Global Imbalances from a Stock Perspective[1]

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Abstract

After the recent crisis, a reduction was observed in global current account ("flow") imbalances. Still, global disequilibria as measured in terms of countries' net foreign assets ("stock imbalances") kept increasing. This paper studies whether stock imbalances have a stabilizing or destabilizing impact on countries' accumulation of external wealth. That is, do creditor economies, by virtue of their positive stock of net foreign assets, keep accumulating –everything else equal— external wealth? Do debtor countries, due to their negative foreign assets, keep accumulating external debt? Our results show that in debtor economies the existing stock of net debt helps to limit current account deficits, thus halting future debt accumulation. In creditor countries, instead, the positive stock of net foreign assets contributes –everything else equal— to increase future current account surpluses, potentially leading to destabilizing dynamics in wealth accumulation. This important asymmetry between creditors and debtors holds in spite of the stabilizing impact that net foreign assets have on the trade balance of creditor countries through real exchange rate fluctuations, and might have relevant implications for global growth.

Keywords: global imbalances, current account, international investment position, external debt, growth.

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1. Introduction

According to a number of academics, the development of global imbalances was in the roots of the Great Recession that we suffered some years ago. Widening global imbalances have been traditionally characterized by increasingly positive or negative current account positions, depending on the country ("flow imbalances"). When the Great Recession exploded an important correction in flow imbalances was observed. Afterwards, when the activity begun to increase, the adjustment in current account imbalances continued (see left panel of Figure 1); with nuances, this was perceived as a sign of the sustainability of the recovery.

Still, other measures of external disequilibria are possible, beyond the traditional one based on current account flows. Indeed, another possibility to measure global imbalances is to analyze them from a stock, rather than a flow, perspective, based on the net foreign assets (NFA) position of the different countries. Under this metric, the right panel of Figure 1 shows that the correction in global imbalances observed in the year 2010 was a transitory phenomenon and afterwards the divergences among countries continued increasing, at least, until 2014.
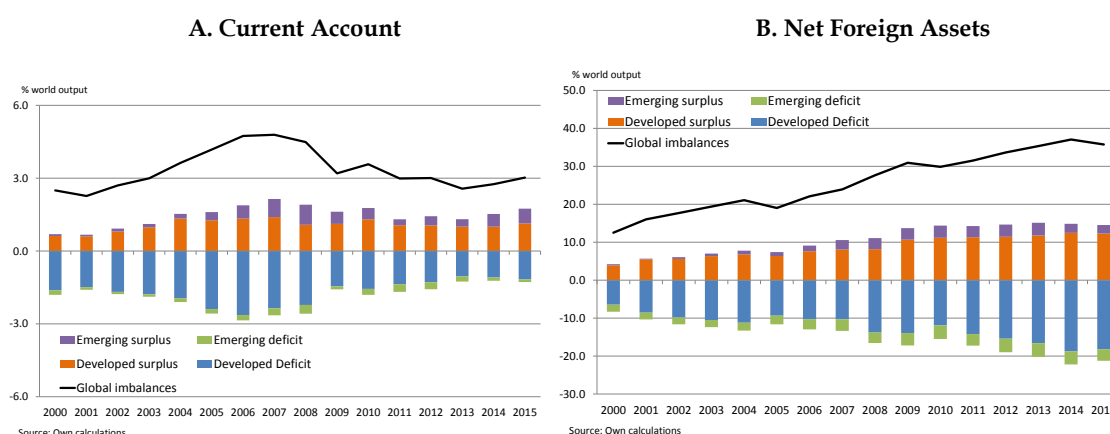
A. Current Account	B. Net Foreign Assets

Figure 1. Global imbalances from a flow and a stock perspective: 2000-2015

In light of this evidence, the focus of the economic debate both in academia and in policy institutions has recently shifted from analyzing current account imbalances to a closer inspection of the implications that NFA ("stock") imbalances may have for external stability. According to IMF (2014a), the projected widening of stock imbalances in the next years will leave several debtor economies exposed to market sentiments. IMF (2014b) and IMF (2016) suggest the opportunity to monitor and ultimately limit the growth of stock imbalances of both debtor and creditor countries. Forbes et al. (2016) focus on the implications that large NFA positions and their composition may have for the ability of an economy to respond to external shocks. Benetrix et al. (2015) show

how the currency composition of countries' NFA leads them to accumulate or lose wealth through valuation effects due to exchange rate fluctuations.

The aim of this paper is to contribute to the debate on the implications of stock imbalances for external stability by answering two related sets of questions.

First, do stock imbalances have a stabilizing or destabilizing impact on the accumulation of external wealth? That is, do creditor countries, by virtue of their positive stock of net foreign assets, keep accumulating– everything else equal— external wealth? If this was the case, stock imbalances would lead creditor (debtors) to accumulate (lose) even more wealth in the future, and might therefore contribute to triggering destabilizing dynamics in the evolution of external wealth.

According to economic theory, this might happen through two direct channels. First, creditors, whose portfolio contains more external assets than liabilities, might receive more revenues from their foreign assets than they pay on their liabilities. Positive investment income flows would lead them to run –everything else equal—current account surpluses, and to accumulate even more external wealth over time. The opposite might happen for debtor economies, which are likely to end up paying more revenues on their foreign liabilities than they get on their external assets, thus running into current account deficits and further wealth losses.

A second channel through which creditor (debtor) positions may lead to future wealth accumulation (loss) is countries' response to temporary income shocks. In this respect, it has been observed in the literature that a transitory increase in a country's wealth lead creditor countries to run current account surpluses and debtor economies to incur in further deficits. This might happen, for instance, if both creditors and debtors decided to invest the additional income according to the portfolio they already have –skewed towards foreign assets in the case of creditors and towards domestic ones in the case of debtors—thus generating, respectively, CA surpluses and deficits (Kraay and Ventura [2000]). The same could happen if debtor countries were more credit constrained than creditor ones, and would decide to borrow more from abroad once a positive income shock partially releases their constraints (Bussiere et al. [2003]).

On the other hand, economic theory offers reasons to believe that the stock of net foreign assets might have a stabilizing impact on the accumulation of external wealth. For one thing, wealth effects should imply that wealthier, creditor countries will end up consuming and therefore importing more than poorer, debtor economies, thus reducing their trade surpluses and halting to some extent the accumulation of external wealth.

Whether stock imbalances have a stabilizing or destabilizing impact on wealth accumulation is therefore essentially an empirical question, which we seek to address in this paper.

A second, related question concerns price fluctuations due to stock imbalances. Namely, are there automatic adjustment mechanisms working through relative price adjustments that can reduce the accumulation or loss of external wealth over time?

In this respect, economic theory predicts that wealthier, creditor countries should record, at least in the long run, an appreciation of their exchange rate. The exchange rate appreciation, in turn, might have several indirect impacts on wealth accumulation. First, it would reduce the competitiveness of creditors' products, thus implying a shrinking in their trade surplus, with an indirect stabilizing effect on the accumulation of external wealth. Second, it will likely affect the revenues received on the stock of external assets and the payments on foreign liabilities, the net impact depending on the currency composition of a country's wealth. Finally, exchange rate fluctuations will cause valuation changes through capital gains or losses on existing gross positions, which may either amplify or reduce a country's wealth accumulation depending on the currency composition of its portfolio.

The second issue we address in this paper concerns precisely the importance of these adjustment mechanisms. Are they empirically relevant? Are they somewhat hampered in a context in which exchange rates might not freely respond to changes in a country's net foreign asset position, like, for instance, a common currency area?

We try to answer these questions using Balance of Payments data from 1980 to 2015 for a set of 39 advanced and emerging market economies. In particular, we first inspect the evolution of wealth accumulation over the last three decades by decomposing it into its main channels (trade balance, investment income balance, valuation effects), trying to extract some stylized facts. We then run panel regressions of the current account, of their sub-balances, and of the real and the financial exchange rate on a set of fundamentals determinants, including net foreign asset positions, in the spirit of IMF (2013a).

The main results of this analysis can be summarized as follows. NFA positions are very persistent: creditors and debtors have kept, respectively, accumulating and losing wealth over the last decades. In particular, among advanced countries, both creditors' wealth accumulation and debtors' wealth loss have proceeded at an increasing pace.

As for the impact of net foreign assets on wealth accumulation, we find that stock imbalances lead to destabilizing dynamics only for creditor countries, that is, a creditor position tends to lead to further wealth accumulation. This seems to be related to a very weak wealth effect for these countries. Namely, the marginal propensity to consume of creditor countries appears to be pretty small, so that their imports do not tend to increase with their external wealth, and cannot compensate for the increased investment income they receive on their net foreign asset position. This is not the case for debtors, which tend to pay more revenues on their stock of debt, but also to consume and import less due to a negative wealth effect, which halts to some extent the accumulation of external debt over time. Besides, the data show that following positive transitory income shocks creditor countries tend to widen their current account surplus and debtors their deficits.

As for indirect impacts through relative prices, the data seem to support the existence of a positive relationship between the stock of NFA and the real effective exchange rate but only for creditor countries. That is, the higher the stock of external wealth of creditor countries the more appreciated their exchange rate, which, in turn, should limit the size of their trade surpluses and the accumulation of further wealth. This suggests that stock imbalances have an indirect stabilizing impact on the trade balance through the real exchange rate. Still, this relationship seems to have been drastically reduced for those economies that joined the Euro Area, and it is in general not sufficient to limit creditors' wealth accumulation.

[Results on the impact of NFA on financial exchange rates, to be added]

It should be clear from the onset that the purpose of this paper is purely positive. Namely, we aim at studying the impact of stock imbalances on wealth accumulation, taking also into account their indirect impact through price fluctuations. Finding –as preliminary results seem to suggest— that stock imbalances lead to destabilizing dynamics in wealth accumulation, would imply that any desired adjustment in flow imbalances should take this mechanism into account. Moreover, given that stock imbalances are projected to keep rising in the next years, their patter will likely have implications for the future evolution of flow imbalances as well. However, we do not try to extract any normative conclusion from our results, neither as for the desirable size of stock imbalances nor for wealth accumulation.

The next section presents some stylized facts on the channels through which countries accumulate external wealth. It also summarizes the theoretical predictions in the literature regarding the impact that the stock of net foreign

assets should have on wealth accumulation through each channel. In the third section we test the empirical relevance of these effects, by estimating the impact that the stock of NFA has on the current account and its sub-balances. The fourth section focuses on the indirect impact that net foreign assets may have on the trade balance through the real exchange rate. Section 5 investigates the relevance of automatic adjustment mechanisms working through financial exchange rate fluctuations. We draw some conclusions in section 6.

2. Inspecting the drivers of external wealth

2.1 Some stylized facts on wealth accumulation

In order to analyze the channels through which countries accumulate external wealth, we adopt a frequently used decomposition of the evolution of net foreign assets over time.[2] Net foreign assets (*NFA*) are calculated by subtracting domestic assets owned by foreigners (*L*) from the value of foreign assets held by nationals (*A*). Taking into account assets and liabilities composition by distinguishing equity (*EQ*) from debt (*DB*), the stock of *NFA* can be expressed as follows:

$$NFA_{it} = A_{it} - L_{it} = A_{it}^{EQ} + A_{it}^{DB} - L_{it}^{EQ} - L_{it}^{DB}.$$

Changes in net foreign assets over time result from the financial operations with the rest of the world that are the financial counterpart of the current and capital account balance (*CA*), valuation changes due to capital gains (*VAL*), and errors and omissions (*EO*) as sometimes there exist small discrepancies among the different statistical sources:

$$NFA_{it} - NFA_{it-1} = CA_{it} + VA_{it} + EO_{it}. \tag{1}$$

Dividing [1] by nominal GDP gives:

$$nfa_{it} - nfa_{it-1} = -\frac{g_{it}}{1+g_{it}} nfa_{it-1} + ca_{it} + val_{it} + eo, \tag{2}$$

where lower case letters denote the ratio of the corresponding variable to GDP and *g* is nominal GDP growth. The first term in equation [2] captures the equilibrating effect that GDP growth has over existing stock positions.[3] Capital gains are calculated as the difference between changes in the stock of foreign assets (liabilities) and net financial outflows –NFO- (inflows –NFI-), distinguishing, again, between equity and debt:

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[2] See, for example, Habib (2010).
[3] For example, when nominal GDP grows and NFA are positive (negative) the first term in [2] is negative (positive), which tends to reduce the net creditor (debtor) position of the country as a percentage of GDP. If nominal GDP declines, the effect is the opposite, i.e. it amplifies the net debtor or creditor position of a country.

$$VAL_{it} = VAL_{it}^{AEQ} + VAL_{it}^{ADB} - VAL_{it}^{LEQ} - VAL_{it}^{LDB};$$

$$VAL_{it}^{AEQ} = \left(A_{it}^{EQ} - A_{it-1}^{EQ}\right) - NFO_{it}^{EQ}; \qquad VAL_{it}^{ADB} = (A_{it}^{DB} - A_{it-1}^{EDB}) - NFO_{it}^{DB}$$

$$VAL_{it}^{LEQ} = \left(L_{it}^{EQ} - L_{it-1}^{EQ}\right) - NFI_{it}^{EQ}; \qquad VAL_{it}^{LDB} = (L_{it}^{DB} - L_{it-1}^{EDB}) - NFI_{it}^{DB}.$$

The current and capital account balance, in turn, can be decomposed into three different sub-balances. First, the trade balance (*TB*) corresponds to the revenues from exports minus the import expenses on both goods and services. Second, the investment income balance (*IIB*) results from the revenues from foreign assets owned by nationals minus the payments to domestic assets owned by foreigners. Finally, the residual balance (*RES*) includes the primary income balance except investment income, the secondary income balance, and the capital account balance:

$$ca_{it} = tb_{it} + iib_{it} + res_{it}. \qquad\qquad\qquad [3]$$

In what follows we present the results of applying decompositions [2] and [3] to a broad sample of advanced and emerging countries using Balance of Payments data between 1980 and 2015, grouping the economies in our sample depending on their level of income and on their net external position.[4] Some stylized facts on external positions and wealth accumulation emerge.

Highly persistent creditor and debtor positions. First, creditor and debtor positions are highly persistent. As it can be seen in Figure 2, in our sample the conditional probability of a country to remain a debtor is 98% and the probability of remaining creditor is 92%.[5] Among other things, this implies that using the net external position as a grouping criterion is quite robust to changes in the reference year considered.

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[4] Country sample and data sources are detailed in Appendix 1. The results of decompositions [2] and [3] are reported also in Tables 2.1 and 2.2 in Appendix 2.

[5] In the classification used in Figures 3 and 4 we allow countries to switch from the creditor to the debtor category and vice versa if their net external position changes over time.
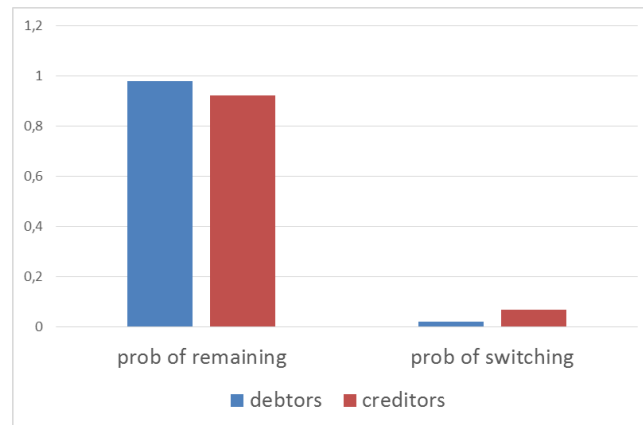
Figure 2. Conditional probability of remaining debtor / creditor

Increasing pace of wealth accumulation (loss) for advanced creditors (debtors) in the last two decades (see Figure 3). Advanced creditor economies have continuously accumulated external wealth at a rising pace since 1995. Similarly, advanced debtor countries have steadily increased their stock of net external debt since 1990, with the exception of one period of rebalancing in the early 2000s. These trends are less clear in the case of emerging countries. Developing creditors (essentially China) barely changed their NFA position since 1980. Emerging debtors increased their external liabilities over the full horizon but reversed this trend significantly in the last 5 years.

Current and capital account responsible for the majority of wealth accumulation (loss). Among the channels through which countries accumulate or lose external wealth over time, the strongest, from a quantitative point of view, over the full time horizon seem to be current and capital account flows. This is true, on average, for all the countries in our sample and for each of the subgroups as well. Still, current and capital account developments are particularly relevant for emerging debtors and advanced creditors. For the latter group, in particular, the importance of the current account for wealth accumulation has strongly and steadily increased over the last two decades.

Sizable but volatile capital gains. Valuation changes from capital gains and losses on existing stock positions have been of a considerable magnitude in several periods and, for debtor economies, over the whole time horizon. They exhibit a considerable volatility for all subgroups of countries. In general, they tend to magnify CA shifts, but have counterbalanced them in some periods.
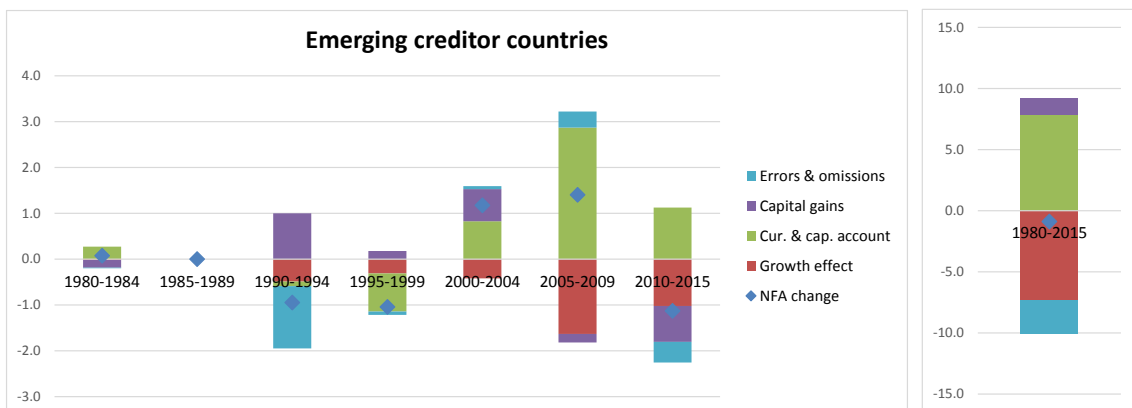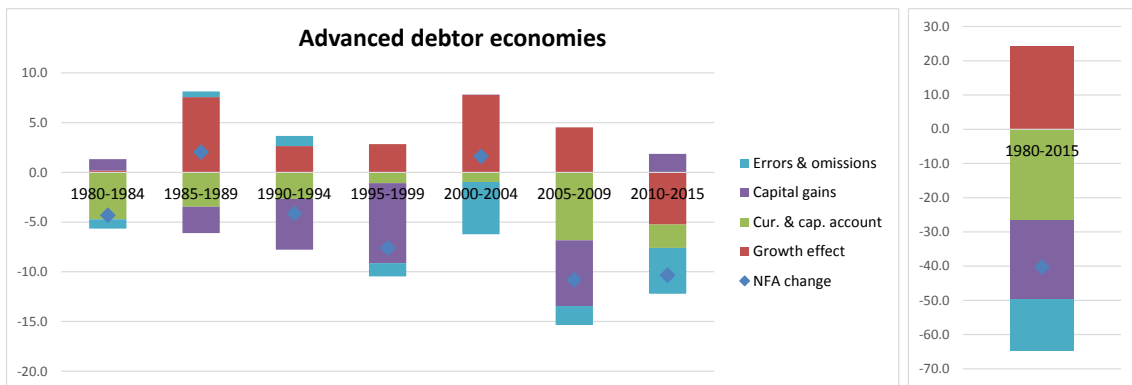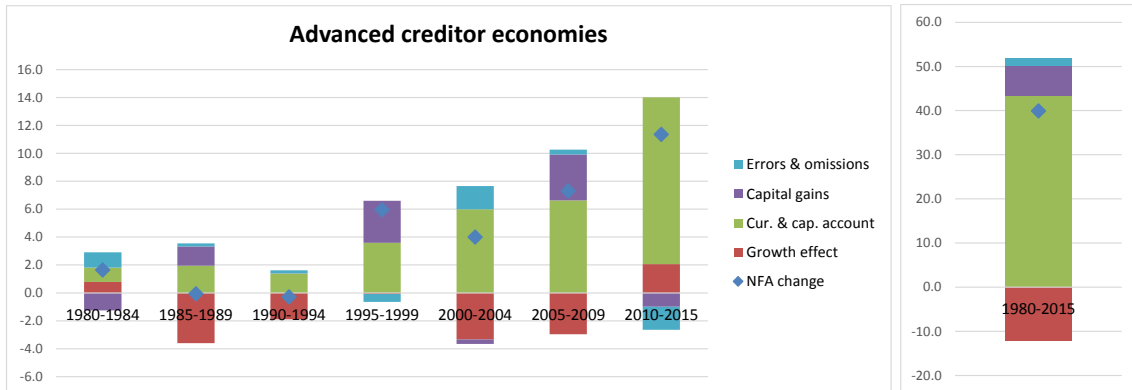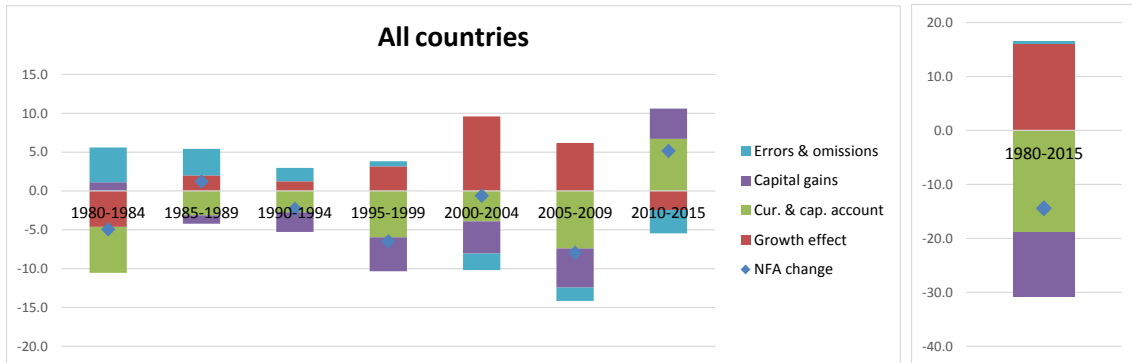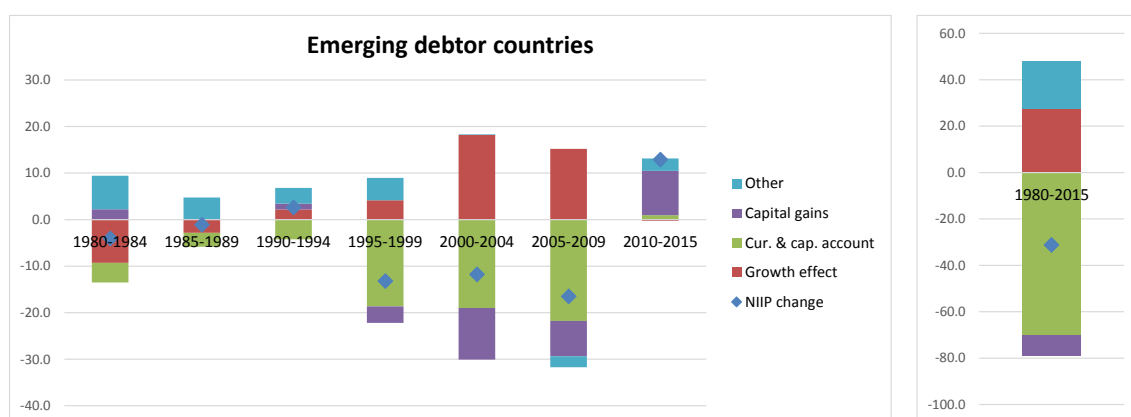
Figure 3. Decomposition of NFA changes, eq. [2]. Non-weighted averages.

Trade balance relatively volatile and especially relevant for creditor countries (see Figure 4). Over the whole time horizon, for both advanced and emerging creditor countries, the bulk of CA flows was due to the trade balance. In particular, in the case of advanced creditor countries the relevance of trade surpluses for CA dynamics has been growing steadily since the early nineties. Compared to other CA components, the trade balance shows a rather volatile pattern for all the subgroups of countries.

Investment income balance more persistent; quantitatively relevant especially for debtors. Compared to the trade balance, the IIB exhibits a higher persistency. It was responsible for the majority of the CA deficits of both advanced and emerging debtor countries over the full time horizon. Still, its relevance has been growing for advanced creditors since the early 2000s, and in the last 10 years the net investment income they received from abroad has contributed significantly to increase their CA surpluses.

Investment income balance tends to be negative for debtors and positive for creditors, but with important exceptions: returns and portfolio composition matter. Unsurprisingly countries' net investment position tends to determine whether they receive net income from abroad. Still, the case of emerging creditors –whose IIB is negative in all the periods considered— highlights that there can be exceptions to this pattern. Indeed, despite their positive NFA position, their portfolio composition, skewed towards safe low-return assets and risky high-return liabilities, implies that they end up paying more on external liabilities than they receive on their assets.[6] Wealth accumulation through the IIB –its direction and magnitude—depends not only on a country's NFA position but also on returns on assets and liabilities and on its portfolio composition.

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[6] Tables 2.3 and 2.4 in Appendix 2 show a detailed analysis of countries' portfolio composition.

All countries

Legend:
- Residual
- Investment income
- Trade
- ♦ Current and cap.acc.

Advanced creditor economies

Legend:
- Residual
- Investment income
- Trade
- ♦ Current and cap.acc.

Advanced debtor economies

Legend:
- Residual
- Investment income
- Trade
- ♦ Current and cap.acc.

Emerging creditor countries

Legend:
- Residual
- Investment income
- Trade
- ♦ Current and cap.acc.
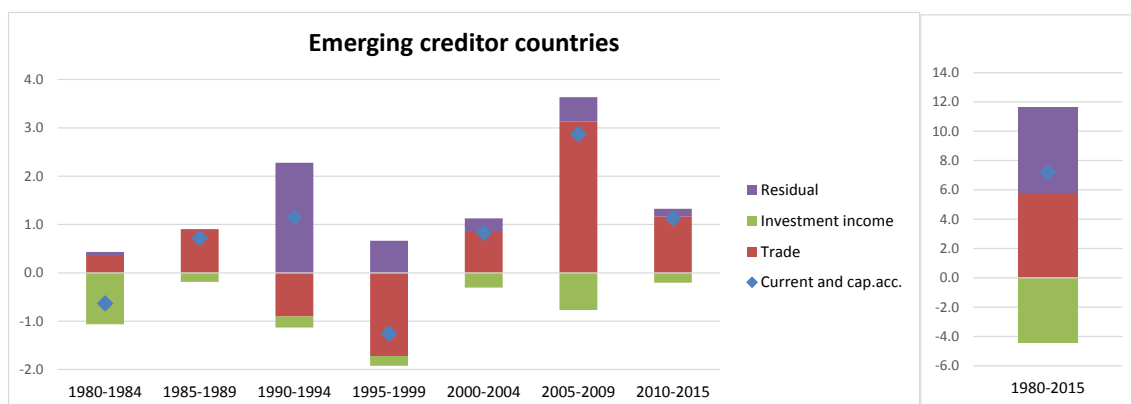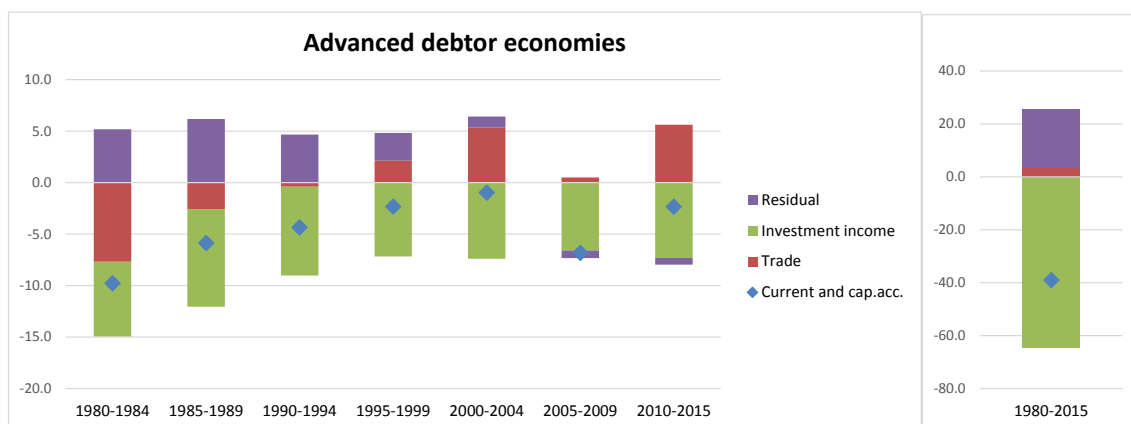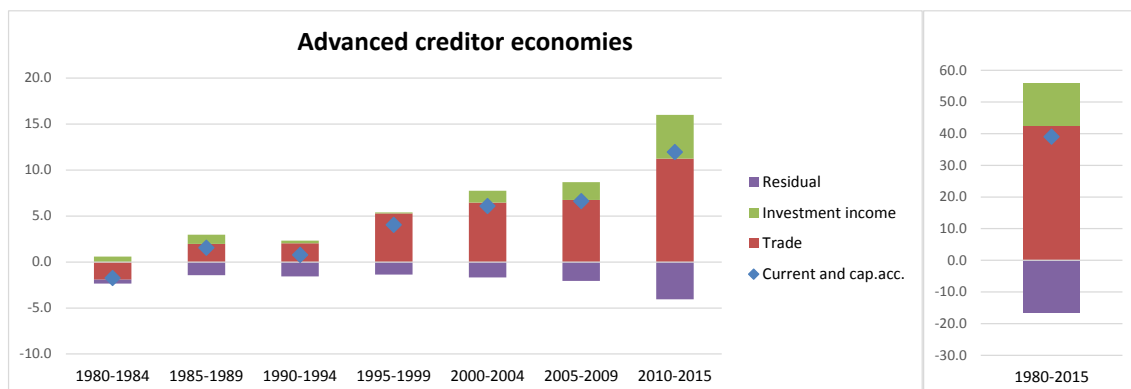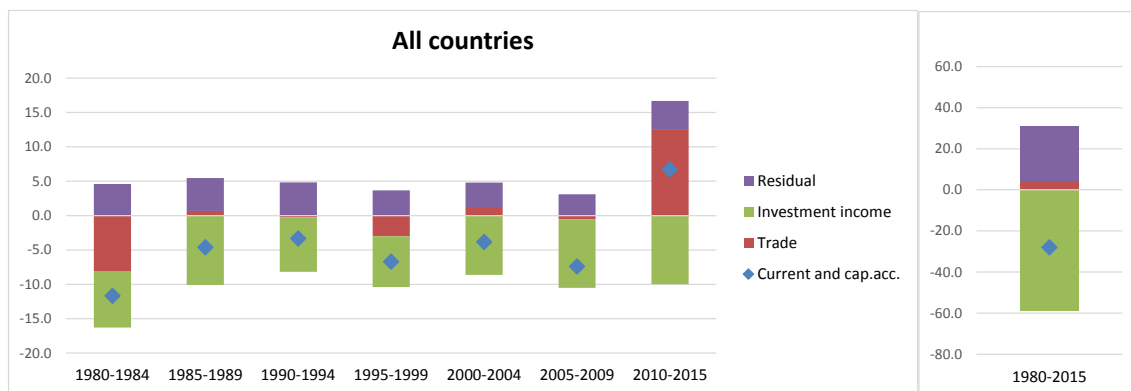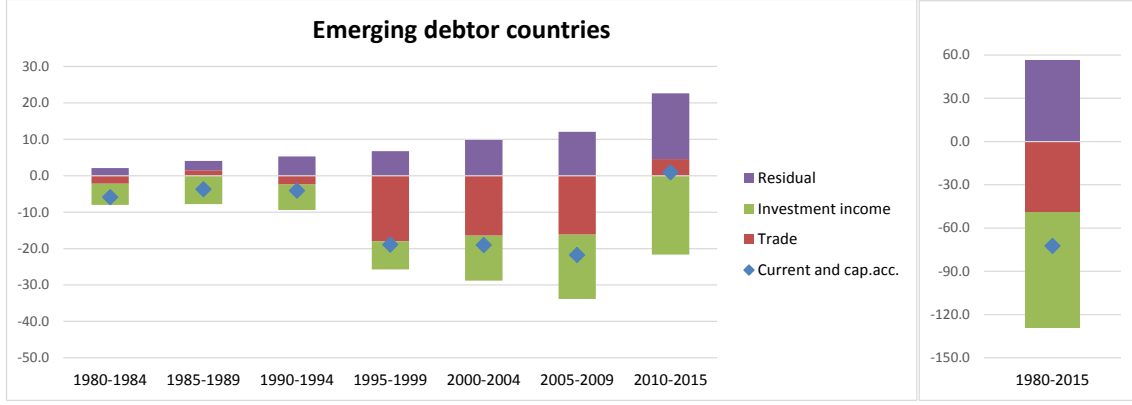
Figure 4. Decomposition of cumulated current and capital account, eq. [3]. Non-weighted averages.

2.2 The impact of stock positions on wealth accumulation: what theory suggests

Having had a look at the channels through which countries, from an accounting perspective, accumulate or lose external wealth, we illustrate here how stock imbalances, in the form of net foreign assets, can affect the evolution of external wealth through each channel, either directly or indirectly.

2.2.1 Direct impact of stock imbalances on the CA

Through the investment income balance: The investment income balance, resulting from the difference between revenues (R) and payments (P) on the existing stock of assets and liabilities, can be written as:

$$IIB_{it} = R_{it} - P_{it} = i_{it}^A A_{it-1} - i_{it}^L L_{it-1} \, , \tag{4}$$

where i_t^A and i_t^L are the implicit yields on assets and liabilities. Dividing [4] by nominal GDP gives:

$$iib_{it} = \frac{i_{it}^A}{1 + g_{it}} \cdot nfa_{it-1} + \left(\frac{i_{it}^A - i_{it}^L}{1 + g_{it}} \right) \cdot l_{it-1} \, .$$

Assume that a share ω_{ij}^A (ω_{ij}^L) of country i's assets (liabilities) is denominated in country j's currency. Then the IIB as a share of GDP can be expressed as:

$$iib_{it} = \left[\frac{\widehat{i_{it}^A}}{1+g_{it}} \left(\Delta FEER_{it}^A \right)^{-1} \right] \cdot nfa_{it-1} + \left[\frac{\widehat{i_{it}^A}/\widehat{\Delta FEER_{it}^A} - \widehat{i_{it}^L}/\widehat{\Delta FEER_{it}^L}}{1+g_{it}} \right] \cdot l_{it-1} \, , \tag{5}$$

where $\Delta FEER_t^A = \frac{FEER_t^A}{FEER_{t-1}^A}$ ($\Delta FEER_t^L$) is the appreciation of the asset (liability) financial effective exchange rate, defined as the weighted average of nominal bilateral exchange rates with weights ω_{ij}^A (ω_{ij}^L) reflecting the currency

denomination country i's assets (liabilities), and capped variables denote returns excluding exchange rate effects.[7]

Equation [5] shows that the investment income balance depends positively on the net foreign asset position, as creditor countries tend to receive more revenues from their stock of foreign assets than they pay on their liabilities. The direct impact of stock imbalances on the investment income balance is then expected to be positive:

$$iib_{it} = f(\underbrace{nfa_{it-1}}_{+}).$$

More precisely, stock imbalances are expected to exert a *destabilizing* impact on external flows through the IIB, that is, creditor countries will tend to receive investment income from abroad thereby increasing further –everything else equal— their net foreign asset position.

It is important to notice that the exact relationship between net foreign assets and investment income depends on returns on assets and liabilities, on growth and on nominal exchange rate fluctuations, as [5] shows. As assets and liabilities include both equity and debt and their implicit yields are very different, the composition of a country's portfolio is also likely to be relevant.[8]

Moreover, the positive association between net foreign assets and the investment income balance could be either mitigated or magnified by the spread between the returns on assets and liabilities, especially in the presence of large gross positions. This is illustrated in Figure 2.1 in Appendix 2, which decomposes the IIB into an NFA term (the first term in equation [5]) and an interest rate differential term (the second term in [5]). Consider, for example, advanced creditors in Figure 2.1. While a negative interest rate differential mitigated their wealth accumulation through the IIB until 2010, in the recent years the differential turned positive, which magnified wealth accumulation from investment income.

Through the trade balance: Another channel through which stock positions can directly affect the CA is the trade balance. The standard argument in the literature to illustrate this link is the presence of wealth effects, which rely on the notion that domestic absorption should depend positively on the stock of financial wealth, which, in turn, tends to increase with the value of net foreign assets. For

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[7] See Forbes et al. (2016). Equation [5] can be written equivalently in terms of a country's gross asset position.
[8] Gourinchas and Rey (2007) show that a relevant part of the spread between the returns the US enjoys on its foreign assets and the returns it pays on its liabilities are due to the composition of its portfolio, whose assets tend to be riskier than the liabilities. See also Habib (2010) and Curcuru et al. (2013).

the purpose of illustration, assuming quadratic utility and a representative agent, we can write:

$$P_{it}C_{it} = (1 - \varphi)\{i_{it}W_{it-1} + H_{it}\} = (1 - \varphi)\{i_{it}NFA_{it-1} + i_{it}V_{it-1} + H_{it}\}, \quad [6]$$

where P_tC_t is nominal consumption expenditure, φ households' discount factor, W denote total financial wealth, H the expected present discounted value of lifetime human wealth, and V indicates the value of total domestic assets.[9]

Expressing the trade balance as the difference between a country's exports and imports and using [6] we can write the trade balance as a share of GDP as:[10]

$$tb_{it} = [\chi_1 + \chi_2(tot_{it})^\theta]^{\frac{(1-\theta)}{\theta}} \left(\frac{1}{REER_{it}}\right)[foreign\ absorption] -$$

$$-[\chi_1 + \chi_2(tot_t)^{-\theta}]^{\frac{(1-\theta)}{\theta}}(1 - \varphi)\left[\left(\frac{i_{it}}{1 + g_{it}}\right)\cdot nfa_{it-1} + \left(\frac{i_{it}}{1 + g_{it}}\right)\cdot v_{it-1} + h_{it}\right] \quad [7]$$

where $tot_{it} \equiv (p_{it}^h/e_{it}p_{it}^f)$ denotes the terms of trade expressed as the ratio between the price of country h exports and imports, so that an increase represents an appreciation of the domestic currency and implies a real exchange rate appreciation; $REER_{it}$ is the real effective exchange rate defined as the home CPI in terms of the foreign, and χ_1 and χ_2 are positive constants. Equation [7] shows that the trade balance should be negatively related to the stock of net foreign assets, as a creditor position should tend –everything else equal– to raise the value of total financial wealth thereby increasing total domestic absorption (here, consumption) and, therefore, imports (wealth effect). The direct impact of stock imbalances on the trade balance is then expected to be negative:

$$tb_{it} = f(\underset{-}{nfa_{it-1}}).$$

Namely, stock imbalances are expected to have a *stabilizing* impact on wealth accumulation through the trade balance, as creditor countries should tend to consume and import more, thereby halting the accumulation of external assets. Notice that the relationship above was derived under important simplifying assumptions, such as no investment in physical capital and no preference shocks, and should hold only controlling for any fluctuation in production, growth, labour income and the value of domestic assets.

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[9] Note that $W_t = NFA_t + V_t$.

[10] To wit, $TB_t = P_t^h GDP_t - P_tC_t$, where P^h denotes the GDP deflator and P is the CPI. Equations [6] and [7] can be derived in any standard 2-country 2-good DSGE model assuming, beyond quadratic utility, that consumption is a CES aggregate of a domestic and a foreign-produced variety and that there is no investment in physical capital.

Notice also that an appreciation of the domestic currency, determining an appreciation of the real exchange rate and of the terms of trade, reduces the international value of foreign absorption and shifts world expenditure towards varieties produced abroad, which –everything else equal– tends to worsen the trade balance.

Through the trade balance, in response to temporary shocks: The economic literature provides reasons to believe that the trade balance might be influenced by the stock of net foreign assets well beyond the wealth effects described above. Indeed, it has been shown that the CA of creditor and debtor countries reacts differently to temporary income shocks. A temporary shock raising current income tends to lead to a CA surplus in creditor countries and to a deficit in debtor economies.[11]

Two explanations have been proposed. First, in the presence of low diminishing asset returns and high risk, agents do not change the composition of their portfolio and invest any additional marginal unit of wealth resulting from the shock according to the portfolio they already have. Then creditors, who favour foreign assets, will invest more abroad than at home, resulting in a CA surplus. Debtors, on the contrary, will invest more at home leading to a CA deficit.[12] Another possibility is that debtor economies are more credit constrained than creditor ones. Then a positive temporary income shock would release credit constraints more in the debtor economy, which would end up borrowing more from abroad.[13] Whatever the reason why temporary shocks affect differently the CA of creditor and debtor countries, we wish to test for this channel as well in our empirical exercises, and we do this by assuming that the corresponding CA response materializes through the trade balance.[14] Then the total direct impact of stock imbalances on the trade balance can be written as:

$$tb_{it} = f\left(\underbrace{nfa_{it-1}}_{-}; \underbrace{nfa_{it-1} * temporary\_shocks}_{+}\right),$$

where the first term represents the wealth effect and the second one the response of the trade balance to temporary income shocks. Stock imbalances are expected to have a *destabilizing* impact on external dynamics following temporary income

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[11] See Kraay and Ventura (2000) and Bussiere et al. (2003).

[12] Kraay and Ventura (2000) illustrate this mechanism in a model of the current account and provide empirical support for their theory.

[13] Bussiere et al. (2003).

[14] This seems a reasonable assumption given that the IIB is determined by past stocks and current returns. We nevertheless verify this assumption in our empirical exercises.

shocks, as they tend to generate trade surpluses in creditor countries and deficits in debtor economies.

Given the relationships derived above, the **_total direct impact_** of stock imbalances on the CA can be expressed as:[15]

$$ca_{it} = tb_{it} + iib_{it} = f\left(\underbrace{nfa_{it-1}}_{?} ; \underbrace{nfa_{it-1} * temporary\_shocks}_{+}\right),$$

where the first term denotes the _net_ impact of the (allegedly positive) investment income effect and the (supposedly negative) wealth effect –its sign being _ex-ante_ undetermined.

2.2.2 Indirect impacts through exchange rate fluctuations

Yet, stock imbalances can also have an indirect impact on the CA and, more generally, on wealth accumulation, through exchange rate fluctuations. Indeed, economic theory gives reasons to believe that a positive (negative) net foreign asset position should be associated, at least in the long run, with a more appreciated (depreciated) exchange rate. The standard argument in the literature assumes that a country's trade balance reacts negatively to exchange rate appreciations, which, as [8] illustrates, tend to shift world demand towards foreign-produced goods. Then, given the standard equation describing wealth accumulation [2], in a long run equilibrium with a constant net foreign asset position the following must hold:

$$tb = -\left(\frac{R-g}{1+g}\right) \cdot nfa - val. \qquad\qquad [9]$$

As [9] shows, a creditor country might afford a lower trade balance in the long run and therefore a more appreciated exchange rate.[16] Moreover, an increase in the net foreign asset position would make the trade balance higher than the right hand side of [9], and an appreciation of the real exchange rate would be required to get back to the equilibrium. Therefore, assuming that the economy tends to the long run equilibrium, the relationship above implies that:

$$reer_{it} = f(\underbrace{nfa_{it-1}}_{+})$$

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[15] As we will explain in more detail in the empirical section, the residual balance includes both items related to the private sector and to the public sector. Therefore, it is not advisable to pursue a unified theoretical argument to explain them. The stabilizing/destabilizing impact of external stocks on this sub-balance will be a purely empirical question.
[16] See, for example, Lane and Milesi-Ferretti (2004), and all the literature on the so-called transfer problem.

and

$$\Delta reer_{it} = f(\underbrace{\Delta nfa_{it-1}}_{+}),$$

where $reer_t$ is the (log of the) real effective exchange rate defined such that an increase denotes an appreciation of the domestic currency. Creditor countries are expected to have a more appreciated exchange rate, and increases in the net foreign asset position are expected to give rise to appreciations. Notice that these relationships have been derived assuming that the economy tends to a stable long-run equilibrium, and that long-run valuation effects, in the form of the spread between returns on assets and liabilities, do not depend on the exchange rate, nor does the investment income balance.

Indirect impact on the current account: The exchange rate, in turn, can affect the CA in two ways, namely through the trade balance and, to the extent that they translate into nominal fluctuations, through the income balance.

As implied by [7], a real exchange rate appreciation worsens the trade balance. Then:

$$tb_{it} = f\left(\underbrace{nfa_{it-1}}_{-} ; \underbrace{nfa_{it-1} * temporary_{shocks}}_{+} ; \underbrace{reer_{it}\left(\underbrace{nfa_{it-1}}_{+} \right)}_{-} \right),$$

where the last term denotes the indirect impact of stock imbalances nfa_{t-1} on the trade balance via the exchange rate level. Through this channel, stock imbalances are expected to have a *stabilizing* effect on the trade balance as a creditor position should be associated with a more appreciated exchange rate, which, in turn, should correspond –everything else equal— to a lower trade balance, which should break the accumulation of external wealth.

Turning to the IIB, an appreciation of the domestic currency in nominal terms tends to reduce both the income from foreign-denominated assets and the payments on foreign-denominated liabilities. As shown in [5], this will have an impact on the income balance through the financial-weighted exchange rate on assets and liabilities, although the net sign of this effect will depend on the currency composition of country i's portfolio, as well as on interest rates and on the size of gross and net holdings. Therefore:

$$iib_{it} = f\left(\underbrace{nfa_{it-1}}_{+}\ ;\Delta feer_{it}{}^{A}\underbrace{\left(\underbrace{\Delta nfa_{it-1}}_{+}\right)}_{-}\ ;\Delta feer_{it}{}^{L}\underbrace{\left(\underbrace{\Delta nfa_{it-1}}_{+}\right)}_{+}\right),\qquad\text{[10]}$$

where $\Delta feer_{t}^{A}$ and $\Delta feer_{t}^{L}$ denote the change in the (log of the) financial exchange rate on, respectively, assets and liabilities. The existing stock of net foreign assets, nfa_{t-1}, might have an indirect impact on the investment income balance through financial exchange rate appreciations/depreciations, for a given nfa_{t-2}. Also, changes in the stock of net foreign assets can impact the investment income balance to the extent that they contribute to appreciate/depreciate the financial exchange rate. This effect may be stabilizing or destabilizing for the accumulation of external wealth and its sign (the net impact of $\Delta feer_{t}^{A}$ and $\Delta feer_{t}^{L}$ on the IIB) depends on the currency denomination of assets and liabilities.[17]

Indirect impact on valuation changes: As shown in [2], the accumulation of external wealth results from both the CA and valuation changes on the existing stock of foreign assets and liabilities. Valuation effects, in turn, are partly due to exchange rate changes and may therefore be affected by existing stock positions.

Valuation effects can be computed as the difference between the change in the value of assets (liabilities) and net capital outflows (inflows), as:

$$VAL_{it} = VAL_{it}^{A} - VAL_{it}^{L} = [(A_{it} - A_{it-1}) - NFO_{it}] - [(L_{it} - L_{it-1}) - NFI_{it}],$$

where *NFO* and *NFI* are, respectively, net capital outflows and inflows.

Valuation changes resulting from exchange rate movements as a share of GDP can be expressed as:[18]

$$val_{it}^{EXC} = a_{it-1} \cdot \Delta feer_{it}{}^{A} - l_{it-1} \cdot \Delta feer_{it}{}^{L}.$$

Valuation changes can then be decomposed into those due to exchange rate movements and those related to changes in asset market prices in local currency as:

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[17] The indirect impact of *nfa* changes on the IIB will have a stabilizing effect, for example, if a country's assets are mostly denominated in foreign currency. Then a positive change in *nfa*, implying an appreciation of the domestic currency, will tend to decrease the domestic-currency value of revenues.

[18] See Lane and Shambaugh (2010).

$$val_{it} = val_{it}^{EXC}\left(\underbrace{\Delta feer_{it}^{A}\left(\underbrace{\Delta nfa_{it-1}}_{+}\right)}_{-}\;;\;\underbrace{\Delta feer_{it}^{L}\left(\underbrace{\Delta nfa_{it-1}}_{+}\right)}_{+}\right) + val_{it}^{MKT}. \qquad [11]$$

Fluctuations in financial-weighted exchange rates have in principle an ambiguous impact on valuation changes, the final sign depending on the currency composition of assets and liabilities. For instance, an appreciation of the domestic currency will lead to capital losses if a country's assets are denominated in foreign currency and its liabilities in the domestic one.[19] To the extent that changes in a country's NFA position are associated with exchange rate appreciations, NFA increases might lead either to capital gains or losses that mitigate or amplify the accumulation of external wealth in the next period –the precise effect depending mainly on the currency composition of gross positions.

Summing up, the impact of existing stock imbalances on the current accumulation of external wealth can be expressed as:

$$\Delta nfa_{it} = tb_{it}\left(\underbrace{nfa_{it-1}}_{-}\;;\;\underbrace{nfa_{it-1} * temporary\_shocks}_{+}\;;\;\underbrace{reer_{it}\left(\underbrace{nfa_{it-1}}_{+}\right)}_{-}\right)$$

$$+\; iib_{it}\left(\underbrace{nfa_{it-1}}_{+}\;;\;\underbrace{\Delta feer_{it}\left(\underbrace{\Delta nfa_{it-1}}_{+}\right)}_{?}\right)$$

$$+\; val_{it}\left(\underbrace{\Delta feer_{it}\left(\underbrace{\Delta nfa_{it-1}}_{+}\right)}_{?}\right) \qquad [12]$$

Stock imbalances are expected to exert a stabilizing effect on the accumulation of external wealth through the trade balance due to wealth effects and through the level of the effective exchange rate, which might be counterbalanced by a destabilizing impact in response to temporary shocks. The existing stock of net foreign assets is expected to trigger destabilizing dynamics through the investment income balance. A past change in the stock of net foreign assets can either increase or decrease the investment income balance by depreciating/appreciating the financial exchange rate, depending on the

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[19] Exchange rate fluctuations may also have an indirect impact on valuation changes, as they may cause changes in asset prices expressed in local currency. We will take this into account in our empirical framework.

currency of denomination of gross holdings. Finally, the impact of past NFA changes on valuation effects is in principle ambiguous and depends, again, on the currency composition of assets and liabilities.

3. The impact of stock imbalances on the CA: empirical tests

Having summarized the impact that stock imbalances should have on the different channels of wealth accumulation according to economic theory, we test in the present section the empirical relevance of these effects. We do so by employing panel regressions of the CA (over GDP) and its sub-balances, which allow us to estimate the direct and indirect impact of the stock of NFA on CA fluctuations (as in the first two terms of eq. [12]) controlling for a set of other possible determinants of external flows.

For its comprehensive perspective, the starting point for this exploration is the analysis performed by the IMF under the multilateral monitoring exercise of external imbalances carried out in the Fund's External Sector Reports (IMF, 2013). In those estimates, the NFA have a statistically significant positive impact on the balance of the current account. Besides, this sign is robust to the inclusion or exclusion of a multiplicity of variables. Importantly, this destabilizing effect also has economic significance because, since as on average creditor and debtor countries have an NFA around 50% of GDP (in absolute value), the estimated coefficient (0.016-0.021) would mean an additional point of surplus and deficit in the current account balance, respectively.

We generalize IMF's regressions by estimating with our panel data a multiplicity of regressions for the current account and the different sub-balances with the following general form:

$$ca_{it} = \alpha + \beta_1 \cdot nfa_{it-1} + \beta_2 \cdot nfa_{it-1} \cdot (creditor_{dum}) + \beta_3 \cdot nfa_{it-1} \cdot (\overline{ygap}_t) + \beta_4 \cdot nfa_{it-1} \cdot (\overline{ygappos}_{it}) + \gamma_1 \cdot reer_{it-1} + \gamma_2 \cdot \Delta feer_{it-1} + (others)_{it} + \varepsilon_t,$$

where we also want to check if there exist any asymmetries between creditors ($creditor_{dum}$ is a dummy capturing this characteristic) and debtors, motivated by the results obtained in the descriptive section. Thus, β_1 is the impact of the NFA stock on the CA for debtor economies and ($\beta_1+\beta_2$) the same for creditor countries. The output gap (ygap, the hat meaning that we are instrumenting that variable) captures the transitory income shocks and we also try to check for possible asymmetries between expansions and recessions; thus, β_3 is the impact of negative transitory shocks and ($\beta_3+\beta_4$) of positive ones. Notice that exchange rates always enter lagged one period, so the coefficient estimated for the NFA variable captures both the direct impact of the stock of net foreign assets on the current account and its indirect impact through the contemporaneous level of the

exchange rate (see eq. [12]), acting both through the trade balance (real exchange rate) and the investment income balance (financial exchange rate) for given nfa_{t-2}.[20] The variable (*others*) denotes different controls and fixed effects when it corresponds.

We present our results in Table 1.[21] As shown in the first column, our estimates provide very similar results to those of the IMF: NFA have a positive effect on the current account balance. Moreover, the lagged variation of the nominal effective exchange with financial weights has a negative effect, and the lagged real effective exchange rate has the opposite sign than expected.

Table 1. Current account regressions

	Basic spec.	Country fixed effs.	Diff. btw. cred. & deb.	Valuation effects	Portf. rebal.	Portf. rebal. in exp. & rec.
Cnte.	-0.010***	-0.052***	-0.054***	-0.053***	-0.054***	-0.056***
	(0.003)	(0.009)	(0.008)	(0.009)	(0.009)	(0.009)
Net foreign assets (L)	0.016**	0.005	-0.015	-	-0.014	-0.024***
	(0.006)	(0.007)	(0.009)		(0.009)	(0.009)
Net foreign assets creditor counties (L)	-	-	0.052***	-	0.053***	0.057***
			(0.015)		(0.015)	(0.016)
Net foreign assets. CA accumulation (L)	-	-	-	-0.011	-	-
				(0.011)		
Net foreign assets. Valuation effects (L)	-	-	-	-0.018*	-	-
				(0.011)		
Net foreign assets creditor countries. CA accumulation (L)	-	-	-	0.055***	-	-
				(0.015)		
Net foreign assets creditor countries. Valuation effects (L)	-	-	-	0.040**	-	-
				(0.018)		
Net foreign assets * output gap (L)	-	-	-	-	0.148	-0.437
					(0.303)	(0.309)
Net foreign assets * positive output gap (L)	-	-	-	-	-	1.351***
						(0.332)
Net foreign assets below -60% (L)	-0.001	0.004	0.013*	0.013*	0.014*	0.011
	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)
Real effective trade weighted exchange rate (L)	0.025***	0.011	0.012	0.011	0.012	0.009
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.007)
Nom. eff. FX financial weights assets side (DL)	-0.016***	-0.014**	-0.014**	-0.014**	-0.014**	-0.013**
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Obs.	1164	1164	1164	1164	1164	1164
Country fixed effects	No	Yes	Yes	Yes	Yes	Yes
R²	0.3872	0.6328	0.6432	0.6472	0.6458	0.6524

Between brackets: standard deviation; L: lagged variable; D: first differences; *,**,*** p-value below 10%, 5% and 1%, respectively.

This destabilizing effect of NFA on the current account balance disappears by introducing fixed effects specification (see the second column) as this variable

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[20] As it is common in CA regressions, if real and financial exchange rates enter the specification, they do it with a lag due to endogeneity concerns. Note that, as long as the other included regressors capture the main determinants of exchange rates omitting the contemporaneous value of the variable will not constitute an issue of omitted variables. See IMF (2013a).

[21] In this and the following tables of this section only the parameters of interest are presented, but regressions include other variables commonly used in this context. Detailed results are shown in Appendix 4. The regressors considered endogenous were instrumented with their adjusted values according to the regressions appearing in Appendix 3.

becomes statistically non-significant.[22] However, this result is hiding a remarkable asymmetry between creditor and debtor countries. As shown in the third column of the table, when we allow the current account balances of both groups of countries to react differently to the NFA, these become stabilizing (although the coefficient is not statistically significant) for debtor countries, and strongly destabilizing in the case of creditors. In particular, for the latter the coefficient takes a value of 0.037 with a p-value of 0.001.[23]

Net external assets include both the accumulation of past current account balances and valuation effects on these financial assets. It could be argued that, as capital gains are very volatile (see the descriptive section), the marginal propensity to spend out of it might be much lower than that of the other component. Perhaps this could explain why stabilizing wealth effects do not seem to be dominant in the case of creditor countries. Thus, in the fourth column of the table we present the results of the two separate components of the NFA.[24] In the case of debtor countries both coefficients are negative and have a similar magnitude. In the case of creditor countries both are positive and the coefficient of the accumulation of current account balances is slightly higher, in line with the hypothesis of a lower marginal propensity to spend out of capital gains.

Finally, in columns 5 and 6 we interact NFA with the output gap, to check whether transitory income disturbances make the countries react differently depending on whether they are creditors or debtors. Again, important asymmetries seem to be present. This interaction term is not relevant in column 5, but, when we consider separately positive and negative output gaps (column 6) a very intense effect appears in the case of transitory increases in income. This suggests that after this kind of shock countries prefer to keep unchanged their portfolio, implying that creditor countries increase their external surplus and debtors their deficit. Another possibility is that debtor countries, who might face tighter financial conditions, relax these restrictions following that shock and increase domestic spending. It is relevant to notice that in the latter specification NFA are statistically significant and negative for debtors, suggesting a significant

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[22] Fixed effects would capture the net effect of time-invariant unobservable variables. This specification would not be valid in the very long term, as it would imply that some countries are permanently in external deficit or surplus. Therefore, it should be understood in a context of high persistence of external balances. In any case, most of the results subsequently obtained (in particular, those related to the asymmetries between creditors and debtors) are robust to the exclusion of fixed effects.

[23] Another relevant property of this specification is that the real effective exchange rate continues to present the opposite sign than expected but now it is not statistically significant.

[24] To obtain these two variables we impose that the initial condition of the capital gains is zero (1979 for most countries). For this reason, the aggregated coefficient of the NFA should be similar to the average of the two coefficients estimated here.

stabilizing effect, and in the case of creditor countries the parameter stands at 0.033 with a p-value of 0.004. This implies that, for net foreign assets on average around 50% of GDP in absolute value (as in our sample), debtor countries will reduce their current account deficit by 1.2% of GDP per year, while creditors would increase their surplus by 1.6%. It is worth to point out that these results are robust to the exclusion of fixed effects.

In order to find the source of these asymmetries, in the next sub-sections we decompose the current account balance in its three main sub-balances: investment income, trade and rest.

3.1 Through the investment income balance

As we saw in the descriptive section, the investment income balance is the more persistent component of the current account balance. This is not surprising since, according to the theoretical section, it has a very close connection with net financial assets through profitability. Since profitability in large sample averages and aggregate portfolios (as used herein) is expected to be positive, the investment income balance should be positively related to net foreign assets.[25]

Table 2. Investment income balance regressions

	Basic spec.	Country fixed effs.	Diff. btw. cred. & deb.	Valuation effects	Portf. rebal.	Portf. rebal. in exp. & rec.
Cnte.	-0.014*** (0.004)	-0.007** (0.003)	-0.007** (0.003)	-0.005 (0.003)	-0.007** (0.003)	-0.007 (0.003)
Net foreign assets (L)	0.039*** (0.004)	0.027*** (0.003)	0.029*** (0.003)	-	0.027*** (0.003)	0.026*** (0.003)
Net foreign assets creditor counties (L)	-	-	-0.007 (0.009)	-	-	-
Net foreign assets. CA accumulation (L)	-	-	-	0.032*** (0.003)	-	-
Net foreign assets. Valuation effects (L)	-	-	-	0.021*** (0.005)	-	-
Net foreign assets * output gap (L)	-	-	-	-	-0.104 (0.087)	-0.137 (0.116)
Net foreign assets * positive output gap (L)	-	-	-	-	-	0.080 (0.171)
Nom. eff. FX financial weights asset side (LD)	0.009* (0.006)	0.004 (0.005)	0.005 (0.004)	0.005 (0.005)	0.004 (0.005)	0.004 (0.005)
Nom. eff. FX financial weights liabilities side (LD)	-0.014** (0.007)	-0.010 (0.007)	-0.011 (0.007)	-0.011 (0.007)	-0.010 (0.007)	-0.010 (0.007)
Obs.	1164	1164	1164	1164	1164	1164
Country fixed effects	No	Yes	Yes	Yes	Yes	Yes
R²	0.4656	0.8305	0.8308	0.8325	0.8311	0.8311

See previous Table.

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[25] It is useful to remember that changes in the financial exchange rates only enter lagged one period in this specification. For this reason, the coefficient of net foreign assets estimated here captures both the direct impact of this variable on the IIB (a positive NFA should imply more revenues from abroad than payments to foreigners) and their indirect impact through financial exchange rate changes, for a given nfa_{t-2} (see eq.[12]).

The regression in the first column, without fixed effects, provides the expected results. The coefficient of NFA is positive, statistically significant and its value seems consistent with the observed implicit returns. In addition, one of the variations of the nominal effective exchange rate with financial weights is statistically significant and has a negative sign. These results hold when fixed effects are introduced (column 2), although the coefficient of NFA is somewhat smaller, but still consistent with average implicit returns.

From the point of view of the asymmetries between creditor and debtor countries, their origin does not appear to be in this sub-balance (column 3), which does not seem to present significant differences according to the origin of the accumulation of net financial assets (column 4). Finally, transitory income shocks, positive or negative, do not seem to be relevant to explain the different behavior of each group of countries (columns 5 and 6).[26]

3.2 Through the trade balance

The trade balance captures the exchanges of goods and services among countries. As such, it presents significant cyclical fluctuations, which depend on the evolution of relative income and wealth. The theoretical section showed how net financial assets, being a component of wealth, should determine these fluctuations. Specifically, they should help stabilize the trade balance, as higher (lower) wealth implies buying abroad more (less) goods than you sell. As the real effective exchange rate enters with a lag, the coefficient estimated for net foreign assets captures both wealth effects and the indirect impact NFA may exert on the trade balance through the real exchange rate (see eq.[12]).

In the basic specification of Table 3, which does not include fixed effects, neither net external assets nor the lagged real effective exchange rate are significant. But once they are included, a negative effect is estimated for net external wealth in line with the theory; thus, in this case, the stock would have a balancing effect on the flow. The lagged real effective exchange rate is still not significant, but this result is quite common in the literature.

Testing the existence of asymmetries between creditors and debtors provides again significant results. Indeed, the stabilizing impact of NFA on the trade balance is verified only for debtor countries, and not for creditors. For the latter group the coefficient is positive (0.021) and statistically significant at the margin, with a p-value of 0.063. This might suggest that wealth effects are very small for this group of economies.

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[26] A final test with this sub-balance consisted on running a regression on the product of the net financial assets by US interest rates. This alternative regressor generated a much poorer equation adjustment and the estimated coefficient was far from the unit.

Table 3. Trade balance regressions

	Basic spec.	Country fixed effs.	Diff. btw. cred. & deb.	Valuation effects	Portf. rebal.	Portf. rebal. in exp. & rec.
Cnte.	-0.009*** (0.004)	-0.039*** (0.008)	-0.041*** (0.008)	-0.040*** (0.008)	-0.040*** (0.008)	-0.043*** (0.008)
Net foreign assets (L)	-0.006 (0.007)	-0.015** (0.007)	-0.035*** (0.009)	-	-0.035*** (0.009)	-0.043*** (0.009)
Net foreign assets creditor counties (L)	-	-	0.056*** (0.015)	-	0.057*** (0.015)	0.061*** (0.015)
Net foreign assets. CA accumulation (L)	-	-	-	-0.034*** (0.010)	-	-
Net foreign assets. Valuation effects (L)	-	-	-	-0.034*** (0.011)	-	-
Net foreign assets creditor countries. CA accumulation (L)	-	-	-	0.062*** (0.015)	-	-
Net foreign assets creditor countries. Valuation effects (L)	-	-	-	0.042** (0.019)	-	-
Net foreign assets * output gap (L)	-	-	-	-	0.119 (0.112)	-0.311 (0.245)
Net foreign assets * positive output gap (L)	-	-	-	-	-	1.083*** (0.265)
Net foreign assets below -60% (L)	-0.001 (0.006)	0.001 (0.006)	0.010 (0.007)	0.010 (0.007)	0.011 (0.007)	0.008 (0.007)
Real effective trade weighted exchange rate (L)	-0.008 (0.007)	-0.002 (0.006)	-0.004 (0.006)	-0.004 (0.006)	-0.003 (0.006)	-0.002 (0.006)
Obs.	1228	1228	1228	1228	1228	1228
Country fixed effects	No	Yes	Yes	Yes	Yes	Yes
R²	0.4006	0.7353	0.7446	0.7454	0.7470	0.7500

See previous Tables.

One possible explanation is that creditors prefer not consuming out of valuation changes due to their high volatility. The results in column 4 seem to offer partial support to this hypothesis by showing that creditor countries have a negligible marginal propensity to spend out of their capital gains on net foreign wealth (the p-value of the significance of the coefficient associated with the valuation effects NFA for creditor countries is 0.634).

Finally, the last column of the table shows that favorable transitory income shocks also have a positive effect on the trade balance of creditors, and the opposite effect on debtor countries. It is also important to note that in this last regression, the effect of NFA on the trade balance for the creditor countries is not statistically different from zero.

3.3 Through the residual balance

The residual balance of the current account includes items determined by both the private sector and the public sector or which depend on various agreements between countries. For example, this sub-balance includes migrants' remittances, which usually flow from richer countries (net immigration) to poorer countries (net emigration). In this sense, his behavior might resemble that of the trade balance, becoming negative in the expansion phase of the cycle and positive in the recession. But it also includes the effect of multilateral mechanisms such as those that exist in the European Union, by which member countries emit transfers

depending on VAT collection and receive them according, especially, to their level of per capita income. In general, this type of items should also flow from the richer countries to poorer ones and fluctuate counter-cyclically. Since both countries with higher and lower per capita income may be creditors and debtors, it seems that the sign of the net external assets in this regression is not defined a priori.

As shown in the first column of Table 4, the net foreign assets have a statistically significant negative sign, being therefore stabilizers for this sub-balance. The real effective exchange rate has also a positive effect, which may result from decisions of migrants. The effect of NFA is maintained when fixed effects are included, but the coefficient is somewhat smaller (column 2). However, no asymmetry between creditors and debtors is observed (column 3). Capital gains derived from net external assets not appear to have a significant effect (column 4) and the interrelation of transitory shocks and NFA also suggests that countries seek to maintain the composition of their portfolios after favorable transitory income disturbances (column 6).

Table 4. Residual balance regressions

	Basic spec.	Country fixed effs.	Diff. btw. cred. & deb.	Valuation effects	Portf. rebal.	Portf. rebal. in exp. & rec.
Cnte.	0.010***	0.018***	0.018***	0.015***	0.018***	0.017***
	(0.001)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Net foreign assets (L)	-0.011***	-0.007***	-0.007***	-	-0.007***	-0.009***
	(0.002)	(0.002)	(0.003)		(0.002)	(0.002)
Net foreign assets creditor counties (L)	-	-	-0.001	-	-	-
			(0.004)			
Net foreign assets. CA accumulation (L)	-	-	-	-0.016***	-	-
				(0.003)		
Net foreign assets. Valuation effects (L)	-	-	-	0.003	-	-
				(0.002)		
Net foreign assets * output gap (L)	-	-	-	-	0.054	-0.044
					(0.045)	(0.065)
Net foreign assets * positive output gap (L)	-	-	-	-	-	0.248**
						(0.108)
Real effective trade weighted exchange rate (L)	0.006*	0.009***	0.009***	0.010***	0.009***	0.009***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Obs.	1228	1228	1228	1228	1228	1228
Country fixed effects	No	Yes	Yes	Yes	Yes	Yes
R^2	0.3833	0.7854	0.7854	0.7989	0.7868	0.7880

See previous tables.

Summarizing the findings of this section, we find that stock imbalances lead to destabilizing dynamics only for creditor countries, that is, a creditor position tends to lead to further wealth accumulation through the current account. This is basically the consequence of what happens with the trade balance, which does not react, in these countries, to their net external wealth. At the same time, their reaction after transitory income shocks is to maintain the composition of their portfolio, and therefore investing abroad. Debtor countries, on the contrary, tend

to consume and import less, most likely due to a negative wealth effect. As we suggest among the conclusions, this adjustment pattern can have important implications for global growth.

4. Are real effective exchange rates determined by net foreign assets?

The coefficient of net foreign assets estimated in trade balance regressions represents both their direct impact through wealth effects and the indirect impact that the NFA stock has on external trade through the real exchange rate. Is the low coefficient estimated for creditor countries due to a weak wealth effect and a scarce marginal propensity to consume out of external wealth or to the fact that a higher level of net foreign assets does not corresponds to a more appreciated exchange rate for these countries? In order to address this question we focus in this section on the latter, indirect effect, trying to establish its empirical relevance and whether it is milder for creditor countries. Another possibility is that the indirect impact of stock imbalances on the trade balance via real exchange rate levels changed over time for several economies in our sample. In particular, even if stock imbalances had a stabilizing impact on the trade balance through the real exchange rate, it may be that the creation of the European Monetary Union mitigated this effect for member countries. For one thing, in the presence of rigidities in relative price adjustments, the real exchange rate of the members of a common currency area might depend on the net foreign asset position of the area as a whole rather than on the external position of each member. We test this hypothesis in this section by establishing whether a country's past stock of net foreign assets influences its real exchange rate level, and whether this relationship changed for Euro countries after the establishment of the common currency.

Our tests rely on panel regressions of the level of the REER on a set of fundamental determinants, including the ratio of NFA to GDP. [27] In the spirit of the REER regressions in IMF (2013a) and IMF (2016), our basic specification controls for a series of potential determinants of the REER level, such as a country's level of development, its trade openness, demographic factors and expected growth. We also test whether the impact of the stock of NFA on the exchange rate is the same for debtor and creditor countries. Namely, we run the following regressions:

$$reer_{it} = \alpha + \beta \cdot nfa_{it-1} + (others)_{it} + \varepsilon_{it}$$

$$reer_{it} = \alpha + \beta_1 \cdot nfa_{it-1} + \beta_2 \cdot nfa_{it-1} \cdot (creditor_{dum}) + (others)_{it} + \varepsilon_{it},$$

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[27] The levels of the real effective exchange rate are recovered from the PPP estimates in the base year.

where $reer_t$ is the (log of the) REER level. Notice that using levels instead of indices allows running panel estimations both with and without fixed effects.[28] β_1 is the impact of the NFA stock on the REER for debtor economies and $(\beta_1 + \beta_2)$ the same for creditor countries; $(others)$ denotes the set of other exchange rate determinants.

We test whether the relationship between NFA and REER changed significantly for the countries that joined the Euro Area in 1999 by running:

$$reer_{it} = \alpha + \beta_1 nfa_{it-1} + \beta_2 nfa_{it-1}(creditor_{dum}) + \beta_3 nfa_{it-1}(postEZ_{dum}) +$$
$$\beta_4 nfa_{it-1}(creditor_{dum})(postEZ_{dum}) +$$
$$\beta_5 nfa_{it-1}(postEZ_{dum})(EZmember99_{dum}) +$$
$$\beta_6 nfa_{it-1}(postEZ_{dum})(EZmember99_{dum})(creditor_{dum}) + (others)_{it} + \varepsilon_{it},$$

where $(postEZ_{dum})$ is a dummy variable that takes the value of 1 after the creation of the Euro Zone, in 1999, and $(EZmember99_{dum})$ is a static dummy that characterizes the countries that joined the EMU in 1999 plus Greece.[29]

The specification above lets us study whether the NFA coefficient changed after 1999 also for economies outside the Euro Area. However, that specification does not allow investigating the impact of the Euro on the countries that joined the single currency after 1999. For this reason we also run a slightly different regression interacting NFA and NFA for creditors with a dummy $(EZmember_{dum})$ that takes the value of 1 if the country has already joined the Euro in the year under consideration, and 0 otherwise:

$$reer_{it} = \alpha + \beta_1 nfa_{it-1} + \beta_2 nfa_{it-1}(creditor_{dum}) + \beta_3 nfa_{it-1}(EZmember_{dum}) +$$
$$\beta_4 nfa_{it-1}(EZmember_{dum})(creditor_{dum}) + (others)_{it} + \varepsilon_{it}.$$

The country sample is the same as in Section 3. The time sample is 1990-2015, due to data availability. Table 5.1 in Appendix 5 reports the full set of results. Table 5 below focuses on the results obtained for our main coefficients of interest, those related to countries' NFA position. [30]

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[28] On this point see IMF (2013a). Being able to run panel regressions without fixed effects is particularly important when estimating the relationship between the stock of NFA and the REER. Indeed, economic theory predicts a positive link between these two variables based on long-run (Steady State) relationships. Fixed effects might capture that link and mechanically lead to estimate a non-significant coefficient.

[29] The coefficients β_1 and $(\beta_1 + \beta_2)$ capture the impact of NFA on the REER for, respectively, debtor and creditor countries before the establishment of the Euro Zone; $(\beta_1 + \beta_3)$ and $(\beta_1 + \beta_2 + \beta_3 + \beta_4)$ the same impact after 1999 for, respectively, debtor and creditor economies outside the EMU; $(\beta_1 + \beta_3 + \beta_5)$ represents the impact after 1999 for debtor countries that joined the Euro Zone; summing all the βs yields instead the same effect after 1999 for creditor countries that joined the Euro Zone since its creation.

[30] See IMF (2013a) for a thorough interpretation of all the regression coefficients.

Table 5. Real effective exchange rate regressions

	Basic spec. [1]	Diff. btw cred. & deb. [2]	1999- Euro Zone break [3]	Euro Zone member dummy [4]
Net foreign assets (L)	0.108*** (0.029)	-0.065** (0.032)	0.113 (0.076)	0.028 (0.045)
Net foreign assets creditor countries (L)	-	0.414*** (0.056)	0.407*** (0.107)	0.323*** (0.069)
NFA*postEZdummy (L)	-	-	-0.176** (0.076)	-
NFA creditors * postEZdummy (L)	-	-	-0.006 (0.097)	-
NFA 99EuroMember * postEZdummy (L)	-	-	-0.016 (0.046)	-
NFA 99EuroMember creditor * postEZdummy (L)	-	-	-0.285*** (0.094)	-
NFA *EuroMember (L)	-	-	-	-0.161*** (0.047)
NFA creditors* EuroMember (L)	-	-	-	-0.123 (0.099)
Obs.	977	977	977	977
Country fixed effects	No	No	No	No
R²	0.8277	0.8434	0.8496	0.8488

Between brackets: standard deviation; L: lagged variable; *, **, *** p-value below 10%, 5% and 1%, respectively.

The basic specification in column 1 shows that, controlling for all the determinants of REER levels, on average countries with a more positive NFA position tend to display a more appreciated exchange rate. Contrary to our conjecture, when we distinguish between debtor and creditor countries in column 2, we find that the relationship above holds only for the latter group, that is, a higher debtor position does not imply a more depreciated exchange rate.[31]

Column 3 shows that before the creation of the Euro Zone creditor countries enjoyed a significant stabilization from REER fluctuations, as a more positive NFA position corresponded to a more appreciated exchange rate, which should have limited creditors' trade surpluses and halted to some extent the accumulation of external wealth. After 1999 this effect is found to be lower for all creditor countries, irrespectively of whether they joined or not the Euro Zone. Yet, after 1999 creditor economies outside the common currency area have still benefited from a significantly more appreciated REER for a higher NFA position. Creditor countries that joined the Euro since 1999, instead, have experimented a much bigger reduction in the link between NFA and the REER, which has practically vanished.[32]

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[31] The coefficient of the lagged foreign assets position for creditor countries is estimated to be 0.349, with a p-value of 0.000.

[32] The coefficient of the lagged NFA position for creditor countries before 1999 is estimated to be 0.521, with a p-value of 0.000. The coefficient for debtor economies outside the EMU after 1999 is a non-significant -0.062 (p-value 0.185). The same coefficient for creditor countries outside the Euro Zone after 1999 is estimated to be 0.339 (p-value 0.000), which is significantly lower than the

The regression in column 4 allows including among Euro members those that joined the common currency after 1999. Consistently with the results obtained in column 3, we find that for creditor countries outside the Euro Area a higher NFA position corresponds to a more appreciated REER. For creditor economies that are members of the EMU this effect is more than halved and not statistically significant.[33] Still, preliminary evidence suggests that the reduction in the positive link between NFA and REER experimented by creditors that joined the Euro Zone is not what explains the destabilizing impact of their NFA on the trade balance. Indeed, isolating NFA effects in TB regression for Euro Area countries and the rest, we find that for debtor countries that are members of the Euro Zone the stabilizing impact of NFA is higher and for Euro Area creditor countries their destabilizing impact is actually lower. Also, the magnitude of these effects is very small, so that only with very high NFA levels they would imply a relevant difference for trade balance dynamics.

Overall, these findings seem to suggest that the reason for the asymmetric impact of stock imbalances on the wealth accumulation of creditor and debtor countries lies more in a weak marginal propensity to consume of the formers than in a different response of relative prices in the two groups of countries.

It is also worth to stress the preliminary nature of the results on REER regressions which, at a first inspection, do not seem to be robust to fixed effects estimation, as shown in Table 5.2 in Appendix 5.

5. And nominal effective financial exchange rates?

[To be completed]

6. Conclusions [preliminary]

Irrespectively of whether they represented a symptom of the global financial crisis or were rather among its causes, global imbalances played an important role in the recent financial turmoil. Traditionally, external imbalances used to be measured as divergences in countries' current account positions ("flow imbalances"). Still, global imbalances can also be characterized as the systematic increase in countries' net claims and liabilities, as described in their net foreign

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pre-EMU coefficient. The NFA coefficient for creditor countries than joined the Euro zone is estimated to be 0.038 for the post-EMU years, which is not significant (p-value 0.595).

[33] The NFA coefficient for creditor countries outside the EMU is 0.532 (p-value 0.000), which is significantly higher than the same coefficient for creditor economies that joined the Euro Area (0.068, p-value 0.344).

asset positions ("stock imbalances"). While after the crisis flow imbalances have significantly diminished, stock imbalances have continued to rise. The aim of this paper is to study some of the implications that stock imbalances may have for external stability.

Our results show the remarkable persistence of countries' debtor and creditor positions. Also, there exists a notable asymmetry between creditor and debtor economies in the impact that stock imbalances have on current account flows. While in debtor countries they help –other things equal– to correct future current account deficits, in creditor economies they contribute to increase surpluses. These findings hold in spite of the stabilizing impact that net foreign assets have on the trade balance of creditor countries through real exchange rate fluctuations. Namely, even though a higher level of net foreign assets corresponds to a more appreciated real exchange rate in the case of creditor economies (which should limit their trade surpluses and wealth accumulation), this equilibrating mechanism is partially damped in the case of countries belonging to a common currency area, and it is in general not sufficient to limit creditors' wealth accumulation.

Overall, the destabilizing impact of stock imbalances on the wealth accumulation of creditor economies seems to be due to the low marginal propensity to consume and import of these countries out of net external wealth. The reasons underlying this result (demographic factors, lack of profitable opportunities for domestic investment, excess demand for safe assets, etc.) go beyond the scope of this paper, but its implications can be very relevant at the global level. In the short run debtor countries remain the most vulnerable to market sentiment and financial tensions, which call for a proper correction in their disequilibria. Although this can be done in different ways, the most common recipe consists in generating surpluses in debtors' current account. Still, if creditor countries do not react by increasing their demand and imports (which constitute debtor economies' exports), the adjustment can only go through a reduction in debtors' imports and, ultimately, in their aggregate demand. This kind of adjustment, while effective in limiting the risks stemming from excessively negative current account and debtor positions, would likely imply a slowdown in both global trade and GDP growth, and may eventually end up hampering global recovery.

Appendix 1. The dataset[34]

The dataset consists of 39 countries including both developed and emerging economies. Most of them are OECD members (Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Israel, Italy, Japan, Korea, Latvia, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovakia, Slovenia and Spain, Sweden, Switzerland, Turkey, UK and US), but not the rest (China, Cyprus, Croatia, India, Lithuania and Romania).

As it is explained below, the variables used in this empirical paper were taken from very different sources. In some cases it was necessary to link different bases for the same time series. This was made using the common year as the fixed point, introducing adjustments when it was necessary to fulfil accounting identities. In other cases, it was necessary to interpolate some missing values from very close proxies.

Balance of payments and international investment position: There were obtained from the IMF BOPs statistics. In most of the cases it was necessary to link the different bases.

GDP and expected growth: The main source is the IMF WEO database, both in real and nominal terms. In some cases, GDP deflators were interpolated from consumer price inflation. Domestic output gaps were calculated using the one-side HP filter and trade-partners output gaps correspond to export-weighted output gaps with variable weights.

PPPs and bilateral exchange rates: They were also taken from the IMF WEO database. Effective exchange rates are weighted with the export share and, again, weights are variable.

Population: This information was obtained from the UN database, jointly with the long-term projections and its structure. This information allows us to calculate both the ageing speed and the dependency ratio as in the EBA IMF exercise.

Financial centre, own currency share in world reserves and reserves: These variables were taken from the IMF EBA database. They were enlarged to 1980 using information from the corresponding IMF annual reports.

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[34] The full data set is available upon request.

Private sector credit: For most of the countries this variable came from the BIS database on credit. For the remaining ones from the World Bank database.

M2 and private sector deposits: They were taken from the World Bank database. In some cases it was necessary to use domestic sources to fulfil data gaps.

Gini Index: It comes from the Standardized World Income Inequality Database and the OECD.

Financial reforms index: it is taken from Abiad et al. (2008).

VIX, US short term interest rate and corporate credit spreads: They come from the FRED database. The short term interest rate corresponds to the three-months and the spreads to that calculated by Moody's.

Gross fixed capital formation deflator: It has been obtained from the OECD database and domestic sources.

Employment: It is taken from the IMF WEO database combined in some cases both with the ILO database and domestic sources.

Openness degree: It is defined as exports plus imports form the balance of payments statistics divided on GDP.

Commodities terms of trade: It was taken from the IMF EBA database and extended using a similar definition but considering less categories of commodities.

Structural public balance: Headline public balance was obtained from the IMF WEO data base and domestic sources. Following IMF EBA calculations, the structural component corresponds to the residual of a country by country regression of this variable on the output gap.

Institutional and political environment: It was taken from the WB database on governance indicators.

Appendix 2. Stylized facts on wealth accumulation – Figures and Tables

TABLE 2.1. DECOMPOSITION OF NFA CHANGES, EQ.[2]. Non-weighted average								
	1980-2015	1980-1984	1985-1989	1990-1994	1995-1999	2000-2004	2005-2009	2010-2015
	All countries							
NIIP change	**-14,4**	-5,0	1,2	-2,3	-6,5	-0,6	-8,0	5,1
Growth effect	**16,0**	-4,6	2,0	1,2	3,2	9,6	6,2	-2,5
Cur. & cap. accoun	**-18,9**	-5,9	-3,1	-2,7	-6,0	-3,9	-7,4	6,7
Capital gains	**-11,9**	1,1	-1,1	-2,5	-4,4	-4,2	-5,0	3,9
Other	**0,4**	4,5	3,4	1,7	0,7	-2,1	-1,7	-3,0
	Advanced creditor economies							
NIIP change	**39,9**	1,6	-0,1	-0,3	6,0	4,0	7,3	11,4
Growth effect	**-12,0**	0,8	-3,6	-1,9	-0,1	-3,3	-3,0	2,1
Cur. & cap. accoun	**43,4**	1,0	2,0	1,4	3,6	6,0	6,6	11,9
Capital gains	**6,8**	-1,3	1,4	0,0	3,0	-0,3	3,3	-1,0
Other	**1,8**	1,1	0,2	0,2	-0,6	1,7	0,3	-1,7
	Advanced debtor economies							
NIIP change	**-40,3**	-4,3	2,0	-4,1	-7,6	1,6	-10,8	-10,3
Growth effect	**24,4**	0,2	7,6	2,6	2,8	7,8	4,5	-5,2
Cur. & cap. accoun	**-26,5**	-4,7	-3,5	-2,7	-1,1	-1,0	-6,8	-2,3
Capital gains	**-23,2**	1,1	-2,6	-5,1	-8,0	0,0	-6,6	1,9
Other	**-14,9**	-0,9	0,6	1,0	-1,3	-5,2	-1,9	-4,6
	Emerging creditor countries							
NIIP change	**-0,9**	0,1	0,0	-0,9	-1,0	1,2	1,4	-1,1
Growth effect	**-7,3**	0,0	0,0	-0,5	-0,3	-0,4	-1,6	-1,0
Cur. & cap. accoun	**7,8**	0,3	0,0	-0,1	-0,8	0,8	2,9	1,1
Capital gains	**1,4**	-0,2	0,0	1,0	0,2	0,7	-0,2	-0,8
Other	**-2,8**	0,0	0,0	-1,4	-0,1	0,1	0,4	-0,4
	Emerging debtor countries							
NIIP change	**-31,2**	-4,1	-1,1	2,6	-13,2	-11,8	-16,5	12,9
Growth effect	**27,4**	-9,3	-2,8	2,2	4,1	18,2	15,2	-0,3
Cur. & cap. accoun	**-69,9**	-4,2	-3,0	-4,2	-18,7	-19,0	-21,8	1,0
Capital gains	**-9,1**	2,2	0,1	1,2	-3,5	-11,1	-7,6	9,5
Other	**20,4**	7,2	4,6	3,4	4,8	0,1	-2,3	2,7

Source: Own calculations and IMF.

TABLE 2.2. DECOMPOSITION OF CUM. CA, EQ. [3]. Non-weighted average

	1980-2015	1980-1984	1985-1989	1990-1994	1995-1999	2000-2004	2005-2009	2010-2015
				All countries				
Current and cap.acc.	-28,0	-11,7	-4,6	-3,3	-6,7	-3,8	-7,4	6,7
Trade	4,0	-8,1	0,7	-0,2	-3,0	1,3	-0,5	12,6
Investment income	-58,9	-8,2	-10,1	-7,9	-7,4	-8,6	-10,0	-10,0
Other	27,0	4,6	4,8	4,8	3,7	3,5	3,1	4,1
				Advanced creditor economies				
Current and cap.acc.	39,0	-1,7	1,5	0,8	4,0	6,1	6,6	11,9
Trade	42,4	-1,9	2,0	2,0	5,3	6,5	6,7	11,2
Investment income	13,3	0,6	1,0	0,3	0,1	1,3	1,9	4,8
Other	-16,7	-0,4	-1,4	-1,6	-1,4	-1,7	-2,1	-4,0
				Advanced debtor economies				
Current and cap.acc.	-39,0	-9,8	-5,9	-4,4	-2,3	-1,0	-6,8	-2,3
Trade	3,5	-7,7	-2,6	-0,4	2,1	5,3	0,5	5,6
Investment income	-64,6	-7,3	-9,5	-8,6	-7,2	-7,4	-6,6	-7,3
Other	22,1	5,2	6,2	4,7	2,7	1,1	-0,7	-0,7
				Emerging creditor countries				
Current and cap.acc.	7,2	-0,6	0,7	1,1	-1,3	0,8	2,9	1,1
Trade	5,7	0,4	0,9	-0,9	-1,7	0,8	3,1	1,2
Investment income	-4,4	-1,1	-0,2	-0,2	-0,2	-0,3	-0,8	-0,2
Other	5,9	0,1	0,0	2,3	0,7	0,3	0,5	0,2
				Emerging debtor countries				
Current and cap.acc.	-72,4	-5,9	-3,7	-4,1	-18,9	-19,0	-21,8	1,0
Trade	-49,1	-2,2	1,5	-2,4	-18,0	-16,5	-16,2	4,6
Investment income	-80,1	-5,8	-7,8	-7,0	-7,7	-12,4	-17,7	-21,7
Other	56,8	2,1	2,6	5,3	6,8	9,8	12,1	18,0

Source: Own calculations and IMF.

All countries

Advanced creditor economies

Advanced debtor economies

Emerging creditor countries

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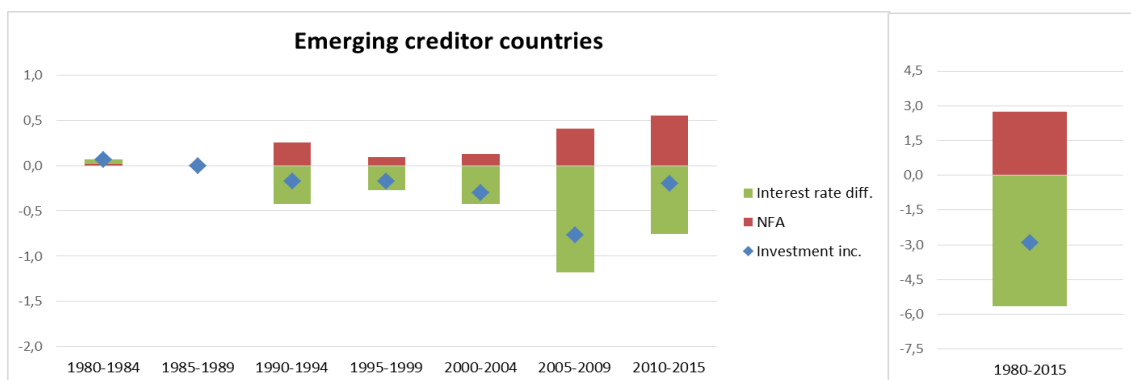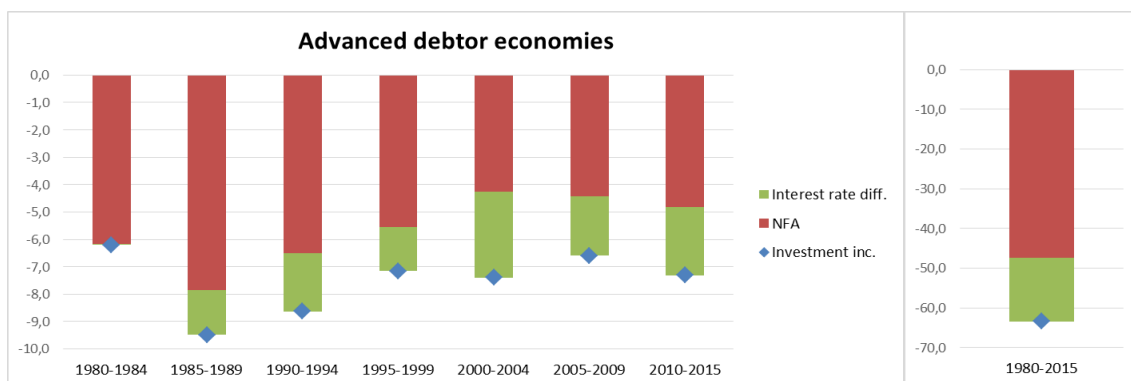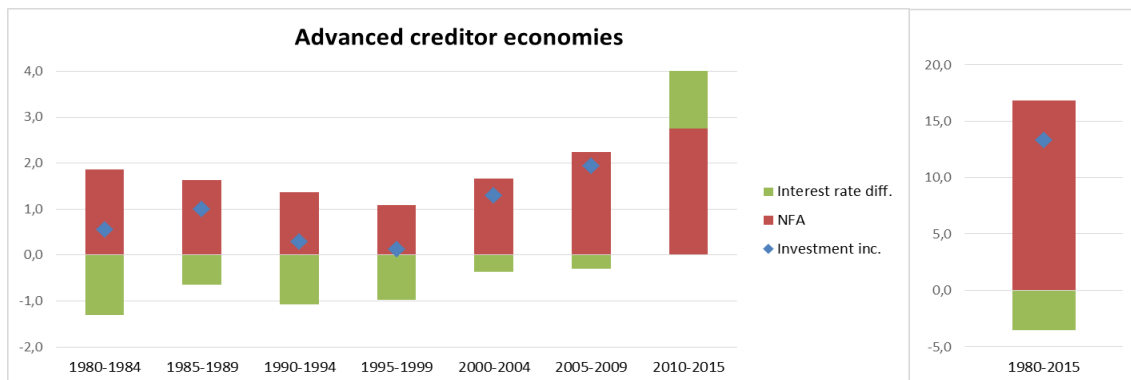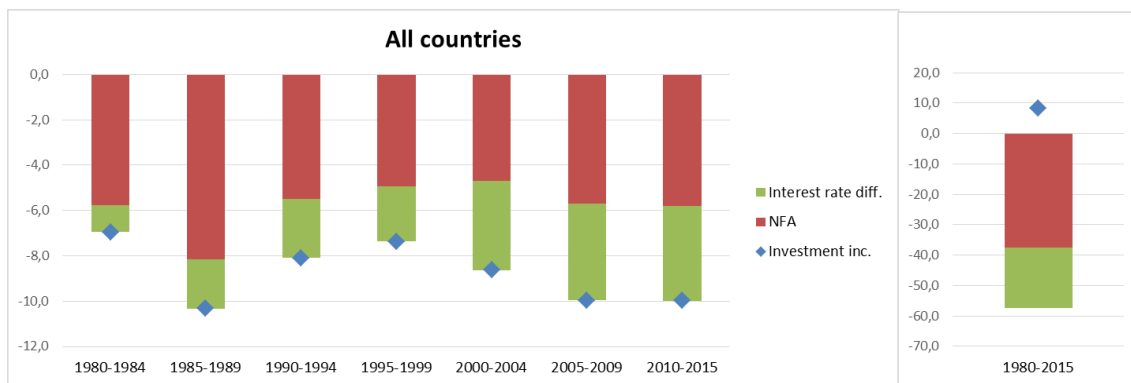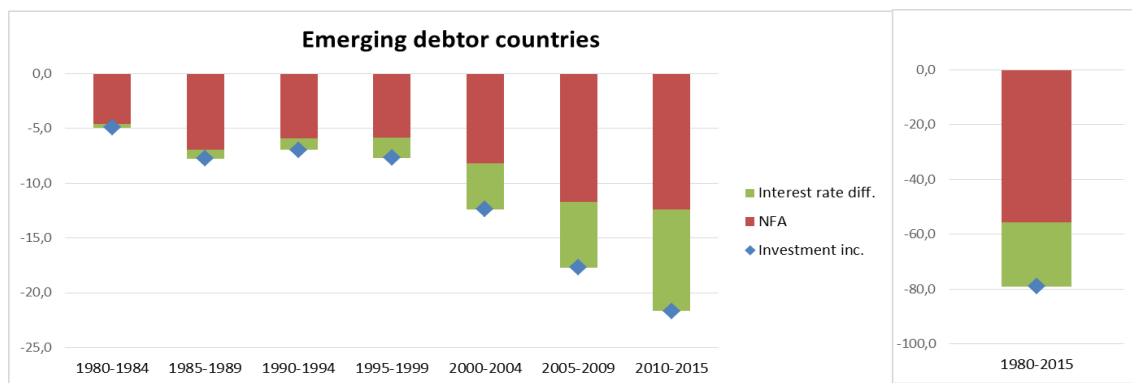
Figure 2.1. Decomposition of the investment income balance, eq. [5]. Non-weighted averages.

TABLE 2.3. PORTFOLIO COMPOSITION: ASSETS. Non-weighted average							
	1980-2015	1980-1984	1985-1989	1990-1994	1995-1999	2000-2004	2005-2009	2010-2015
All countries							
Share of equity	0,22	0,16	0,18	0,18	0,21	0,25	0,28	0,31
Share of debt	0,78	0,85	0,83	0,82	0,79	0,75	0,72	0,69
Advanced economies							
Share of equity	0,28	0,17	0,20	0,24	0,30	0,34	0,35	0,37
Share of debt	0,72	0,84	0,80	0,76	0,70	0,66	0,65	0,63
Advanced creditor economies							
Share of equity	0,25	0,15	0,18	0,21	0,26	0,26	0,28	0,38
Share of debt	0,75	0,85	0,82	0,79	0,74	0,74	0,72	0,62
Advanced debtor economies							
Share of equity	0,30	0,18	0,21	0,26	0,31	0,37	0,38	0,37
Share of debt	0,70	0,82	0,79	0,74	0,69	0,63	0,62	0,63
Emerging countries							
Share of equity	0,12	0,09	0,10	0,06	0,07	0,09	0,17	0,21
Share of debt	0,88	0,92	0,91	0,94	0,93	0,91	0,83	0,79
Emerging creditor countries							
Share of equity	0,05	0,00 .		0,08	0,05	0,00	0,10	0,03
Share of debt	0,95	1,00 .		0,92	0,95	1,00	0,90	0,97
Emerging debtor countries							
Share of equity	0,13	0,11	0,09	0,06	0,07	0,10	0,18	0,22
Share of debt	0,87	0,89	0,91	0,94	0,93	0,90	0,82	0,78

Source: Own calculations and IMF.

	1980-2015	1980-1984	1985-1989	1990-1994	1995-1999	2000-2004	2005-2009	2010-2015
TABLE 2.4. PORTFOLIO COMPOSITION: LIABILITIES. Non-weighted average								
All countries								
Share of equity	0,26	0,13	0,14	0,19	0,27	0,32	0,34	0,33
Share of debt	0,74	0,87	0,86	0,81	0,73	0,68	0,66	0,67
Advanced economies								
Share of equity	0,24	0,14	0,16	0,20	0,28	0,30	0,31	0,31
Share of debt	0,76	0,86	0,84	0,80	0,72	0,70	0,69	0,69
Advanced creditor economies								
Share of equity	0,26	0,16	0,20	0,20	0,28	0,26	0,31	0,36
Share of debt	0,74	0,84	0,80	0,80	0,72	0,74	0,69	0,64
Advanced debtor economies								
Share of equity	0,24	0,13	0,14	0,20	0,28	0,32	0,31	0,28
Share of debt	0,76	0,87	0,86	0,80	0,72	0,68	0,69	0,72
Emerging countries								
Share of equity	0,28	0,10	0,07	0,17	0,25	0,35	0,39	0,37
Share of debt	0,72	0,92	0,93	0,83	0,75	0,65	0,61	0,63
Emerging creditor countries								
Share of equity	0,14	0,01	.	0,18	0,18	0,08	0,19	0,10
Share of debt	0,86	0,99	.	0,82	0,82	0,92	0,81	0,90
Emerging debtor countries								
Share of equity	0,30	0,11	0,07	0,15	0,26	0,37	0,41	0,39
Share of debt	0,70	0,89	0,93	0,85	0,74	0,63	0,59	0,61

Source: Own calculations and IMF.

Appendix 3. The auxiliary regressions

Some of the regressors included as controls could be endogenous. Therefore, we estimate the equations in the main text by instrumental variables. In order to implement the traditional two-step procedure, we need to run auxiliary regressions to derive the fitted value of the corresponding variables. These regressions for the structural public balance, reserve accumulation, credit-to-GDP ratio, output gap, labor productivity and total factor productivity appear below.

The structural component of the fiscal balance depends positively on that at world level, it seems to be quite persistent and it is higher in countries with a fixed FX regime, higher ageing speed, population growth, when higher is expected growth and in situations of global financial stress. On the contrary, it is lower when the oil balance is in surplus and the economy is in expansion. These two last outcomes probably reflect the difficulties in properly correcting observed balances from temporary business cycle fluctuations.

In the case of reserve accumulation, following the EBA results, we have run the regressions country by country, although using the same explanatory variables. As an average, reserve accumulation is higher when other countries do the same, when the FX regime is fixed, when there are financial turbulences at the global level and when countries have positive terms of trade shocks. It is lower when higher is the financial liberalization degree, when higher are the interest rates, and when the structural public balance is showing a surplus.

The output gap has a common component among countries, it is positively correlated with the financial cycle and with real exchange rate and negatively with the structural fiscal balance and the changes in the Gini index.

Finally, the explanatory factors of labor and total factor productivity are basically the same. They are positively correlated with the level of human capital and the output gap, and negatively with the relative price of investment in equipment goods.

Table 3.1. Auxiliary regressions

	Struc. fiscal balance		Res. acc.**	Credit-to-GDP ratio		Output gap		Labor productivity		Total factor productivity	
	RE	FE		RE	FE	RE	FE	RE	FE	RE	FE
Cnte.	-0.014 (0.009)	-0.047 (0.010)	0.048	-0.288 (0.086)	-0.505 (0.010)	0.001 (0.001)	0.001 (0.001)	-5.220 (0.863)	-9.187 (0.573)	-6.125 (1.140)	-9.815 (0.432)
World aver. dep. var. (L)	0.550 (0.134)	0.608 (0.144)	0.710	-	-	1.115 (0.119)	1.098 (0.113)	-	-	-	-
Country aver. dep. var.	0.983 (0.023)	-	-	0.933 (0.022)	-	-	-	0.389 (0.104)	-	0.396 (0.146)	-
Relative investment deflator (L)	-	-	-	-	-	-	-	-0.436 (0.164)	-0.161 (0.131)	-0.320 (0.130)	-0.150 (0.110)
Human capital	-	-	-	-	-	-	-	3.163 (0.511)	5.610 (0.533)	2.731 (0.408)	4.111 (0.386)
FX regime: strong peg	0.008 (0.003)	0.015 (0.006)	0.005	0.113 (0.048)	0.198 (0.087)	-	-	-	-	-	-
FX regime: weak peg	0.001 (0.003)	0.002 (0.004)	0.003	0.046 (0.039)	0.060 (0.053)	-	-	-	-	-	-
Expected growth (L)	0.411 (0.066)	0.414 (0.068)	-	-	-	-	-	-	-	-	-
Output gap (L)	-0.201 (0.045)	-0.211 (0.046)	-	1.904 (0.594)	1.807 (0.636)	-	-	-	-	-	-
Aging speed	0.052 (0.021)	0.060 (0.028)	-	1.301 (0.383)	1.992 (0.483)	-	-	-	-	-	-
Population growth	0.505 (0.149)	0.656 (0.428)	-	6.789 (1.843)	5.915 (4.278)	-	-	-	-	-	-
VIX (L)	0.001 (0.000)	0.001 (0.000)	0.001	-	-	-	-	-	-	-	-
Oil external balance (L)	-0.010 (0.003)	-0.014 (0.003)	-	-	-	-	-	-	-	-	-
Financial liberal. (L)	-	-	-0.048	0.184 (0.084)	0.238 (0.164)	-	-	-	-	-	-
US interest rate	-	-	-0.047	-3.193 (0.560)	-1.881 (0.492)	-	-	-	-	-	-
US corp. spread	-	-		7.648 (3.811)	7.989 (3.494)	-	-	-	-	-	-
ToT raw materials	-	-	0.426	-	-	-	-	-	-	-	-
Fitted credit-to-GDP ratio	-	-	-	-	-	0.057* (0.010)	0.071* (0.011)	-	-	-	-
Fitted output gap	-	-	-	-	-	-	-	1.706 (0.359)	1.043 (0.253)	1.586 (0.261)	1.181 (0.234)
Real eff. exch. rate (L)	-	-	-	-	-	0.024 (0.007)	0.031 (0.008)	-	-	-	-
Gini index (D)	-	-	-	-	-	-0.280 (0.127)	-0.272 (0.125)	-	-	-	-
Fitted struc. fiscal balance	-	-	-0.097	-	-	-0.779* (0.099)	-0.749* (0.091)	-	-	-	-
Obs.	1279	1279	1279	1311	1311	1240	1240	1240	1240	1240	1240
R^2	0.4259	0.0716	0.3394	0.8543	0.2589	0.4375	0.4404	0.6851	0.1240	0.6936	0.5266
Std. Dev.	0.0288	0.0288	-	0.2472	0.2472	0.0243	0.0241	0.1662	0.1662	0.1352	0.1353

Between brackets: standard deviation; L: lagged variable; D: first differences; * First differences of the corresponding variable; **Country-by-country regression, the parameters in the table represent the countries' average

Appendix 4. Detailed external balance regressions

Table 4.1. Current account regressions

	Basic spec.	Country fixed effs.	Diff. btw. cred. & deb.	Valuation effects	Portf. rebal.	Portf. rebal. in exp. & rec.
Cnte.	-0.010*** (0.003)	-0.052*** (0.009)	-0.054*** (0.008)	-0.053*** (0.009)	-0.054*** (0.009)	-0.056*** (0.009)
Net foreign assets (L)	0.016** (0.006)	0.005 (0.007)	-0.015 (0.009)	-	-0.014 (0.009)	-0.024*** (0.009)
Net foreign assets creditor counties (L)	-	-	0.052*** (0.015)	-	0.053*** (0.015)	0.057*** (0.016)
Net foreign assets. CA accumulation (L)	-	-	-	-0.011 (0.011)	-	-
Net foreign assets. Valuation effects (L)	-	-	-	-0.018* (0.011)	-	-
Net foreign assets creditor countries. CA accumulation (L)	-	-	-	0.055*** (0.015)	-	-
Net foreign assets creditor countries. Valuation effects (L)	-	-	-	0.040** (0.018)	-	-
Net foreign assets * output gap (L)	-	-	-	-	0.148 (0.303)	-0.437 (0.309)
Net foreign assets * positive output gap (L)	-	-	-	-	-	1.351*** (0.332)
Net foreign assets below -60% (L)	-0.001 (0.006)	0.004 (0.006)	0.013* (0.007)	0.013* (0.007)	0.014* (0.007)	0.011 (0.007)
Real effective trade weighted exchange rate (L)	-0.025*** (0.008)	-0.011 (0.008)	-0.012 (0.008)	-0.011 (0.008)	-0.012 (0.008)	-0.009 (0.007)
Nom. eff. FX financial weights assets side (DL)	0.016*** (0.006)	0.014** (0.006)	0.014** (0.006)	0.014** (0.006)	0.014** (0.006)	0.013** (0.006)
Financial centre	0.024*** (0.008)	0.016 (0.013)	0.019 (0.012)	0.018 (0.013)	0.019 (0.013)	0.019 (0.013)
Relative TFP (L)	-0.002 (0.007)	0.049*** (0.009)	0.048*** (0.009)	0.046*** (0.009)	0.049*** (0.009)	0.048*** (0.009)
Relative TFP * K openness (L)	0.019* (0.011)	0.032*** (0.012)	0.032*** (0.012)	0.032*** (0.012)	0.032*** (0.011)	0.035*** (0.011)
Relative energy balance (oil exporters)	0.973*** (0.096)	1.191*** (0.154)	1.179*** (0.147)	1.171*** (0.145)	1.176*** (0.146)	1.200*** (0.145)
Relative dependency ratio	-0.017 (0.039)	-0.021 (0.043)	-0.057 (0.044)	-0.064 (0.043)	-0.055 (0.044)	-0.050 (0.043)
Relative population growth	0.105 (0.323)	-0.871** (0.372)	-0.946** (0.371)	-1.007*** (0.372)	-0.933** (0.367)	-0.863** (0.354)
Relative output growth (L)	-0.271*** (0.032)	-0.333*** (0.034)	-0.333*** (0.034)	-0.333*** (0.034)	-0.330*** (0.034)	-0.316*** (0.033)
VIX * capital openness (L)	0.001 (0.000)	0.001** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001** (0.000)	0.001** (0.000)
VIX* capital openness*own country share in world reserves (L)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Own country share in world reserves	-0.007 (0.015)	-0.021 (0.021)	-0.026 (0.021)	-0.026 (0.021)	-0.027 (0.021)	-0.033 (0.020)
Relative output gap (I)	-0.314*** (0.058)	-0.270*** (0.057)	-0.266*** (0.057)	-0.265*** (0.057)	-0.224*** (0.065)	-0.213*** (0.063)
Commodity ToTgap * trade openness	0.146*** (0.041)	0.120*** (0.042)	0.125*** (0.042)	0.125*** (0.041)	0.126*** (0.042)	0.105*** (0.041)
Relative structural public balance (I)	0.609*** (0.096)	1.223*** (0.166)	1.213*** (0.165)	1.218*** (0.165)	1.187*** (0.165)	1.161*** (0.160)
Relative reserve accumulation*capital controls	0.383*** (0.089)	0.359*** (0.090)	0.350*** (0.090)	0.353*** (0.090)	0.352*** (0.090)	0.340*** (0.089)
Obs.	1164	1164	1164	1164	1164	1164
Country fixed effects	No	Yes	Yes	Yes	Yes	Yes
R²	0.3872	0.6328	0.6432	0.6472	0.6458	0.6524

Table 4.2. Trade balance regressions

	Basic spec.	Country fixed effs.	Diff. btw. cred. & deb.	Valuation effects	Portf. rebal.	Portf. rebal. in exp. & rec.
Cnte.	-0.009***	-0.039***	-0.041***	-0.040***	-0.040***	-0.043***
	(0.004)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Net foreign assets (L)	-0.006	-0.015**	-0.035***	-	-0.035***	-0.043***
	(0.007)	(0.007)	(0.009)		(0.009)	(0.009)
Net foreign assets creditor counties (L)	-	-	0.056***	-	0.057***	0.061***
			(0.015)		(0.015)	(0.015)
Net foreign assets. CA accumulation (L)	-	-	-	-0.034***	-	-
				(0.010)		
Net foreign assets. Valuation effects (L)	-	-	-	-0.034***	-	-
				(0.011)		
Net foreign assets creditor countries. CA accumulation (L)	-	-	-	0.062***	-	-
				(0.015)		
Net foreign assets creditor countries. Valuation effects (L)	-	-	-	0.042**	-	-
				(0.019)		
Net foreign assets * output gap (L)	-	-	-	-	0.119	-0.311
					(0.112)	(0.245)
Net foreign assets * positive output gap (L)	-	-	-	-	-	1.083***
						(0.265)
Net foreign assets below -60% (L)	-0.001	0.001	0.010	0.010	0.011	0.008
	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)
Real effective trade weighted exchange rate (L)	-0.008	-0.002	-0.004	-0.004	-0.003	-0.002
	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Financial centre	0.004	-0.003	0.001	0.002	0.002	-0.001
	(0.008)	(0.010)	(0.010)	(0.010)	(0.010)	(0.011)
Relative TFP (L)	-0.014	0.017*	0.017**	0.018**	0.018**	0.018**
	(0.008)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Relative TFP * K openness (L)	0.035***	0.044***	0.043***	0.043***	0.043***	0.046***
	(0.011)	(0.011)	(0.010)	(0.010)	(0.010)	(0.010)
Relative energy balance (oil exporters)	1.056***	1.136***	1.122***	1.108***	1.119***	1.145***
	(0.091)	(0.124)	(0.129)	(0.130)	(0.129)	(0.127)
Relative dependency ratio	-0.267	-0.166***	-0.196***	-0.205***	-0.195***	-0.193***
	(0.054)	(0.055)	(0.055)	(0.053)	(0.054)	(0.054)
Relative population growth	-0.116	-0.614***	-0.643***	-0.659***	-0.631***	-0.637***
	(0.223)	(0.236)	(0.234)	(0.235)	(0.234)	(0.229)
Relative output growth (L)	-0.233***	-0.279***	-0.279***	-0.277***	-0.279***	-0.267***
	(0.027)	(0.029)	(0.029)	(0.029)	(0.029)	(0.028)
Relative pension to GDP ratio (L)	0.239	0.017	-0.011	-0.001	-0.022	-0.006
	(0.059)	(0.067)	(0.066)	(0.007)	(0.066)	(0.065)
Own country share in world reserves	-0.010	-0.003	-0.007	-0.005	-0.006	-0.010
	(0.017)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)
Relative output gap (I)	-0.139***	-0.136***	-0.136***	-0.133***	-0.104**	-0.087*
	(0.048)	(0.048)	(0.048)	(0.048)	(0.051)	(0.050)
Commodity ToTgap * trade openness	0.199***	0.178***	0.182***	0.183***	0.182***	0.164***
	(0.039)	(0.040)	(0.040)	(0.040)	(0.040)	(0.040)
Relative structural public balance (I)	0.660***	1.027***	1.020***	1.020***	1.018***	0.987***
	(0.108)	(0.139)	(0.138)	(0.138)	(0.139)	(0.135)
Relative institutional strength	0.022***	0.023***	0.021***	0.020***	0.021***	0.021***
	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Obs.	1228	1228	1228	1228	1228	1228
Country fixed effects	No	Yes	Yes	Yes	Yes	Yes
R^2	0.4006	0.7353	0.7446	0.7454	0.7470	0.7500

Between brackets: standard deviation; L: lagged variable; D: first differences; I: Instrumented; *, **, *** p-value below 10%, 5% and 1%, respectively.

Table 4.3. Investment income balance regressions

	Basic spec.	Country fixed effs.	Diff. btw. cred. & deb.	Valuation effects	Portf. rebal.	Portf. rebal. in exp. & rec.
Cnte.	-0.014*** (0.004)	-0.007** (0.003)	-0.007** (0.003)	-0.005 (0.003)	-0.007** (0.003)	-0.007 (0.003)
Net foreign assets (L)	0.039*** (0.004)	0.027*** (0.003)	0.029*** (0.003)	-	0.027*** (0.003)	0.026*** (0.003)
Weight of equity instr. in ext. assets (L)	0.009* (0.006)	0.011* (0.007)	0.012* (0.007)	0.009 (0.007)	0.011 (0.007)	0.011 (0.007)
Net foreign assets creditor counties (L)	-	-	-0.007 (0.009)	-	-	-
Net foreign assets. CA accumulation (L)	-	-	-	0.032*** (0.003)	-	-
Net foreign assets. Valuation effects (L)	-	-	-	0.021*** (0.005)	-	-
Net foreign assets * output gap (L)	-	-	-	-	-0.104 (0.087)	-0.137 (0.116)
Net foreign assets * positive output gap (L)	-	-	-	-	-	0.080 (0.171)
Nom. eff. FX financial weights asset side (LD)	0.009* (0.006)	0.004 (0.005)	0.005 (0.004)	0.005 (0.005)	0.004 (0.005)	0.004 (0.005)
Nom. eff. FX financial weights liabilities side (LD)	-0.014** (0.007)	-0.010 (0.007)	-0.011 (0.007)	-0.011 (0.007)	-0.010 (0.007)	-0.010 (0.007)
Relative financial depth	0.015*** (0.003)	0.002 (0.005)	0.003 (0.005)	0.003 (0.005)	0.003 (0.005)	0.003 (0.005)
Relative TFP (L)	-0.013*** (0.003)	-0.007** (0.003)	-0.007** (0.003)	-0.009*** (0.003)	-0.008** (0.003)	-0.008** (0.003)
Relative TFP * K openness (L)	0.026*** (0.006)	-0.003 (0.006)	-0.003 (0.006)	-0.006 (0.006)	-0.003 (0.006)	-0.003 (0.006)
Relative health exp. to GDP ratio (L)	0.090 (0.082)	0.325*** (0.087)	0.340*** (0.088)	0.332*** (0.086)	0.316*** (0.086)	0.320*** (0.087)
Relative output gap (I)	-0.059* (0.031)	-0.070*** (0.027)	-0.072*** (0.027)	-0.071*** (0.027)	-0.105*** (0.038)	-0.104*** (0.039)
Relative credit to GDP ratio (I)	-0.007* (0.004)	-0.011** (0.005)	-0.011** (0.005)	-0.011** (0.005)	-0.012** (0.005)	-0.011** (0.005)
Obs.	1164	1164	1164	1164	1164	1164
Country fixed effects	No	Yes	Yes	Yes	Yes	Yes
R^2	0.4656	0.8305	0.8308	0.8325	0.8311	0.8311

Between brackets: standard deviation; L: lagged variable; D: first differences; I: Instrumented; *, **, *** p-value below 10%, 5% and 1%, respectively.

Table 4.4. Residual balance regressions

	Basic spec.	Country fixed effs.	Diff. btw. cred. & deb.	Valuation effects	Portf. rebal.	Portf. rebal. in exp. & rec.
Cnte.	0.010***	0.018***	0.018***	0.015***	0.018***	0.017***
	(0.001)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Net foreign assets (L)	-0.011***	-0.007***	-0.007***	-	-0.007***	-0.009***
	(0.002)	(0.002)	(0.003)		(0.002)	(0.002)
Net foreign assets creditor counties (L)	-	-	-0.001	-	-	-
			(0.004)			
Net foreign assets. CA accumulation (L)	-	-	-	-0.016***	-	-
				(0.003)		
Net foreign assets. Valuation effects (L)	-	-	-	0.003	-	-
				(0.002)		
Net foreign assets * output gap (L)	-	-	-	-	0.054	-0.044
					(0.045)	(0.065)
Net foreign assets * positive output gap (L)	-	-	-	-	-	0.248**
						(0.0108)
Real effective trade weighted exchange rate (L)	-0.006*	-0.009***	-0.009***	-0.010***	-0.009***	-0.009***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Financial centre	-0.010***	-0.002	-0.002	-0.004*	-0.002	-0.002
	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)
Relative TFP (L)	0.007**	0.006**	0.006**	0.007**	0.006**	0.006**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Relative TFP * K openness (L)	-0.022***	-0.016***	-0.016***	-0.012***	-0.016***	-0.015***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Relative energy balance (oil exporters)	-0.052***	-0.024*	-0.024*	-0.027*	-0.023	-0.025*
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Relative pensions to GDP ratio (L)	-0.084***	-0.089***	-0.088***	-0.109***	-0.092***	0.089***
	(0.021)	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)
Relative financial depth (L)	-0.012***	-0.019***	-0.018***	-0.019***	-0.019***	-0.018***
	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Relative output growth (L)	-0.021**	-0.016**	-0.016*	-0.016*	-0.016	-0.014
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
VIX*own country share in world reserves (L)	-0.001	-0.001*	-0.001*	-0.001	-0.001*	-0.001**
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Relative Gini index (L)	0.006	0.037**	0.037**	0.024*	0.035**	0.035**
	(0.014)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Relative output gap (I)	-0.041**	-0.045**	-0.045**	-0.047***	-0.030	-0.025
	(0.019)	(0.018)	(0.018)	(0.018)	(0.019)	(0.019)
Obs.	1228	1228	1228	1228	1228	1228
Country fixed effects	No	Yes	Yes	Yes	Yes	Yes
R^2	0.3833	0.7854	0.7854	0.7989	0.7868	0.7880

Between brackets: standard deviation; L: lagged variable; D: first differences; I: Instrumented; *, **, *** p-value below 10%, 5% and 1%, respectively.

Appendix 5. Detailed Real Effective Exchange Rate regressions

Table 5.1. Real Effective Exchange Rate regressions

	Basic spec.	Diff. btw cred. & deb.	1999- Euro Zone break	Euro Zone member dummy
Cons.	-0.825*** (0.224)	-0.927*** (0.217)	-0.901*** (0.215)	-0.928*** (0.215)
Net foreign assets (L)	0.108*** (0.029)	-0.065** (0.032)	0.113 (0.076)	0.028 (0.045)
Net foreign assets creditor countries (L)	-	0.414*** (0.056)	0.407*** (0.107)	0.323*** (0.069)
NFA*postEZdummy (L)	-	-	-0.176** (0.076)	-
NFA creditors * postEZdummy (L)	-	-	-0.006 (0.097)	-
NFA 99EuroMember * postEZdummy (L)	-	-	-0.016 (0.046)	-
NFA 99EuroMember creditor * postEZdummy (L)	-	-	-0.285*** (0.094)	-
NFA *EuroMember (L)	-	-	-	-0.161*** (0.047)
NFA creditors* EuroMember (L)	-	-	-	-0.123 (0.099)
Relative GDP at PPP (L)	0.11*** (0.022)	0.136*** (0.021)	0.136*** (0.020)	0.143*** (0.020)
VIX * capital openness (L)	0.0003 (0.002)	0.0001 (0.002)	-0.0006 (0.002)	0.0003 (0.002)
VIX* capital openness*own country share in world reserves (L)	0.0006 (0.008)	0.0017 (0.007)	0.004 (0.007)	0.001 (0.006)
Own country share in world reserves	0.11 (0.081)	0.119 (0.077)	0.134 (0.082)	0.056 (0.076)
Relative trade openness (L)	-0.006 (0.076)	-0.039 (0.074)	0.016 (0.080)	0.015 (0.080)
Rel. expected growth	5.39*** (1.193)	5.817*** (0.112)	5.884*** (1.141)	5.664*** (1.140)
Relative population growth	9.66*** (1.45)	9.807*** (1.415)	10.723*** (1.446)	9.949*** (1.410)
Relative aging	0.332 (0.256)	0.498** (0.245)	0.477** (0.240)	0.428* (0.246)
Relative dependency ratio	0.436* (0.249)	0.42* (0.251)	0.491* (0.261)	0.487* (0.261)
Rel. institutional risk	0.151*** (0.031)	0.136*** (0.029)	0.136*** (0.030)	0.139*** (0.029)
Rel. K stock per employee	0.745*** (0.030)	0.736*** (0.069)	0.705*** (0.068)	0.723*** (0.069)
Rel. VAT as % of GDP	0.027*** (0.070)	0.033*** (0.069)	0.033*** (0.006)	0.034*** (0.006)
Commodity TOT	0.393*** (0.110)	0.415*** (0.107)	0.405*** (0.106)	0.425*** (0.107)
Share of administered prices	-2.131*** (0.343)	-2.333*** (0.304)	-2.340*** (0.289)	-2.133*** (0.331)
Rel. Gini index	-0.763** (0.343)	-0.899*** (0.33)	-0.864** (0.334)	-0.861*** (0.329)
Rel. pensions (L)	1.297*** (0.352)	1.243*** (0.345)	1.499*** (0.369)	1.269*** (0.358)
Rel. output gap (I)	4.716*** (0.919)	4.506*** (0.888)	4.331*** (0.887)	4.610*** (0.355)
Obs.	977	977	977	977
Country fixed effects	No	No	No	No
R²	0.8277	0.8434	0.8496	0.8488

Between brackets: standard deviation; L: lagged variable; I: Instrumented; *, **, *** p-value below 10%, 5% and 1%, respectively. Relative aggregates are expressed with respect to trade partners. Relative GDP at PPP is expressed with respect to the average of the three frontier countries (US, Japan and Germany).

Table 5.2. Real Effective Exchange Rate regressions, fixed effects

	Basic spec.	Diff. btw cred. & deb.	1999- Euro Zone break	Euro Zone member dummy
Cons.	-1.551*** (0.153)	-1.527*** (0.156)	-1.432*** (.159)	-1.591*** (.155)
Net foreign assets (L)	-0.161*** (0.029)	-0.176*** (0.038)	-.061 (.071)	-.312*** (.0436)
Net foreign assets creditor countries (L)	-	0.055 (0.071)	-.194 (.136)	.172** (.084)
NFA*postEZdummy (L)	-	-	-.214*** (.061)	-
NFA creditors * postEZdummy (L)	-	-	.304*** (.084)	-
NFA 99EuroMember * postEZdummy (L)	-	-	.222*** (.061)	-
NFA 99EuroMember creditor * postEZdummy (L)	-	-	-.061 (.116)	-
NFA *EuroMember (L)	-	-	-	.231*** (.048)
NFA creditors* EuroMember (L)	-	-	-	-0.123 (.114)
Relative GDP at PPP (L)	0.459** (0.181)	0.475** (0.187)	.269 (.203)	.520*** (.185)
VIX * capital openness (L)	-0.0008 (0.001)	-0.0008 (0.001)	-.001* (.001)	-.001 (.001)
VIX* capital openness*own country share in world reserves (L)	0.001 (0.004)	0.001 (0.004)	.005 (.004)	-.000 (.003)
Own country share in world reserves	0.261*** (0.063)	0.241*** (0.070)	.261*** (.079)	.466*** (.084)
Relative trade openness (L)	-0.278 (0.183)	-0.281 (0.182)	-.350** (.163)	-.306* (.176)
Rel. expected growth	3.754*** (0.949)	3.775*** (0.947)	3.584*** (.853)	3.418*** (.896)
Relative population growth	3.929*** (1.486)	3.962*** (1.485)	3.914** (1.535)	3.023** (1.336)
Relative aging	-0.548* (0.313)	-0.509 (0.318)	-.340 (.285)	-.467 (.296)
Relative dependency ratio	-0.893** (0.383)	-0.859** (0.398)	-.865** (.377)	-.955** (.380)
Rel. institutional risk	0.278*** (0.056)	0.274*** (0.057)	.216*** (.055)	.243*** (.058)
Rel. K stock per employee	0.537*** (0.162)	0.506*** (0.179)	.650*** (.189)	-.312*** (.043)
Rel. VAT as % of GDP	0.002 (0.011)	0.002 (0.011)	-.000 (.011)	.004 (.011)
Commodity TOT	0.652*** (0.067)	0.638*** (0.070)	.615*** (.072)	.669*** (.070)
Share of administered prices	-0.221 (0.841)	-0.197 (0.840)	-.315 (.635)	-.048 (.803)
Rel. Gini index	0.112 (0.394)	0.097 (0.400)	.076 (.403)	.053 (.388)
Rel. pensions (L)	1.452*** (0.414)	1.421*** (0.423)	1.461*** (.446)	1.492*** (.418)
Rel. output gap (I)	0.658 (0.405)	0.654 (0.407)	.655* (.381)	.559 (.411)
Obs.	977	977	977	977
Country fixed effects	Yes	Yes	Yes	Yes
R²	0.9396	0.9397	0.9446	0.9427

Between brackets: standard deviation; L: lagged variable; I: Instrumented; *,**,*** p-value below 10%, 5% and 1%, respectively. Relative aggregates are expressed with respect to trade partners. Relative GDP at PPP is expressed with respect to the average of the three frontier countries (US, Japan and Germany).

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