0
-4
-8
1975
1980
1985
1990
1995
2000
2005

Literature

- Froot-Rogoff (1991)

- VAR: Kim and Roubini (2004), Corsetti and Müller (2006)

- **Results**

- Countries: US, UK, Australia, Canada

- Positive **G shock** $\longrightarrow$

  1. Real exchange rate **depreciates**

  2. "**Twin deficits**" (with varying intensity)

  3. Consumption **rises**

- **Results (continued)**

Will argue that accounting simultaneously for results 1-3 is difficult in **many** models

Methodology

SVAR as in Blanchard and Perotti (2002) and Perotti (2003)

- Suppose model with **Y** (output), **G** (govt. spending) and **T** (taxes)

$$X_t = A(L)X_{t-1} + U_t$$

$U_t \equiv [u_t^g \quad u_t^t \quad u_t^y]'$ vector of reduced form residuals

$$u_t^g = \underbrace{\alpha_{gy} u_t^y}_{\textbf{effect (1)+(2)}} + \underbrace{\beta_{gt} e_t^t}_{\text{struct. tax shock}} + \underbrace{e_t^g}_{\text{struct. G shock}}$$

u_t^g captures **three effects**.

1. *automatic response* of G to innovations in Y (automatic stabilizers)

2. *systematic discretionary* response of fiscal policy to Y

3. *structural* shocks

- **Identification**

1. Net-out effect (1) by resorting to external estimates on tax and spending elasticities to GDP

Elasticity of $G \simeq 0 \rightarrow$ G ranked first in the VAR

2. Net-out effect (2) by employing **quarterly** data

3. Assume *orthogonalization* to disentagle e_t^g and e_t^t

- Our **SVAR** model

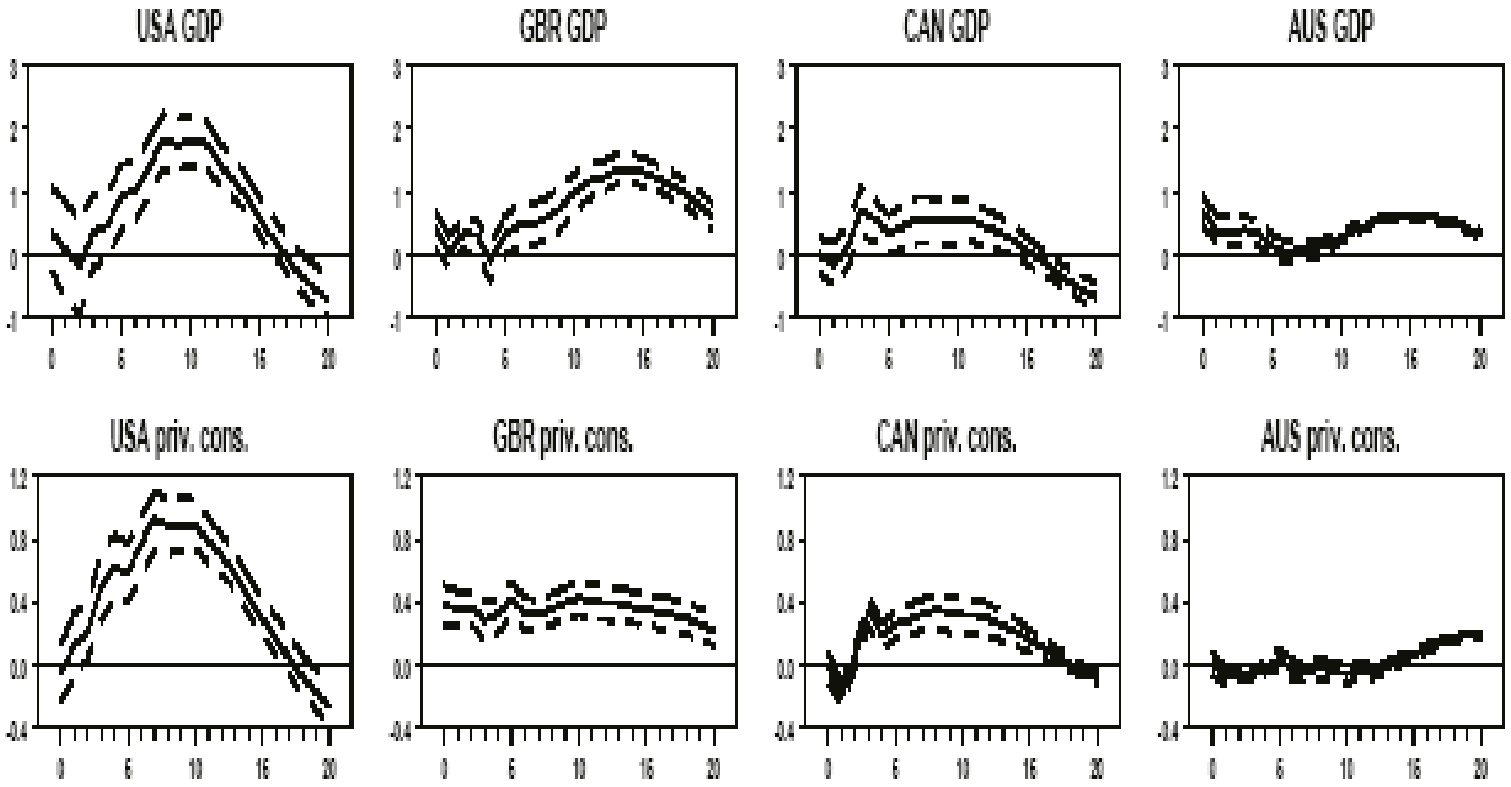
$$\begin{bmatrix} \log\ G_t \\ \log\ T\_net \\ \log Y_t \\ \log\ C_t \\ \log\ CPI_t \\ \log\ REER_t \\ \log\ R_t \end{bmatrix}$$

- Sample 1975:1 - 2005:2

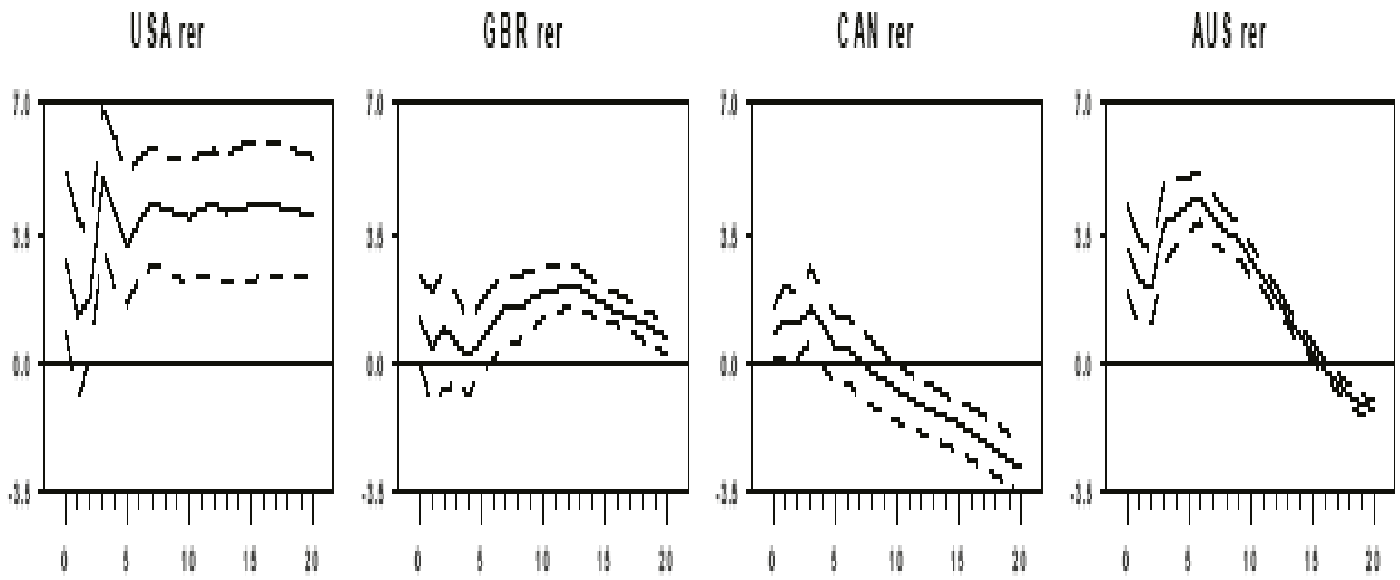
- Countries: UK, US, Canada, Australia (**non-interpolated** data)

Results from **SVAR (**whole sample**):** shock to G (1% of GDP)

1. GDP and Consumption **rise**

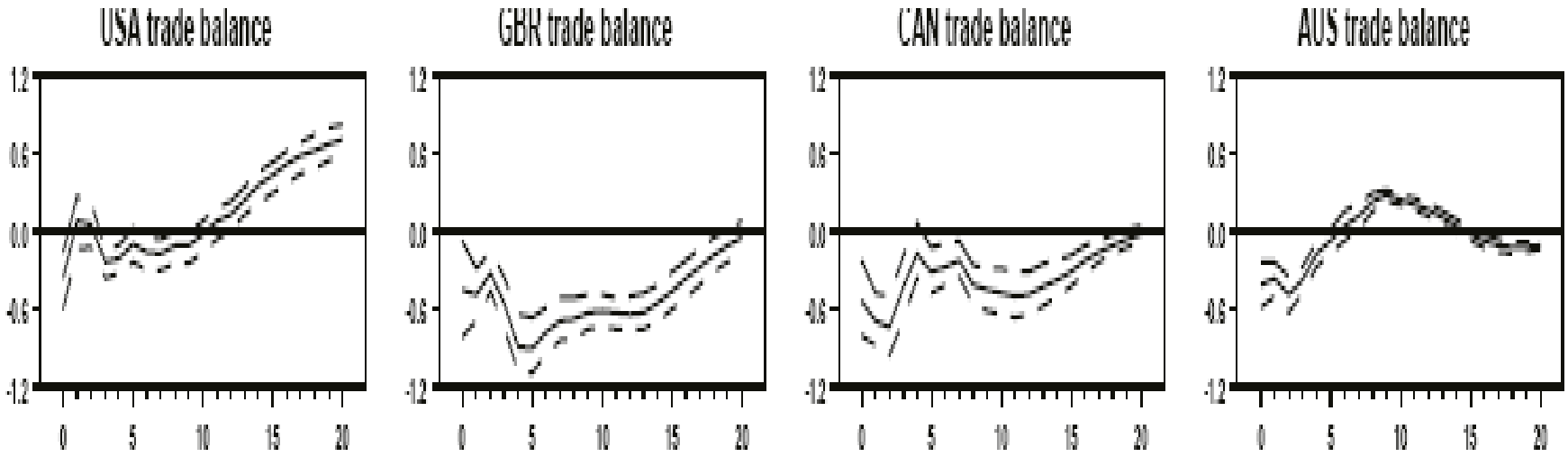


2. Real exchange rate **depreciation** (G shock = 1% GDP)



3. Trade balance **deteriorates** (twin deficit) $\Leftrightarrow$ (G shock = 1% GDP)

$\rightarrow$But effect in the US is small



- Does **identification/ordering** matter? YES
- Convention: measure of fiscal deficit should be "**cyclically adjusted**"
- In practice: put **GDP first** in ordering

- Suppose *reduced-form* model is

$$u_d = \beta u_y + \varepsilon_d \quad (1)$$
$$u_y = \gamma u_d + \varepsilon_y \quad (2)$$

$\varepsilon_d =$ "true" *deficit/GDP* shock; $\varepsilon_y =$ "true" *GDP* shock

$\beta < 0$ for two effects: (i) $\uparrow Y \rightarrow \downarrow \frac{D}{Y}$ (D given); (ii) $\uparrow Y \rightarrow \downarrow D$ (automatic effect on taxes/spending programs)

$\gamma > 0$ (standard theory)

- Note: u_y **correlated** with ε_d

$$u_y = \frac{\gamma}{1-\beta\gamma}\varepsilon_d + \frac{1}{1-\beta\gamma}\varepsilon_y$$

- Suppose estimate with Choleski ordering (**Y first**):

$$u_d = \widetilde{\beta} u_y + \widetilde{\varepsilon}_d \quad (3)$$

$$u_y = \widetilde{\varepsilon}_y \quad (4)$$

$\rightarrow$Impose u_y **uncorrelated** with $\widetilde{\varepsilon}_d$ ($\rightarrow$upward bias in $\widetilde{\beta}$)

- But in fact..

$$\widetilde{\varepsilon}_d = \varepsilon_d - \underbrace{\left(\widetilde{\beta} - \beta\right)}_{>0} u_y$$

$\rightarrow$Estimated deficit shock **negatively** correlated with true GDP shock

$$\uparrow \text{deficit} \rightarrow \downarrow Y$$

- In summary: $\uparrow$ deficit $\rightarrow \downarrow Y \rightarrow \uparrow \frac{D}{Y}$ via 2 channels

1. denominator increases

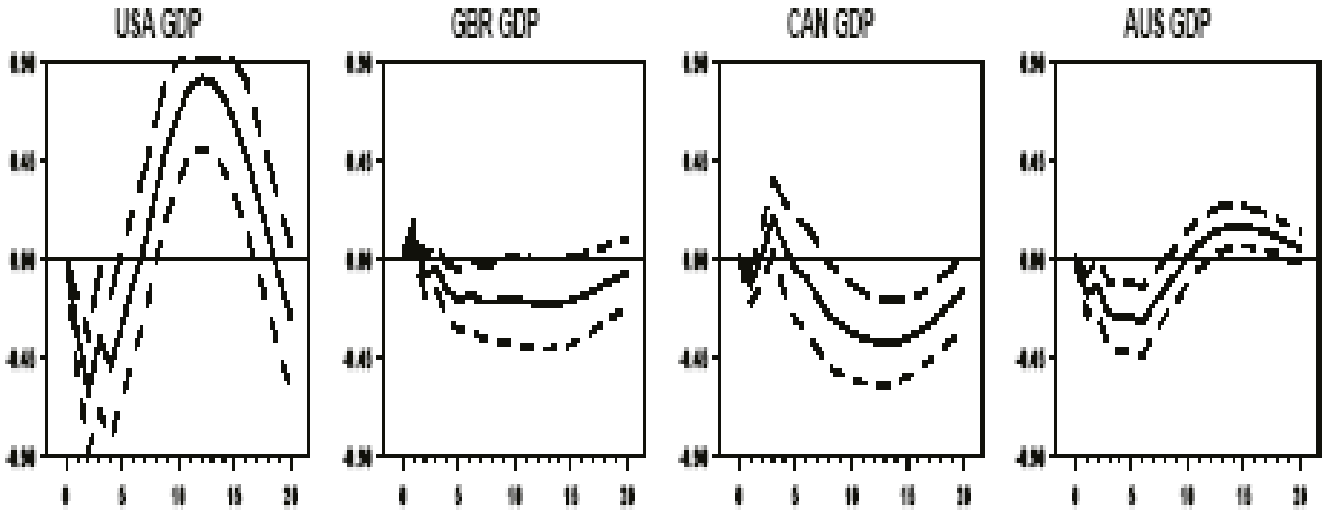
2. automatic effect on taxes/spending

$\rightarrow$**Spurious negative correlation** between deficit innovation and GDP innovation

- In addition: $\downarrow Y \rightarrow \uparrow \frac{TB}{Y}$ $\rightarrow$spurious negative correlation between deficit shock and **trade balance** shock (**twin divergence**)

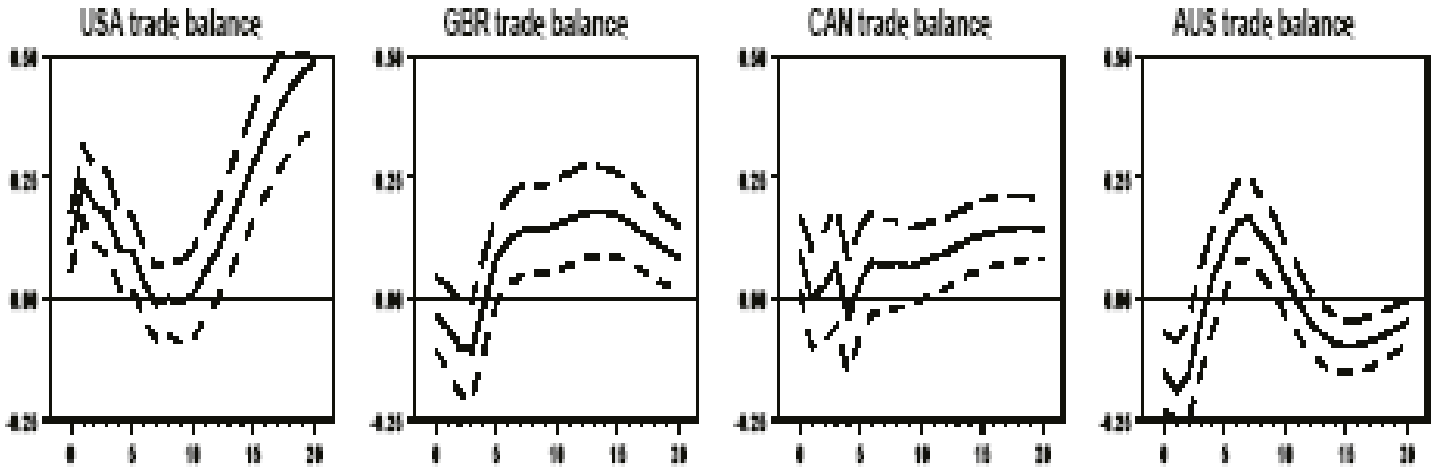
- **Recursive** approach with **Y first**

(1) **GDP falls**



- Recursive approach

(2) **Trade Balance Improves** $\rightarrow$ Twin **divergence**



- Some **theory**

$\longrightarrow$Use standard **NOEM model** with nominal rigidities (w/ or w/o investment) and **complete** markets

1. RER appreciates

2. Consumption falls (standard wealth effect)

3. Trade balance deteriorates (although it depends on openness and elasticity of substitution)

- Key point:

C and RER strongly linked via **international risk-sharing**

$$\frac{C_t}{C_t^*} = \kappa(RER_t)^{\frac{1}{\sigma}}$$

- Facts vs Theory: **2 puzzles**

	Facts	**Standard Theory**
RER	**Depreciation**	**Appreciation**
(RER,Consumption)	**Both rise**	**Both fall**

RER puzzle

1. IS-LM- Mundell-Fleming : **appreciation**

2. Obstfeld-Rogoff: **depreciation** but for "*wrong*" reason, i.e., need consumption to **fall**

Consumption-RER puzzle

1. All models with **complete markets** predict positive comovement btw. C and RER but in **wrong** direction

2. Similar prediction in "only-bond" economies (see, e.g, Erceg et al. 2006)

$\longrightarrow$Necessary condition: need to generate **positive consumption response**

$\longrightarrow$Yet this is **not** sufficient !

- **Three** classes of candidate models: what works / what doesn't

1. **Imperfect Asset Markets**

- Savers vs. spenders (Mankiw 2000), rule-of-thumb (ROT) consumers (Gali et al. 2006)

- If share or ROTer's large enough $\longrightarrow$ **positive** response of consumption to a rise in G

2. **Non-Separability in Utility**

(i) King-Plosser-Rebelo (1988): consumption and employment **complements**

$$\frac{1}{1-\sigma} C_t^{1-\sigma} \; V(1-N_t) \qquad \sigma > 1$$

- Virtually all models imply $\uparrow G \rightarrow \uparrow N$

- Hence KPR preferences $\rightarrow \uparrow C$

(ii) Greenwood-Hercowitz-Huffmann (1988)

$$\frac{1}{1-\sigma}\left(C_t - \psi N_t^{\zeta}\right)^{1-\sigma}$$

MRS cons./leisure does not depend on C $\longrightarrow$ **no wealth effect on L supply**

$$\frac{-U_{n,t}}{U_{c,t}} = \zeta\psi N_t^{\zeta-1}$$

- With **flex** prices: L supply schedule not affected by change in G $\longrightarrow$ no effect on N and W/P $\longrightarrow$ C must fall

- With **sticky** prices: L demand schedule shifts up $\longrightarrow$ C, N, W/P all rise

3. **Equilibrium Variable Markups**

Idea:

$\uparrow G \rightarrow \downarrow$ markup

$\rightarrow L^D$ schedule shifts out sufficiently to generate rise in real wage and substitution of leisure into consumption

Three variants of models with equilibrium variable markups

(i) NCES preferences (Kimball 95, Gust et al. 07) $\rightarrow$ Markup depends on relative price of imports ("Dornbusch effect": markup rises when terms of trade appreciate)

(ii) Deep habits (Ravn et al. 07)

(iii) Increasing returns + entry-exit of firms (Devereux et al. 1996)

	Rise in Consumption	RER depreciation
Imperf. Asset Market	YES	NO
Non-separab. utility		
KPR preferences	YES	YES if elastic L^S
GHH preferences	YES if sticky P+elastic L^S	NO for standard calibr.
Variable markup		
NCES	YES	NO
Deep habits	YES	YES
IRS - entry/exit	YES	??

- **Example**: consumption-leisure **non-separable** (King, Plosser and Rebelo 1988)

$$U(C_t, L_t) = \frac{1}{1-\sigma} C_t^{1-\sigma} \; V(L_t) \qquad \sigma > 1$$

$\longrightarrow$Consumption and leisure are **complements**

- Marginal utility of wealth:

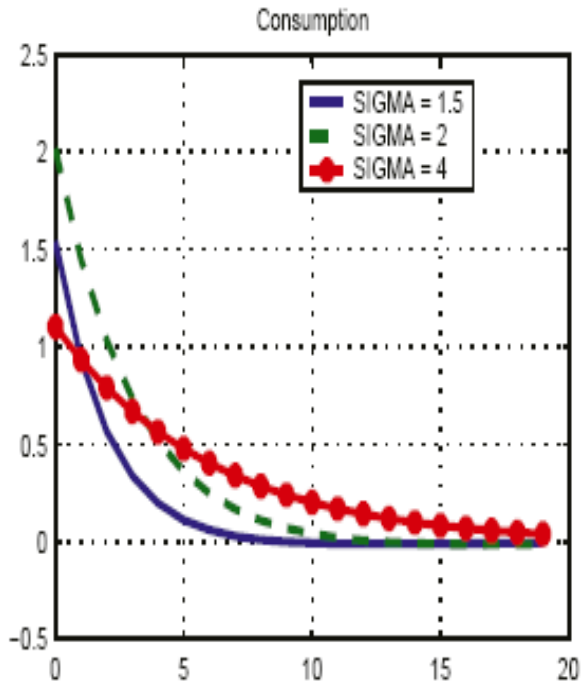
$$\lambda_t = \frac{N_t^{1+\varphi}}{C_t^{\sigma}}$$

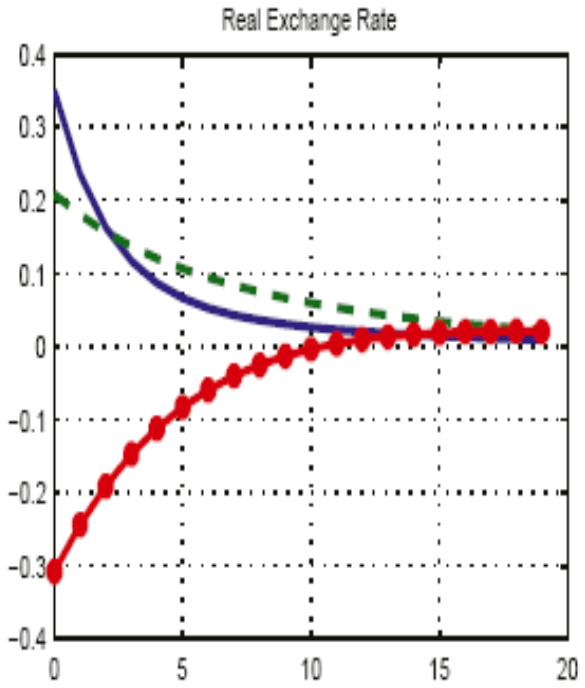
$\longrightarrow$Higher employment raises the marginal utitlity of consumption

$\uparrow G \ \rightarrow \ \uparrow L$ supply $\rightarrow\uparrow MU_c \rightarrow\uparrow C \rightarrow RER$ depreciates (via risk-sharing)

- Effect depends on σ and φ ($\uparrow \sigma \rightarrow\uparrow \varphi \rightarrow \downarrow L^s$ elasticity)

$\rightarrow$Need sufficiently low σ (i.e., sufficiently high L^s elasticity)





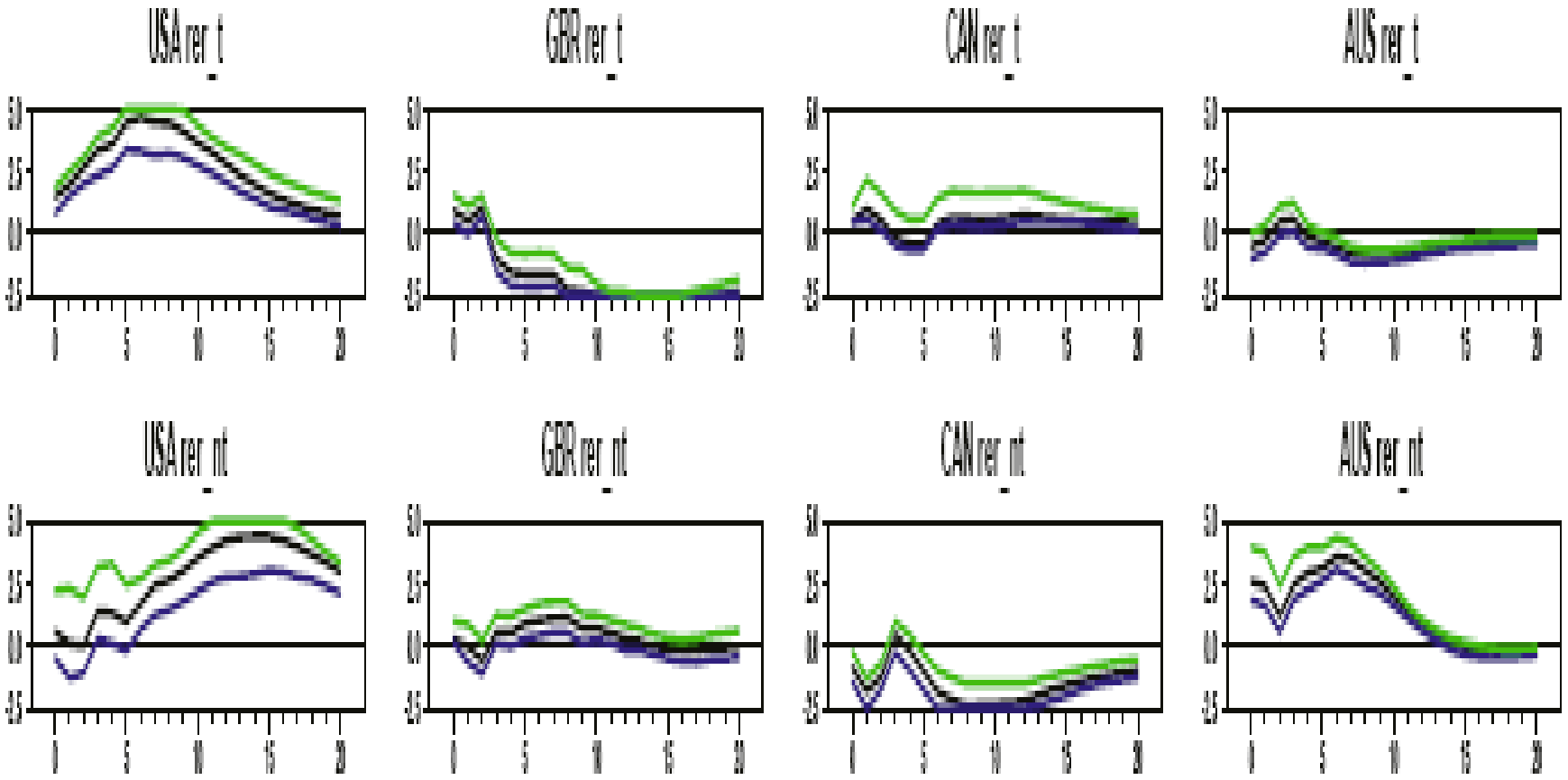
- **Extensions: traded and non-traded goods**

Typical RER decomposition :

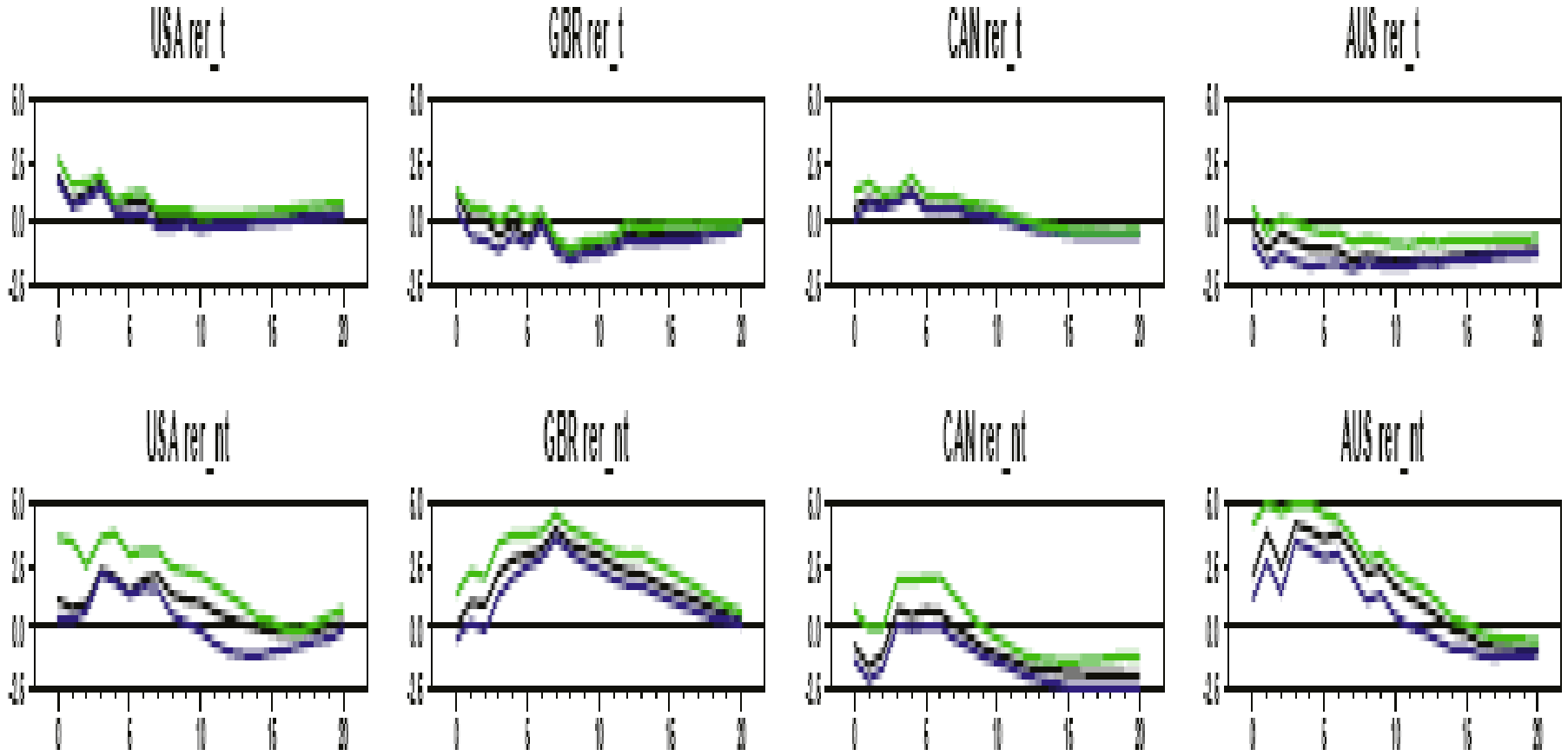
$$RER_{CPI,t} = \underbrace{\frac{NER_t \; P^*_{T,t}}{P_{T,t}}}_{RER_T} \times \underbrace{\frac{\left(P^*_{N,t}/P^*_{T,t}\right)^{\omega^*_N}}{\left(P_{N,t}/P_{T,t}\right)^{\omega_N}}}_{RER_N}$$

1. Measure traded goods prices using export and import prices (see e.g., Burstein et al. 2006)

2. What drives RER depreciation? RER_N plays non-negligible role


USA rer t
GBR rer t
CAN rer t
AUS rer t
USA rer nt
GBR rer nt
CAN rer nt
AUS rer nt

From 1980


USA rer_t
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USA rer_nt
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