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Persistence of Current-account Disequilibria and Real Exchange-rate Misalignments

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Background

Dramatic increase in global imbalances since 1990:

▶ The US current account deficit: 1.6% and 1.7% of GDP during the 1990s and 1980s $\longrightarrow$ 6% of GDP (600 billion dollars) over the period 2004-2008.

▶ Same trend in some eurozone countries: significant deficits
- Spain: $\longrightarrow$ 8% of GDP
- Portugal: $\longrightarrow$ 10% of GDP
- Greece: $\longrightarrow$ 11% of GDP

▶ Opposite trend in other countries: large surpluses
- Eurozone: Germany (6% of GDP), Netherlands (7.1% of GDP), Norway (14.4% of GDP) and Switzerland (10.3% of GDP)
- Outside the Eurozone: China (7.5% of GDP), Japan (4% of GDP), oil producing countries.

Background

▶ Several theoretical and empirical papers have been devoted to the study of the sustainability and adjustment towards equilibrium of current account imbalances.

▶ Some of these papers argue that current account adjustment happens through a major exchange rate correction (Freund, 2005; Obstfeld and Rogoff, 2005; Debelle and Galati, 2007).

▶ These papers are based on the previously established theoretical link between the current account and the real exchange rate (Mundell, 1961; Dornbusch and Fischer, 1980; Rodriguez, 1980; Branson, 1981).

▶ However, very few empirical studies have investigated this relationship (see Arghyrou and Chortareas, 2008).

▶ No empirical contribution had focused on the relationship between real exchange rate misalignments — i.e. the difference between the observed real exchange rate and its equilibrium value — and the persistence current account imbalances.

Background

Why focus on the link between the persistence of current account imbalances and exchange rate (ER) misalignments?

1. Only current account deficits/surpluses that do not reflect changes in economic fundamentals are bad $\implies$ current account imbalances (unobserved) rather than the current accounts themselves.

2. When the gap between the current account and its equilibrium level becomes persistent, reversion to equilibrium often requires important costs from an economic viewpoint.

3. The economic costs are likely to be higher in monetary unions since adjustment through (nominal) exchange rates is not operational.

4. The G20 summits had even advocated the need for some countries to correct their ER misalignments to reduce the size of global imbalances.

5. No empirical study on the link between the two imbalances.

Contributions

Filling the gap in the literature on several points:

1. assess "bad" current account imbalances; those disconnected from economic fundamentals.

2. study the adjustment mechanism towards equilibrium by paying a particular attention to the impact of real ER misalignments.

3. investigate the non-linearity given that the link between the real exchange rate and the current account can be (Arghyrou and Chortareas, 2008).

4. analyze whether the relationship between persistence of current-account imbalances and ER misalignments differs depending on whether countries belong or not to a monetary union.

Methodology

Prior estimates:

① Current account imbalances:

$$CA_{i,t}^{gap} = CA_{i,t} - \widehat{CA}_{i,t} \tag{1}$$

$$CA_{i,t} = a_i + \sum_{v=1}^{n} b_v Z_{i,t} + \mu_{i,t} \tag{2}$$

↪ Medium-term determinants of current accounts.

② Exchange rate misalignments:

$$Mis_{i,t} = reer_{i,t} - \widehat{reer}_{i,t} \tag{3}$$

$$reer_{it} = \lambda_i + \delta.prod_{i,t} + \vartheta.nfa_{i,t} + \nu_{i,t} \tag{4}$$

↪ The behavioral equilibrium exchange-rate (BEER) approach

Methodology

Main estimates:

▶ Panel smooth transition regression (PSTR) introduced by González et al. (2005)

$$CA_{i,t}^{gap} = \alpha_i + \beta_0 CA_{i,t-1}^{gap} + \beta_1 CA_{i,t-1}^{gap} \times F\left(Mis_{i,t}; \gamma, c\right) + \varepsilon_{i,t} \qquad (5)$$

- α_i denotes the country-fixed effects and $\varepsilon_{i,t}$ is an i.i.d. error term
- estimated coef. vary according to the regime considered
- changes in the estimated value of the coef. is smooth and gradual
- $Mis_{i,t}$ acts as the transition variable

▶ The transition function F is normalized and bounded between 0 and 1, and is given by (González et al., 2005):

$$F\left(Mis_{i,t}; \gamma, c\right) = \left[1 + \exp\left(-\gamma \prod_{j=1}^{m}(Mis_{i,t} - c_j)\right)\right]^{-1} \qquad (6)$$

- γ ($\gamma > 0$) stands for the slope parameter, and $c_j, j = 1, \ldots, m$, are the threshold parameters satisfying $c_1 \leq c_2 \leq \ldots \leq c_m$.

Methodology

▶ The two most common cases in practice correspond to $m = 1$ (logistic) and $m = 2$ (logistic quadratic).

- a logistic function $\implies$ the dynamics is asymmetric and the two regimes are associated with small and large values of real ER misalignments relative to the threshold.
- a logistic quadratic function $\implies$ the dynamics is symmetric across the two regimes, but the intermediate regime follows a different pattern.

▶ We follow the three-step methodology proposed by González et al. (2005) to apply PSTR models:

1. testing for homogeneity against the PSTR alternative
2. selecting (i) between the logistic and logistic quadratic specification for the transition function, and (ii) the transition variable.
3. testing the validity of the estimated PSTR model.

Data

▶ 22 high-income OECD countries
  - 11 eurozone members and 11 non-eurozone countries
  - data are annual, spanning the period from 1980 to 2011.

Table 1: Data sources

Primary data	Sources	Expressed in relative terms	Notation
Current account balance to GDP ratio	WEO Database (IMF)	No	*CA*
Fiscal balance to GDP ratio	WEO Database, OECD Database	Yes	*rdef*
Net foreign asset to GDP ratio (Lagged)	Lane and Milesi-Ferretti (2007)	No	*nfa*
Level of PPP-adjusted GDP per capita	WEO Database	Yes	*prod*
Old-age dependency ratio	WDI (The World Bank)	Yes	*rold*
Population growth rate	WDI	Yes	*popg*
M2 to GDP ratio	WDI, OECD Database	No	*m2*
Openness	WDI	No	*open*
GDP growth rate	WEO Database	Yes	*rgrw*
Oil balance	WEO	No	*oilb*
Terms of trade	WDI, DG ECFIN	No	*tot*

Note: The aging rate (denoted raging) does not appear in this list because it is directly calculated by the authors as described in the text. WEO: World Economic Outlook; WDI: World Development Indicators; OECD: Organization for Economic Co-operation and Development; DG ECFIN: Directorate General for Economic and Financial Affairs.

Preliminary results

▶ **Current account imbalances**

Figure 1: Observed current account and estimated current account
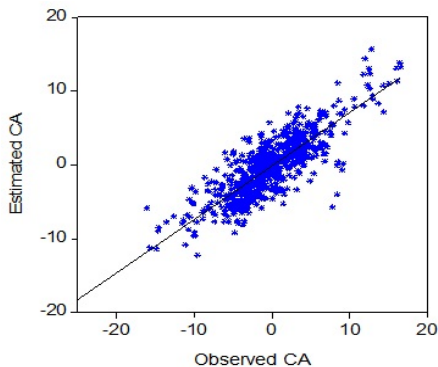
Preliminary results

▶ **Current account imbalances**

Table 2: Correlation between the estimated current-account imbalances

	CA^{gap1}	CA^{gap2}	CA^{gap3}	CA^{gap4}	CA^{gap5}	CA^{gap6}
CA^{gap1}	1	0.9910	0.9921	0.9921	0.9628	0.9628
CA^{gap2}	0.9923	1	0.9832	0.9832	0.9684	0.9684
CA^{gap3}	0.9703	0.9628	1	1.0000	0.9703	0.9703
CA^{gap4}	0.9703	0.9628	1.0000	1	0.9703	0.9703
CA^{gap5}	0.9614	0.9617	0.9892	0.9892	1	1.0000
CA^{gap6}	0.9614	0.9617	0.9892	0.9892	1.0000	1

Note: The correlation matrix above the diagonal relates to the different estimates of the current-account gap with 4-year averaged data, while the correlation matrix below the diagonal refers to the different estimations of the current-account gap from annual data.
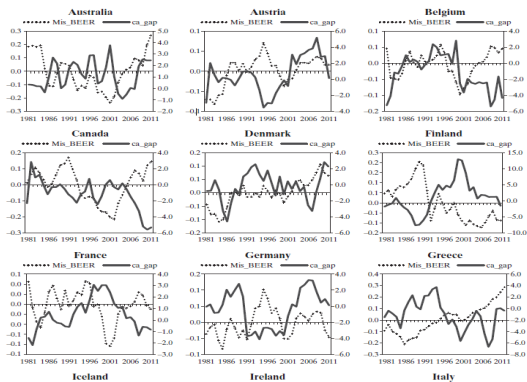
▶ **Equilibrium exchange rate**

$$reer_{i,t}^{est} = \widehat{\lambda}_i + \underset{(0.150)}{0.400} prod_{i,t} + \underset{(0.03)}{0.069} nfa_{i,t} \tag{7}$$

Preliminary results

▶ **Real ER Misalignments and current-account (CA) imbalances**

Figure 2: Some links between misalignments and CA imbalances

PSTR estimation results

Table 3: Results of linearity tests (p-values), whole sample

	$r = 0$	$r = 1$
LM	0.001	0.681
F	0.001	0.687

Note: *LM* and *F* denote Lagrange Multiplier and F tests for linearity. $r = 0$ refers to the null hypothesis of linearity against the alternative of a PSTR model with two regimes. $r = 1$ refers to the null hypothesis of PSTR model with two regimes against the alternative of a PSTR model with three regimes.

Table 4: Results of the PSTR estimation, whole sample

Variable	*Coefficient*		*t-statistic*
$CA_{i,t-1}^{gap}$	0.5806***		8.51
$CA_{i,t-1}^{gap} \times F$	0.4968*		1.70
Threshold $\hat{c}$		0.1124	
Slope coefficient $\hat{\gamma}$		17.2894	

Note: *** (resp. **, *): significant at the 1% (resp. 5%, 10%) level.

PSTR estimation results

Table 5: Results of linearity tests (p-values), sub-samples

	Euro members		Others	
Variable	$r = 0$	$r = 1$	$r = 0$	$r = 1$
LM	0.018	0.338	0.021	0.190
F	0.019	0.348	0.023	0.200

Note: *LM* and *F* denote Lagrange Multiplier and F tests for linearity. $r = 0$ refers to the null hypothesis of linearity against the alternative of a PSTR model with two regimes. $r = 1$ refers to the null hypothesis of PSTR model with two regimes against the alternative of a PSTR model with three regimes.

Table 6: Results of the PSTR estimation, sub-samples

	Euro members		Others	
Variable	*Coefficient*	*t-statistic*	*Coefficient*	*t-statistic*
$CA_{i,t-1}^{gap}$	0.6055***	8.28	0.5162***	7.52
$CA_{i,t-1}^{gap} \times F$	0.2892***	2.99	1.28***	4.49
Threshold $\hat{c}$	-0.0073		0.1406	
Slope coefficient $\hat{\gamma}$	880.7212		1279.3	

Note: *** (resp. **, *): significant at the 1% (resp. 5%, 10%) level.

Conclusion

▶ We show that persistence of current-account imbalances is strongly dependent on real exchange-rate misalignments.

▶ While there is no persistence in cases of currency undervaluation or weak overvaluation, persistence tends to augment for overvaluations higher than 11%.

▶ We show that belonging or not to a monetary union affects the results:
  - CA disequilibria tend to be persistent even for very low exchange-rate overvaluations in the euro area
  - this is not the case for non eurozone members for which persistence is observed for overvaluations higher than 14%.

▶ Countries with a fixed exchange rate regime, especially those in a monetary union, need to pay particular attention to their exchange rate misalignments.