

# Revisiting the Current Account: Insights from Sectoral Balances

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## Abstract

Current account imbalances play a key role in shaping current macroeconomic debates in advanced economies. This paper seeks to shed new light on these imbalances and their subsequent adjustment by analyzing their domestic counterpart in the national accounts: the net financial balances of the household, government, corporate, and banking sector. We re-examine through this lens: (i) the standard medium-term covariates of the current account balance, (ii) its adjustment in the aftermath of the global financial crisis, (iii) and episodes of persistent external imbalances. Our results challenge the widespread view that the household sector plays a central role in current account patterns. In fact, we find that corporates (and to a lesser extent the public sector) account for a large share of the dynamics of the current account balance. In our analysis of external adjustment, our results are consistent with an expenditure reduction channel operating primarily through improvements in the corporate net balance. Our findings provide guidance for the inclusion of domestic sectoral balances in future theoretical and empirical analysis of global imbalances.

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# 1 Introduction

In the past few decades, financial globalization has led to a well-documented widening of current account balances. Despite a large and costly contraction of global imbalances in the aftermath of the global financial crisis, significant current account deficits and surpluses persist, particularly in advanced economies.<sup>1</sup> Much less discussed, however, is the domestic counterpart of these imbalances, the net financial balances of households (HH), governments (GOV), non-financial corporations (NFC), and financial corporations (FC).

Consider a country that is running a current account deficit (that is, with a level of domestic spending that exceeds domestic output, or alternatively a level of investment that exceeds saving). Accordingly, this country is a net borrower from the rest of the world, which entails well-known risks (Blanchard, 2007). The domestic counterpart of this deficit is reflected in the net financial balance of the main domestic sectors (that is, income minus expenditures of that sector, or alternatively investment that exceeds saving of that sector). Typically, one would expect the corporate sector to run a net financial deficit, i.e to borrow in order to fund investment, and the household sector to run a net financial surplus, i.e to be a net saver, with banks intermediating the funds. However, in the past few decades the corporate sector has tended to run puzzling net financial surpluses in some countries (see for instance Chen et al. 2017), contributing significantly to current account dynamics. Overall, the sum of the net financial balances of the domestic sectors add up to the current account balance of the whole economy.<sup>2</sup>

Although in advanced economies most direct cross-border financial transactions are undertaken by banks or sovereigns (Avdjiev et al., 2017), understanding which sectors of the economy are the ultimate counterpart of this borrowing is key, irrespective of the intermediation process (Lane, 2015).<sup>3</sup> Documenting the contribution of domestic sectoral balances to the current account and the covariation patterns between these variables is an important first step in assessing these vulnerabilities. However, remarkably little is known of the domestic counterpart of global imbalances and the distribution of these imbalances across sectors.<sup>4,5</sup> The main contribution of this paper is to bridge this gap in order to sharpen our understanding of the drivers and the adjustment process of

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<sup>1</sup>See Menzie D. Chinn's recent Jackson Hole speech, August 2017.

<sup>2</sup>The net transactions between domestic sectors cancel out at the aggregate level, giving us the net resource flow with the rest of the world (see conceptual framework section for further details).

<sup>3</sup>Granted the identity of the sector undertaking the cross-border transaction has importance, however, the household sector can ultimately borrow from the rest of the world either directly through cross-border transactions or indirectly through the banking sector for instance.

<sup>4</sup>At the policy level, the G20 data gaps initiative in 2009 identified strengthening the availability of sectoral balance sheets (recommendation R15) as key to addressing the gaps in data revealed by the global financial crisis.

<sup>5</sup>Nonetheless, the prevailing narrative attributes current account deficits in the run-up to the Eurozone crisis to excesses of the private sector in Spain and Ireland and in the public sector in Greece or Portugal, see for instance Baldwin and Giavazzi (2015).

external imbalances in advanced economies. Building on sectoral balance sheets and transactions data over the 1995-2015 period, this study will pursue four broad lines of analysis: (i) document the patterns of the contribution of each sector to external imbalances; (ii) offer a new take on the standard medium-term covariates of external imbalances by looking at their association with domestic sectoral balances; (iii) shed new light on the severity of the post-crisis adjustment process using sectoral balances; and (iv) study the sectoral implications of persistent capital inflow and outflow episodes.

A better understanding of the domestic implications of cross-border financial flows is essential for macroeconomic and financial stability. A large literature has studied the relationship between current account balances and a set of economic fundamentals, with the idea in mind that balanced current accounts were not the correct benchmark for external sustainability. Indeed, current account deficits can be consistent with underlying economic fundamentals, such as demographics or levels of development. Understanding how these covariation patterns are reflected in the medium-term fluctuations of sectoral balances is potentially informative. Additionally, prior to the crisis current account imbalances often exceeded levels consistent with these fundamentals, contributing to the severity of the post-crisis adjustment (Lane and Milesi-Ferretti, 2012). Up until now, it was not known how these findings carried through to the sectoral level. We look at the contribution of each sector balance to the closing of excessive imbalances. Overall, the risks associated with excessive imbalances make it imperative to better understand their source.<sup>6</sup> Interestingly, a glance at the data shows the net balances of the GOV sector and NFC sector strongly co-move with the current account, whereas no such pattern emerges for the HH sector and FC sectors.<sup>7</sup>

Our analysis yields three important findings: (i) net financial surpluses in the NFC sector explain a large share of the difference between current account deficit and surplus countries; (ii) current account fundamentals play a surprisingly limited role in explaining the net HH financial balance, whereas they explain a large share of the variation of the NFC and GOV sectors' net financial balances; and (iii) there is a strong relationship between the pre-crisis balances of the NFC sector and the GOV sector and the adjustment of the current account since the 2008 crisis. This result is consistent with an expenditure reduction narrative of external adjustment, with the key role of the improvement of corporate net balances (that is, an increase in corporate saving

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<sup>6</sup>Indeed, large and persistent external deficits can lead to the creation or amplification of domestic distortions, upward pressure on asset markets, fiscal and banking volatility but also to potential sudden stops in net flows and debt rollover problems (Lane, 2015). Large current account surpluses can also be problematic at a global level, as they have to be matched by a corresponding deficit, and at a domestic level, as they can reflect structural distortions (IMF, 2017).

<sup>7</sup>However, it is important to bear in mind that a large portion of the household sector's net worth is in the form of non-financial assets not present in their financial net balance (mainly real-estate holdings). Allen (2017) shows that household's housing assets and capital gains have a strong negative association with changes in the external position, and particularly with the net international debt position.

or a reduction of investment) as opposed to a reduction of consumption by the household sector. Nevertheless, one could ask if these results are relevant if households ultimately own the corporate sector. We would argue in the affirmative, as in the data the household sector does not completely offset changes in the net balance of the NFC sector, pointing to distortions or the presence of a "corporate veil" (Poterba, 1987). Moreover, due to the large increase in cross-border holdings of the past few decades, an increasing share of the corporate sector is owned by foreign shareholders as opposed to domestic households.<sup>8</sup> Thus these findings can provide guidance for future empirical and theoretical research in international macroeconomics, that has previously somewhat neglected the role of sectoral balances and the corporate sector in particular.

Our contribution is linked to the ever-expanding literature on the patterns of international balance sheets and capital flows. Recent papers have highlighted aggregate patterns of cross-border capital flows are not always indicative of underlying cross-border sectoral relationships, see Alfaro et al. (2014), Galstyan et al. (2016) and Avdjiev et al. (2017) for instance. However, in line with Lane (2015), we stress the importance of looking at the domestic sectoral balance sheets and external balance sheets in an integrated manner. We build on the large literature explaining medium-term current account dynamics with a set of macroeconomic fundamentals, see Chinn and Prasad (2003), Chinn and Ito (2007), Lane and Milesi-Ferretti (2012), and Phillips et al. (2013).<sup>9</sup> We also build on Lane and Milesi-Ferretti (2012, 2015) in studying the adjustment process of the current account since the crisis. Additionally, given the importance of the corporate sector in our results, this research is related to the literature on the corporate saving glut and the presence of a "corporate veil", see Poterba (1987), Gruber and Kamin (2016) and Chen et al. (2017) amongst others.<sup>10</sup> Finally, this paper is also related to Mian et al. (2017) who find a central role for the household debt in predicting future trade balances.

This paper has many potential policy implications, as a better surveillance of external balances and positions is a key part of prudent policymaking (Obstfeld, 2012). It can help identify imbalances and monitor potential vulnerabilities, a need that has been recognised by policymakers and regulators since the crisis, with the establishment of the Macroeconomic Imbalance Procedure (MIP) for instance.<sup>11</sup> The rest of this paper is structured in the following manner. First, we present the conceptual framework and review national accounts identities. Then, we shed light on the

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<sup>8</sup>Future extensions will study the increasing share of foreign ownership of the domestic corporate sector.

<sup>9</sup>As the object of this paper is not to establish new drivers of the current account, but to study their relationship with the domestic sectoral counterpart of the current account, our regressions resemble the ones of the papers cited above.

<sup>10</sup>Our work is linked to the literature on sectoral accounts, see Castren and Kavonius (2009), Behringer and van Treeck (2015) and Carvalho (2015). In Particular, Behringer and van Treeck (2015) study the link between sectoral balances and the current account through the lens of a rise in inequality.

<sup>11</sup>Put in place in 2011, the MIP identifies emerging macroeconomic imbalances in EU countries based on 14 main indicators, 6 of these can be derived from the sectoral financial accounts.

broad stylised facts and correlation patterns between sectors. In section 4, we present the empirical analysis of medium-term determinants of the current account. Next, we examine the international adjustment since the crisis, and finally, we perform an event study investigating the contribution of sectoral balances to external episodes. Section 7 offers some conclusions and possible extensions.

## 2 Conceptual Framework

Let's begin by taking a look at the basic concepts that will be used throughout this paper. Traditionally, the current account is decomposed into either the difference between exports and imports (and net foreign income) or the difference between saving and investment (e.g. Chinn and Prasad 2003). However, in recent years there has been an increase in the availability of sectoral balance sheet data in most advanced economies, allowing us to break down the current account balance into the sum of the net financial balances of the household sector, the government, non-financial corporations, and the financial sector.<sup>12</sup> As the net cross-sectoral transactions of the domestic sectors cancel out in the aggregate, we have the following identity:

$$CA_{it} = NFB_{it}^{HH} + NFB_{it}^{GOVT} + NFB_{it}^{NFC} + NFB_{it}^{FC} \quad (1)$$

with the current account balance denoted  $CA_{it}$  and  $NFB_{it}^s$  is the net financial balance of sector (s) (HH: Households, GOV: Government, NFC: Non-Financial Corporations, FC: Financial Corporations). Improvements in the net financial balance of one sector will improve the current account balance, everything else equal.

Just like the current account at the aggregate level, the financial balance of each sector is equal to income minus total expenditures of that sector. In addition, the net financial balance of a sector can be derived as saving less investment or calculated as the difference between the net acquisition of financial assets and net incurrence of financial liabilities. Moreover, a financial surplus (a net lending or saver balance) indicates the sector is a net acquirer of financial assets, whereas a deficit (a net borrowing balance) indicates the sector is running down its financial assets (or increasing its borrowing) to fund its spending.

Additionally, national accounts identities allow us to decompose the change between the net

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<sup>12</sup>There exists discrepancies between the current account and the net international investment position (NIIP) derived from the Balance of Payments (BOP/IIP) and the net financial balance and position of the rest of the world accounts from the sector accounts. However, they are conceptually equivalent, see Appendix A on the consistency between the two statistics. We use the current account balance and the NIIP as they suffer from less mis-measurement. Our findings are robust to using the rest of the world balance.

international investment position (NIIP) between  $t$  and  $t - 1$  in the following manner:<sup>13</sup>

$$NIIP_t - NIIP_{t-1} = CA_t + SFA_t \quad (2)$$

where  $SFA_t$  is the Stock Flow Adjustment term, used as a proxy for revaluation changes.<sup>14</sup>

In turn, this allows us to decompose both the net international investment position and the stock flow adjustment across domestic counterparts:

$$NIIP_{it} = NFP_{it}^{HH} + NFP_{it}^{GOVT} + NFP_{it}^{NFC} + NFP_{it}^{FC} \quad (3)$$

$$SFA_{it}^{NIIP} = SFA_{it}^{HH} + SFA_{it}^{GOV} + SFA_{it}^{NFC} + SFA_{it}^{FC} \quad (4)$$

with  $NFP_{it}$  is the Net Financial Position of each domestic sector (s) of the economy.

These decompositions will allow us to subsequently study the contributions of each sectoral balance to the current account, the covariation patterns between the standard set of fundamentals of the current account and sectoral balance, the international adjustment process since the crisis and finally the patterns of sectoral balances during episodes of current account imbalances.<sup>15</sup> However, there are other ways one could assess current account balances through sectoral balances. For instance, one could explain each balance with a set of fundamentals specific to each sector, see for instance IMF (2017). However, given our ultimate focus on deepening our understanding of the current account, the limited data availability for sectoral balances and our desire to easily compare our results to the literature, we will limit our scope to the standard set of covariates of the current account in this paper.

### 3 Sectoral Balances and Global Imbalances

This section describes the contribution of sectoral balances to the current account balance (the flow side) and of sectoral positions to the net international investment position (NIIP) (the stock side) from 1995 to 2015.<sup>16</sup> In addition to looking at our full sample of countries, we also split the

<sup>13</sup>We have  $FA_t = -(CA_t + KA_t + EO_t)$ .  $FA_t$  is the financial account balance,  $KA_t$  pertains to the capital account balance and  $EO_t$  is the net errors and omissions. For simplicity, we assume  $KA_t$  and  $EO_t$  are equal to 0.

<sup>14</sup>The Stock Flow Adjustment term is composed of a valuation term, the net capital gain on the existing holdings of foreign assets and liabilities, and a term capturing net other non-flow changes to the net international investment position (for example, due to changes in reporting methods and data revisions). See Curcucu et al. (2009) for further discussion on the importance of the net other statistical term.

<sup>15</sup>It is important to note that the aggregate results on the current account might not necessarily be identifiable at the sectoral level as these sectors covary between themselves.

<sup>16</sup>We use annual non-consolidated Financial accounts compiled by Eurostat and the OECD. These accounts are based on ESA 2010 methodology adopted in May 2013 and an application of the updated United Nation's System of National Accounts (SNA 2008) guidelines of 2008.

sample between current account deficit and surplus countries.<sup>17</sup> Finally, we shed light on the how each sectors' net transactions and holdings are associated with the current account and the NIIP respectively.

### 3.1 Sectoral Contribution to the Current Account Balance

Using the national account decomposition described above, Figure 1 shows the contribution of each sector to the current account balance in our full sample of countries (a), current account deficit (b), and surplus (c) countries.<sup>18</sup> A number of general features stand out from these figures.

First, we see that external imbalances have shrunk in the aftermath the crisis, as the overall current account of our sample is roughly balanced since 2008. However the size of the sectoral balance counterparts mirroring the current account has expanded since then (varying from a window of around +5 to -5 percent of GDP to +10 to -10 percent of GDP after 2008). The GOV sector is responsible for a large portion of the net domestic deficits for the whole sample (with net borrowing balances from under 1 percent to over 8 percent of GDP). The HH sector's net lending balance accounted for a large portion of the net surplus in the late 1990s and from 2008 onwards, with decreases in the early 2000s culminating in a net borrowing balance in 2006. The net balance of the corporate sector has been more volatile, alternating between net borrowing and lending balances in the 1990s and 2000s with a large negative adjustment in 2008. Finally, the FC has consistently been a relatively small net lender throughout the period, reflecting its intermediation role.

Nonetheless, Figures 1 (b) and (c) show these aggregate patterns hide considerable heterogeneity between current account deficit and surplus countries.<sup>19</sup> In the build-up to the global financial crisis, the absolute size of the net lending and borrowing balances were larger in current account surplus countries than in current account deficit countries. However, since then, this trend has reversed with a notable expansion of the net lending balance of the HH sector and net borrowing balance of the GOV sector in deficit countries.

Additionally, the net lending/borrowing patterns for NFC sector and the HH sector have striking differences in current account deficit or surplus countries. In current account surplus countries, these sectors have consistently had net lending balances throughout the period (with a few exceptions for

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<sup>17</sup>Countries are split into surplus or deficit countries based on their current account balance in 2007, the eve of the global financial crisis, following IMF (2017). We also cumulate current account balances from 1995 to 2007 and find the same country split. Surplus countries are France, Belgium, Sweden, Netherlands, Canada, Denmark, Norway, Germany, Finland, Austria, Japan. Deficit countries are Portugal, Cyprus, the United Kingdom, Lithuania, Spain, Greece, Czech Republic, Hungary, the United States, Slovak Republic, Italy, Estonia. This is a reduced sample in order to only take into account countries with data from 1995 to 2015.

<sup>18</sup>Dropping the most extreme cases, like Norway for instance, does not significantly alter the figures.

<sup>19</sup>Current account imbalances have shrunk in deficit countries and surplus countries (at least up until 2013). However, significant surpluses remain in countries like Germany or Japan, whereas large deficits persist in the United States and the United Kingdom for instance.

the NFC sector). This is relatively surprising given the typical presumption that the NFC sector is a net borrower. However, in deficit countries, the NFC and HH sectors' balances have been considerably more volatile. The NFC sector was a net borrower through most of the period and the household sector alternated small net lending and borrowing balances from 1999 to 2007. Since the crisis, the household sector has become a large net saver, in line with a deleveraging process, whereas the NFC sector has continued to alternate positive and negative balances. Moreover, the reversal of the NFC sector in 2008 was a lot larger in deficit countries than in surplus countries, leading to a 5 percent net borrowing balance in deficit countries and a mere 1 percent of GDP in surplus countries. In relation to the public sector, surplus countries had larger net deficits from 1995 to the beginning of the 2000s, when deficit countries began to run larger deficits, in particular since 2008.<sup>20</sup>

To summarize, even though current account imbalances have shrunk since the crisis, domestic imbalances have expanded. Moreover, there are systematic differences between the domestic counterpart of current account surpluses and deficits, mostly due to net lending balances in the NFC sector in surplus countries and net borrowing balances of the GOV sector in deficit countries since the global financial crisis.

### 3.2 Sectoral Contribution to the Net International Investment Position

In relation to the domestic counterpart of the net international investment position, depicted in Figure 2, the overall trends are more stable. Structurally the NFC sector tends to have large negative positions, households large positive positions, governments relatively smaller negative positions and financial corporations approximately balanced positions. Since 2010, domestic sectoral positions have been relatively stable, with improvements in the HH position not large enough to offset the deteriorations in the GOV and NFC sector, leading to an overall deterioration of the net international investment position in our sample (by over 10 percentage points). Figures 2 (b) and (c) show that this trend hides considerable heterogeneity between current account surplus countries and deficit countries, with the net external position reaching approximately 55 percent of GDP in surplus countries and -40 percent of GDP in deficit countries in 2015.

Table 1 shows that current account deficit countries have systematically larger HH surplus positions and more negative NFC and FC deficit positions, with this pattern accentuating over time. Interestingly, it is only since the global financial crisis that deficit countries also have more

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<sup>20</sup>In addition, if we look at the aggregate contribution of the private sector (HH, NFC, and FC) and the public sector in deficit and surplus countries, up until 2001, the net borrowing of the public sector was larger in current account surplus countries, but since the crisis in 2008, deficit countries have run larger public net borrowing balances. The private sector in deficit countries has alternated between net saver and borrow up until the crisis, whereas in surplus countries, it has been a significant net saver during the whole period.



negative net GOV positions, with similar positions in 2002 and 2007. We see that during the 2002-2007 period, the net position of the NFC sector deteriorated in our sample in both deficit and surplus countries (by 23.6 percentage points). However, from 2007 onwards, the net position improves in surplus countries (by 10 percentage points) and deteriorates in deficit countries (by 10 percentage points). Moving to the GOV sector, its net position rose between 2002 and 2007, only deteriorating slightly in deficit countries. However, it decreased by 32 percentage points from 2007 onwards, due to a large deterioration of its net position in deficit countries (it worsened by 46 percentage points in deficit countries and improved by 8 percentage points in surplus countries). Households' net position improved by 18 percentage points between 2002 and 2007 and 46 percentage points since 2007, due to a large accumulation of net assets in deficit countries (over 80 percentage points over the 2002-2015 period compared to a modest improvement of under 3 percentage points in surplus countries). Finally, the FC net position has improved by around 4 percentage points in both periods, with larger increases in deficit countries over the 2002-2007 period and in surplus countries post 2007.

If we decompose the change in stock positions between flows (i.e. cumulated net balances) and stock-flow adjustments (i.e. valuation gains or losses), Figure 3 shows different patterns across time periods (the boom phase 2001-2007, the crisis 2008-2009, and the post-crisis 2010-2015) and type of country.<sup>21</sup>

During the boom period, large net SFA gains account for most of the improvement in the household sector's net position (71 percent of the total 75.7 percentage point change) due to the general increase in asset prices. These gains were largely mirrored in losses in the non-financial corporate sector. The deterioration of the net position of the government sector during this period was mostly due to flow adjustments both in external surplus and deficit countries (18 and 11 percent of GDP respectively). The financial sector's small positive net position is driven by positive flows counteracted by negative stock-flow adjustments in both types of countries. We also note that deficit countries had positive stock-flow adjustments of the net international investment position (i.e valuation gains), whilst surplus countries had negative adjustments (i.e. valuation losses).

The global financial crisis reversed some of the SFA gains on the household sector side, with large positive adjustments in the non-financial corporate sector, mostly in deficit countries. The financial sector in deficit countries also had positive SFA gains of 7 percent of GDP. In the public sector, there were large negative changes in the net position of both surplus and deficit countries, with large negative flow adjustments of 5 percent of GDP in surplus countries and 18 percent in deficit countries.<sup>22</sup>

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<sup>21</sup>We use the decomposition explained in section 2, equation 2.

<sup>22</sup>The global financial crisis is defined as the 2008-2009 period, thus most of the subsequent sovereign debt crisis is not captured.

From 2010 onwards, most of the recovery in household balance sheets took place in deficit countries, the net position improved by over 95 percentage points in deficit countries and by 15 percentage points in surplus countries. However, the deterioration of the government balance sheet continued with large negative cumulative flows in both surplus and deficit countries (even if in surplus countries positive stock-flow adjustments more than compensate for the deterioration of the net lending balance).

In sum, even as net external flow imbalances have shrunk, net international position imbalances have expanded. The domestic counterpart of this expansion has been largely reflected in a deterioration of the NFC sector balance in all countries prior to 2008, and since then in a deterioration of the net position of the GOV and NFC sector in deficit countries. The balance sheet of the HH sector has recovered significantly in deficit countries (largely due to valuation gains), but not enough to stop a deterioration of the external position.

### 3.3 Correlation Patterns Between Domestic and External Imbalances

How do domestic financial balances correlate with the current account? Figure 4 shows there is a strong systematic positive relationship between the cumulated current account balance and the cumulated net financial balance of the NFC sector and the GOV sector. Indeed, larger cumulative net lending balances of the NFC and GOV sector tend to go hand in hand with larger current account surpluses. Surprisingly, we can also note that there exists no such correlation pattern in relation to the FC and HH sectors.

Furthermore, these patterns are confirmed when we look at the annual covariation matrix sectoral net flows and the current account (see Table B1 for the complete matrix). We see that the NFC and GOV sectors' net positions are most strongly linked with the current account with (unconditional) correlation coefficients of over 0.5. Looking at the HH sector, we see a relatively strong positive correlation with the rest of the world in terms of stock positions, but it becomes weaker in terms of the flow adjustments, and even negative when we look the stock-flow adjustment (our proxy for valuation changes). In terms of stock-flow adjustments, we see a very strong unconditional correlation between the HH sector and the NFC sector of around 0.7. We also note the strong correlations between the SFA and the NFC (0.4), indicating strong transmission channels of economic shocks through changes in valuations of assets and liabilities.<sup>23</sup>

However, if we distinguish between external surplus and deficit countries, the correlation matrix

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<sup>23</sup>Looking at the correlation patterns between the HH sector and the NFC sector, we see very small coefficients for stock positions and flow balances (-0.29 and -0.08 respectively) and a high correlation between the stock-flow adjustments between the sectors (-0.78). The lack of a strong relationship is in line with the literature of the inability of the HH sector to pierce the corporate veil. However, the high SFA correlation is partly due to a large share of the NFC equities (on the liabilities) held by the HH sector (on the asset side).

of net flows changes slightly (see Table B1 (2)). We see that the positive relationship linking the GOV sector to the current account is primarily driven by external surplus countries. We also see that the association between the net lending of the NFC sector and the rest of the world is a lot stronger in deficit countries than in surplus countries. Additionally, the HH sector’s net financial balance is positively correlated with the current account in deficit countries but not in surplus countries.<sup>24</sup>

In total, we find a relatively limited contribution of the HH sector to the current account balance, with the lion’s share of the association due to the NFC and GOV sector.

## 4 Sectoral Balances and the Covariates of the Current Account

Our empirical strategy is threefold. First, in this section, we will present our econometric specification of medium-term covariates of the current account. We will examine how the net sectoral balances are associated with the set of macroeconomic fundamentals usually used in the literature to analyze the current account. In the next section, we will examine the contribution of sectoral balances in the international adjustment process in the aftermath of the global financial crisis. Finally, we will perform an event study investigating the dynamics of sectoral balances during significant and persistent current account surplus and deficit episodes.

### 4.1 Empirical Strategy

As outlined above, the first step in our empirical work is to revisit the question of the medium-term determinants of external imbalances by analyzing the correlation patterns of a standard set of macroeconomic fundamentals with the sectoral counterpart of current account balances. In order to accomplish this, we run the following panel OLS regressions with time fixed effects in the spirit of Chinn and Prasad (2003), Chinn and Ito (2007) and Lane and Milesi-Ferretti (2012).<sup>25,26</sup>

$$CA_{it} = \alpha + \beta X_{it} + \epsilon_{it} \tag{5}$$

Building on the existing literature,  $X_{it}$  represents macroeconomic fundamentals such as demographic factors (old age dependency ratio, ageing speed and population growth), GDP growth, the level of

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<sup>24</sup>These patterns are confirmed if we look at net flow correlation matrix during episodes of current account surpluses (current account balances above 3 percent of GDP) and deficits (current account balances below -3 percent of GDP) instead of surplus and deficit countries.

<sup>25</sup>As a robustness test, we also follow Phillips et al. (2013) in applying the latest IMF External Balance Assessment (EBA) methodology by running panel fixed effect regressions on annual data and find similar results. We also use a slightly different set of macroeconomic fundamentals without changing our main findings.

<sup>26</sup>As an additional robustness check, we run OLS estimations on two-year and four-year averaged data and as well as annual data with similar results. We also run Seemingly Unrelated Regressions (SUR) with similar results (available upon request).

GDP per capita, the lagged net international investment position, private credit and the terms of trade index.<sup>27</sup> We also add a dummy for the global financial crisis. Likewise, for the sectoral balance we have:

$$\begin{aligned}
 NFB_{it}^{HH} &= \alpha + \beta X_{it} + \epsilon_{it} \\
 NFB_{it}^{GOV} &= \alpha + \beta X_{it} + \epsilon_{it} \\
 NFB_{it}^{NFC} &= \alpha + \beta X_{it} + \epsilon_{it} \\
 NFB_{it}^{FC} &= \alpha + \beta X_{it} + \epsilon_{it}
 \end{aligned} \tag{6}$$

Our dependent variable  $NFB_{it}$  is the Net Financial Balance of the each institutional sector of the economy (HH: Households, GOV: Government, NFC: Non-Financial Corporations, FC: Financial Corporations). Keep in mind, the net financial balance of a sector can be derived as saving less investment or as the difference between the net acquisition of financial assets and net incurrence of financial liabilities. In addition, the sum of the domestic net financial balance equals the current account of the economy as a whole. In our main specification, we cumulate the net flows in 3 year non-overlapping periods to smooth business-cycle fluctuations.

## 4.2 Econometric Results

Table 2 presents our results for the estimation of equations (5) and (6). Column (1) shows the regression for the current account, in columns (2)-(5), we repeat the analysis for the net financial balance of each domestic sector. We find that aggregate patterns are not distributed across all sectors and a surprisingly limited role for the HH sector. Indeed, the traditional determinants of the current account explain a large share of the net balances of the NFC and the GOV sector, however, they explain relatively little of the HH and FC sector balances. We also find some covariates have interesting offsetting effects between sectors.

In terms of overall explanatory power, the set of fundamental determinants explain 60 percent of the current account balance. This result is reflected in the GOV and NFC sectors' balances, where fundamentals explain 58 and 39 percent of the respective variation. Next comes the HH sector with 16 percent and the FC with a mere 4 percent.<sup>28</sup>

In relation to the sign, magnitude, and significance of the coefficients, we also observe some noteworthy points. Regarding the current account regression column (1), GDP per capita, private

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<sup>27</sup>The dependency ratio is the ratio of the population over 65 years old relative to the working age population (between 30 and 64 years old). Ageing speed is determined as the difference between the expected old age dependency ratio in  $t+20$  and the old age dependency ratio in  $t$ .

<sup>28</sup>Similar results are found if we run the regression with the net financial balance of the rest of the world account (from the sectoral accounts) as the dependent variable instead of the current account. However, the coefficients' signs are reversed given the accounting methodology described in Appendix A. As discussed previously, we prefer the current account balance from the Balance of Payments due to its superior quality.

credit, population growth, the lagged NIIP and the global financial crisis dummy are all significant at the usual levels. GDP per capita, which can be used as a proxy for the marginal product of capital, has its expected positive sign. Private credit, a proxy for financial development is significant and negative, in line with the literature, as is population growth. The lagged NIIP also has the expected sign, as the steady-state current balance should be proportional to the equilibrium NIIP. Concerning the global financial crisis dummy, it is significant and negative.<sup>29</sup>

Turning our attention to the net financial balance of the HH sector given by column (2), we see that the terms of trade index and the old age dependency ratio are individually significant. Concerning the former, the correlation is in line with its expected effect on the current account. However, old age dependency is positively associated with the household balance, contrasting with its expected relation with the current account, as retirees typically draw down their savings.

Column (3) shows the regression results for the net financial balance of the GOV sector. Interestingly, two groups emerge: determinants with the same sign as the expected effect on the current account and the others. The terms of trade term, ageing speed and GDP growth all have signs contradicting the expected effect on the current account. For instance, ageing speed strongly negatively co-moves with the net balance of the government sector, whereas its expected effect on the current account is positive (albeit insignificant here) and its effect on the non-financial balance is positive and significant statistically and in economic magnitude. Private credit, GDP per capita and the old age dependency ratio move in the same direction as they are predicted to affect the current account. The last variable stands out, as it goes in the opposite direction in the HH sector regression.

Looking at the NFC sector's net balance, column (4), the demographic determinants are all significantly associated with the net lending of firms and have the "right" signs in terms of their expected association with the current account. Both population growth and the old age dependency ratio are negatively associated with corporate net lending. Ageing speed is strongly associated with improvements in the net balance. Interestingly, the old age dependency ratio is of similar magnitude to the GOV sector and counterbalances the effect on the HH sector. Ageing speed, on the contrary, goes against the effect on the GOV sector, illustrating the potentially contrasting effects of fundamentals on each sector balance. Private credit is positively associated with the net balance, in contrast to its effect on the current account and the government balance. One might expect the sector to act like the mirror image of the HH sector, given it is largely owned by the HH sector. But, this is only the case for the old age dependency ratio, indicating that corporate sector patterns are largely not completely offset by the household sector, indicating the presence of

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<sup>29</sup> Additionally, we break down the net lending of each sector into saving and investment flows, see Table B4 for the results. We see this negative sign of the global financial crisis dummy is reflected in GOV saving.

distortions in line with the literature on a "corporate veil".

Finally, in relation to the net balance of the FC sector, columns (5), macroeconomic fundamentals do not seem to matter much. It is important to keep in mind that the net balance of the FC sector is relatively small owing to its intermediation role. However, the net lending balance is negatively associated with GDP growth (in contrast to the GOV sector) and with population growth. Surprisingly, the global financial crisis dummy and private credit are not significant for this sector.

The main lessons of these findings are that the aggregate results linking a set of fundamental to the medium-term movements in the current account do not translate across the domestic counterparts of the current account. In fact, there is a striking difference in overall explanatory power across sectors. These covariates explain the bulk of the variation of the NFC and GOV sector financial balance. However, it is not the case for the households, the sector at the source of many traditional theoretical models and narratives of the current account. In addition, while we do find interesting offsetting dynamics between some sectors, it is not systematically the case that the household sector offsets decisions of corporates or the government. This evidence suggests households do not fully pierce the "corporate veil" and corroborates the failure of Ricardian equivalence.

## 5 Sectoral Balances and the Adjustment since the Crisis

In this section, we take a fresh look at the patterns linking pre-crisis imbalances and the subsequent adjustment of the current account since the global financial crisis, drawing on Lane and Milesi-Ferretti (2012, 2015). However, here we study these linkages through the lens of domestic sector balances.<sup>30</sup>

The key insights from this section are that the lion's share of the adjustment of the current account in the aftermath of the crisis can be accounted for by lower pre-crisis NFC net balances and larger post-crisis NFC adjustments. The post-crisis improvements in the NFC are consistent with the narrative of an external adjustment operating primarily through decreasing investment as opposed to increasing saving. Finally, these patterns are even more pronounced in countries running pre-crisis current account deficits in excess of the values indicated by their underlying fundamentals (i.e. negative "gap" countries).

We proceed in three steps. First, we examine how pre-crisis sectoral balances can account for the adjustment process of the current account in the aftermath of the crisis. Second, we study the post-crisis adjustment channels. In other words which sector adjusted as a counterpart of the current account rebalancing. Finally, after defining the pre-crisis current account gap as deviations of the observed current account from the balance explained by a set of fundamental, we show that

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<sup>30</sup>Because we are looking at a more recent time period, we can extend our sample of countries, see Notes of Figure 5 for the list of countries.

there is striking cross-country variation in both pre and post-crisis dynamics of the domestic sectors depending on whether the country was running an excessive current account balance or not in the run-up to the crisis. We focus on predetermined variables in our regressions to limit the endogeneity issues in interpreting our results. Our approach does not allow us to take a stand on the underlying causal mechanisms, but to identify through which sector the aggregate adjustment of the current account took place.

As a first glance at the data, Figure 5 shows the bivariate relationship between the adjustment of the current account since 2008 (i.e. the change between the average current account balance between 2005-2008 and its 2015 value) and the pre-crisis average balance between 2005-2008 for the current account and each domestic sector.<sup>31</sup> We see that the correlation is clearly negative and very strong between the post-crisis adjustment and the pre-crisis current account balance. This negative association is reflected in the pre-crisis NFC and GOV balances. Countries with the smallest pre-crisis net balances in these sectors tend to have larger current account adjustments in the aftermath of the crisis. The relationship is a lot weaker for the HH and FC sectors.

Next, we look at this relationship while taking into account the initial level of net international investment position. Indeed, following Lane and Milesi-Ferretti (2015), increased pressure to adjust could have been placed on countries with high levels of outstanding net international liabilities. In order to control for this, first, we perform the simple following cross-sectional regression:

$$\Delta CA_{i,0508-15} = \alpha + \beta CA_{i,0508} + \gamma NIIP_{i,0408} + \epsilon_i \quad (7)$$

$\Delta CA_{i,0508-15}$  is the adjustment of the current account balance,  $CA_{i,0508}$  is the average current account balance the 2005-2008 period, and  $NIIP_{i,0408}$  is the average stock of net international assets over the 2004-2007 period. The regression results are shown in Table 3, column (1). As expected, a larger pre-crisis current account deficit is associated with a larger post-crisis adjustment. In order to see how this aggregate result is distributed across domestic sectors, we replace the pre-crisis current account balance with the domestic sectoral net balances, denoting  $NFB_{i,0508}^s$  the average balance of sector (s) (HH, GOV, NFC, and FC):

$$\Delta CA_{i,0508-15} = \alpha + \sum_s \beta^s NFB_{i,0508}^s + \gamma NIIP_{i,0408} + \epsilon_i \quad (8)$$

It is the pre-crisis net financial balance of the corporate sector that is most significantly correlated with the current account adjustment (column (2)). The household and government sector are also negatively associated with the adjustment, but at lower significance levels.

Pushing further, we ask if conditional on the pre-crisis current account imbalance, do the sector

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<sup>31</sup>We omit the extreme cases of Iceland, Norway and Bulgaria for the following analysis.

balances give any additional information on the post-crisis adjustment of the current account? Following Lane and Milesi-Ferretti (2015), we derive a measure of current account imbalances, called the current account gap, as the difference between the observed current account from the balance explained by a set of fundamentals in the pre-crisis period.<sup>32</sup> To see this, we run the following cross-sectional regression:

$$\Delta CA_{i,0508-15} = \alpha + \beta NFB_{i,0508}^s + \delta GAP_{i,0508} + \gamma NIIP_{i,0408} + \epsilon_i \quad (9)$$

The results of this regression are column (4)-(7). Given the pre-crisis current account gap, only the net balance of the NFC sector survives and is negatively correlated with the current account adjustment.<sup>33</sup>

Next, in order to see through which channels the adjustment of the current account took place, we look at the relationship between the current account gap and the subsequent adjustment of the domestic sectors since the crisis (i.e. the change between the average sector balance between 2005-2008 and its 2015 value). Column (1) of Table 4 shows that the pre-crisis gap accounts for a large portion of the current account adjustment since the crisis. This aggregate result is only reflected in the NFC sector, column (4), where the pre-crisis current account gap explains a similar share of the post-crisis adjustment of the corporate sector. Countries with more negative gaps have experienced a larger adjustment in their current account and NFC balance. This is consistent with the narrative of an external adjustment achieved mainly through decreasing investment as opposed to decreasing consumption.<sup>34</sup>

Finally, we examine the striking difference in patterns between countries with positive or negative pre-crisis current account gap values.<sup>35</sup> Indeed, a symmetric adjustment between positive and negative gap countries seems unlikely, as sustainability constraints in excess deficit countries do not necessarily have a counterpart in excess surplus countries. Figure 6 shows the stark contrast

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<sup>32</sup>To derive the current account balance explained by fundamentals, we run the regression  $CA = CA(X_{it})$  over the 1970-2015 period with 4 year non-overlapping averages.  $X_{it}$  corresponds to the controls used in table 2. The current account gap is then computed as follows:  $CA^{gap} = CA^{observed} - CA^{predicted}$ . The results of the regression are in line with Lane and Milesi-Ferretti (2012) and are available upon request.

<sup>33</sup>Moreover, there was also a large within sector adjustment since the crisis, with all sectors undergoing a correction of their net lending balance, see Figure B1. The adjustment of the government sector was the strongest, unsurprisingly followed by the NFC sector. Results available upon request.

<sup>34</sup>Additionally, Figure B2 shows the contemporaneous post-crisis adjustment of the current account and the sector balances. Clearly we cannot infer any causal link as the variables are jointly determined. However, we do see that there is a strong association between the current account adjustment and the NFC and GOV sectors. The relationship is less clear for the HH and FC sectors.

<sup>35</sup>After taking the difference between the actual and predicted pre-crisis current account, we find the following sub-sample of countries with a negative gap: Bulgaria, Latvia, Greece, Ireland, Serbia, the United States, Lithuania, Romania, Portugal, Estonia, Spain, Malta, Cyprus, and the United Kingdom. The positive gap sub-sample is composed of Slovak Republic, Luxembourg, Croatia, Slovenia, Hungary, Italy, Belgium, France, Poland, Denmark, Czech Republic, Canada, Finland, Austria, Korea, Rep., the Netherlands, Switzerland, Germany, Japan, Norway, and Sweden.



in average flows pre-crisis (a) and post-crisis adjustments (b) when we split the sample.<sup>36</sup> The average pre-crisis sectoral flows were smaller in current account gap countries, most noticeably for the NFC sectors and GOV sector. Moreover, the post-crisis adjustment in all sectors was notably larger in negative current account gap countries, in particular for the NFC sector with an average adjustment of over 8 percent of GDP in negative gap countries against under 4 percent in positive gap countries.<sup>37</sup>

In summary, the large adjustment in current account balances seen in the aftermath of the global financial crisis is largely accounted for by corporate sector flows, consistent with the narrative of declines in investment. These patterns have striking differences between countries with pre-crisis positive or negative current account gaps (measured as the difference between the observed current account and the level predicted by fundamentals), with adjustments in every sector substantially larger in the negative gap countries. In both sets of countries, the bulk of the adjustment occurred in the corporate sector, however, the household sector also increased its net lending balance considerably in negative gap countries. These findings are consistent with the expenditure reduction explanation of current account reversals, with most of the adjustment occurring on the investment side (mainly due to the NFC sector) as opposed to the consumption side (mainly due to the HH sector).

## 6 Sectoral Balances During Current Account Episodes

In our preceding analysis, we looked at the domestic counterpart of current account covariates and adjustments. In this section, we will examine periods of significant and persistent capital inflows and outflows and document their implications for domestic sectors by (i) determining if these external episodes are associated with domestic episodes, and (ii) by studying the average domestic flows during these external episodes.<sup>38</sup> Ultimately, we find a striking difference in the patterns of domestic net flows in the form of large GOV deficits during the former and large net surpluses of NFC during the latter.

We define a significant current account surplus or deficit to be a balance over 3 percent of GDP in absolute value in one year.<sup>39</sup> First, we see if these persistent capital inflows (or current

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<sup>36</sup>We drop Iceland as the extreme nature of the build-up of its financial sector skews the cross-country average.

<sup>37</sup>Evidently, it is difficult to infer much regarding the underlying causal mechanisms from our approach (as these variables are jointly determined), however, we can speak to which sector's balance can account for the aggregate patterns we see for the current account.

<sup>38</sup>As there are many endogeneity issues that plague the question of the sectoral implications of external shocks and the external implications of domestic shocks, our approach here is to take the external episode as given, and study the domestic implications.

<sup>39</sup>We combine consecutive years into episodes, see Table B2 and B3 for a full list of the episodes. We also follow Benigno et al. (2015) in defining an episode of high capital inflows, when they rise more than one standard deviation above their long-run trend. We calculate these trends over the 1970-2015 period and find very similar results.

account deficits) and outflows (or current account surpluses) are associated with large imbalances in domestic sectors' net financial balances. Within the subsample of significant current account imbalances, we look at the domestic sectors' net financial balance and define in a similar manner significant episodes of domestic deficits and surpluses of over 3 percent of GDP in absolute value. Figure 7 shows that if there is an external imbalance in a year-country, there is a corresponding domestic episode in 95 percent of the cases.<sup>40</sup>

Taking a significant current account surplus or deficit as given, we see that a significant household net surplus is not a discriminating factor between the two types of episodes (for current account surpluses, in 55 percent of the cases there is also a significant household surplus and in 51 percent of the time for current account deficits). However, significant GOV and NFC deficits occur much more during current account deficits. Similarly, significant NFC surpluses occur in 45 percent of the cases of current account surplus periods, against only 15 percent of the cases in current account deficit episodes.

Next, combining consecutive periods into episodes we look at the adjustments of the net sectoral balances during external episodes.<sup>41</sup> Table 5 shows the significant differences between sectors. First, confirming the previous finding, the HH sector is the only sector whose balance does not change sign between current account deficit and surplus episodes. Indeed, it has an average balance of 3.2 percent of GDP in surplus episodes, 2 percent in deficit episodes and 3 percent when there are no current account episodes. In all the other sectors, the sign of the domestic balance is negative in external deficit episodes and positive in surplus episodes. It is particularly striking for the NFC and GOV sector, where balances go from under 1 percent of GDP to -4.9 and 3.8 percent of GDP between surplus and deficit episodes. Similarly, the GOV sector has an average net surplus of 0.6 percent of GDP during surplus episodes and -3.8 percent deficit during current account deficits.

In order to investigate the average dynamics of the sectoral flows during these persistent current account episodes, Figures B3 and B4 show the cross-country means and medians of the sector net financial balance in a 12-year window of the episode (year 0 marks the beginning of the episode).<sup>42</sup> Both during current account deficit and surplus episodes, average HH balances tend to decrease. The dynamics of the GOV and NFC sectors are more striking. Indeed, government balances tend to improve on average during surplus episodes (from -5 percent of GDP to close to 0 on average within 5 years). Moreover, NFC balances are consistently negative during current account deficit episodes, whereas they are mostly positive during surplus episodes.

Going further, Table B2 and B3 show the adjustment of the main sectors during surplus and

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<sup>40</sup>Given our definition of significant imbalances, we have 194 year-country pairs of current account surpluses and 227 of current account deficits.

<sup>41</sup>Table B2 and B3 show the full list of episodes. In order to focus on persistent episodes, we eliminate 1-year episodes. We also combine episodes if they are separated by less than 3 years.

<sup>42</sup>The average length of an episode is around 10 years.

deficit episode by country. In order to get a clearer picture of how sectors adjust, we classify the episodes very simply in two categories: public episodes (G) and private episodes (P). We do this by looking at the sum of net balance for the private sector (adding HH, NFC, and FC) over the period of time the episode lasts, comparing it to the public sector net balance and assigning the episode to the sector with the largest adjustment. Table B2 shows that in current account deficit episodes, the public sector adjustment is larger in 17 out of the 23 episodes and the private sector in the remaining 6 cases. Interestingly, Greece and Portugal both had public (G) current account deficit episodes while Estonia had a private current account episode for instance, based on this methodology. However, for the current account surplus episodes, most episodes were associated with larger adjustments in the private sector, with 15 of the 18 episodes dominated by private sector flow adjustments and 3 were public sector driven (Table B3). For instance, for most of the sample, the Netherlands and Norway had current account surplus episodes, however private flows dominated in the former and public flows in the latter

In sum, when we analyze domestic balances during external episodes, the striking difference between deficit and surplus episodes is the presence of large government deficits during the former and large net surpluses of non-financial corporations during the latter. Household net balances do not seem to be relevant for discriminating between current account deficit and surplus episodes. Interestingly, in terms of magnitude, cumulated private flows dominate public flows during surplus episodes in most countries, whereas public flows are larger during deficit episodes.

## 7 Concluding Remarks

In this paper, we have sought to better understand global imbalances and international adjustments in advanced countries by analyzing their domestic sectoral counterpart.

Our main findings shed light on a rather limited role for the household sector in explaining these trends, in stark contrast to the corporate and public sector. These results hold for (i) the contribution of domestic balances to current account imbalances, (ii) the co-movement with the set of medium-run determinants of the current account, (iii) the adjustment in the aftermath of the global financial crisis, and (iv) the dynamics of domestic balances during persistent current account imbalance episodes.

For instance, there are systematic differences in the patterns of the domestic counterpart of external balances in current account surplus and deficit countries. This is largely due to the NFC sector net surplus in surplus countries in the past few decades and net deficits of the government sector in deficit countries since the global financial crisis. These results are somewhat at odds with the prevailing narrative that the household sector plays a central role in current account dynamics.

Moreover, there is a striking difference between domestic balances in the overall explanatory power of the standard set of macroeconomic fundamentals commonly used as covariates of the current account. These variables explain the bulk of the variation of the NFC and GOV sector financial balance. This is not the case for the HH sector, at the source of many traditional theoretical models and narratives of the current account. Moreover, these fundamentals can sometimes have some interesting offsetting effects between domestic sectors, however, there is no evidence of the household sector perfectly offsetting changes in the corporate or public sector, pointing to distortions and the presence of a "corporate veil" or non-Ricardian behavior.

Similarly, the NFC sector accounts for most of the correlation patterns between prior current account balances and the resulting adjustment process, with the HH sector playing a very limited role once again. These patterns are driven by countries with negative pre-crisis current account gaps (measured as the difference between the observed current account and the level predicted by fundamentals), with adjustments substantially larger for every sector in these countries. These findings are consistent with an expenditure reduction explanation of current account reversals, with most of the adjustment occurring on the investment side (mainly due to the NFC sector) as opposed to the consumption side (mainly due to the HH sector). Finally, when we analyze domestic balances during episodes of capital inflows and outflows, we find that the sizable difference in patterns between the two types of episodes is due to the prevalence of significant surpluses of the NFC sector during capital inflow episodes and GOV deficits in capital outflow episodes.

In turn, these findings have implications for macroprudential policymaking. First, a better understanding of the drivers of external balances and positions is a key part of surveillance and prudent policymaking. The key role of the corporate sector net lending balance should not be overlooked. Second, as we have identified asymmetric effects of macroeconomic fundamentals on the domestic counterparts of the current account, integrating sectoral balance sheets into the analysis of external imbalances is essential. Finally, we observe a strong relationship between pre-crisis levels of the NFC balance and macroeconomic performance since the crisis, pointing towards the importance of monitoring domestic balances jointly with external balances.

In terms of future research agenda, our results still leave open a series of important questions. We view the main findings of this paper as providing guidance for future theoretical and empirical work on current account determinants and adjustments. Our results point towards the importance of the NFC sector in these dynamics, previously somewhat neglected in the traditional intertemporal models of the current account.<sup>43</sup> On the empirical side, a more granular approach might be necessary to identify the underlying heterogeneity within and across sectors. Future extensions will also seek to expand the analysis to see if the source of the imbalance matters in terms of early warning signals

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<sup>43</sup>See for instance Obstfeld and Rogoff (1995).

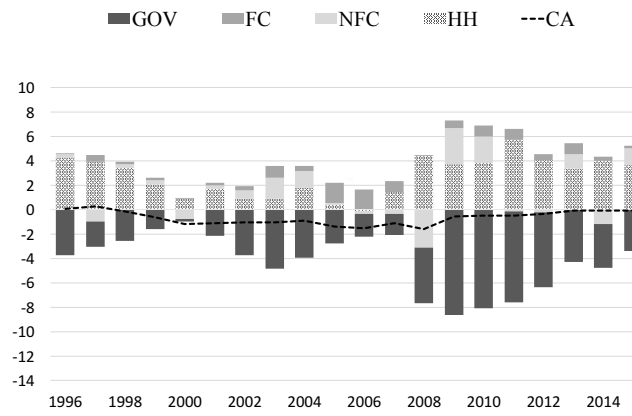
for crisis periods, building on Gourinchas and Obstfeld (2012).

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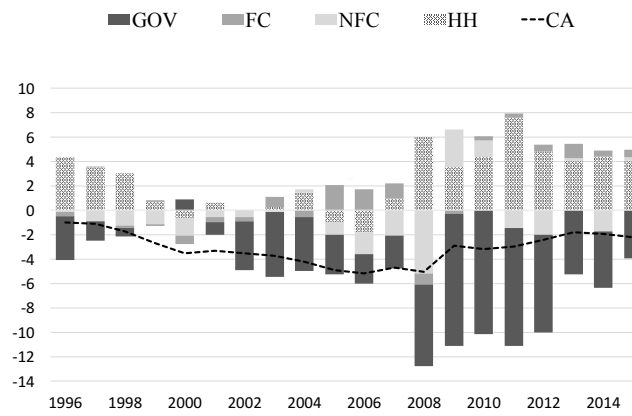
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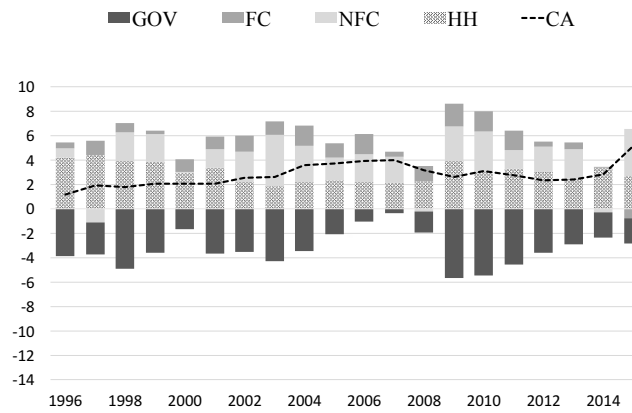
Figure 1: Sectoral Contribution to Current Account Balances



(a) All Countries



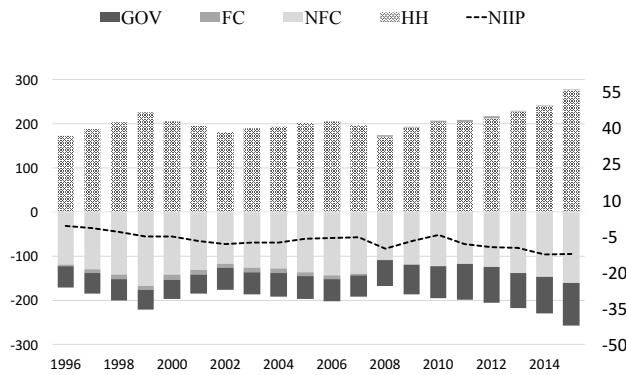
(b) Deficit Countries



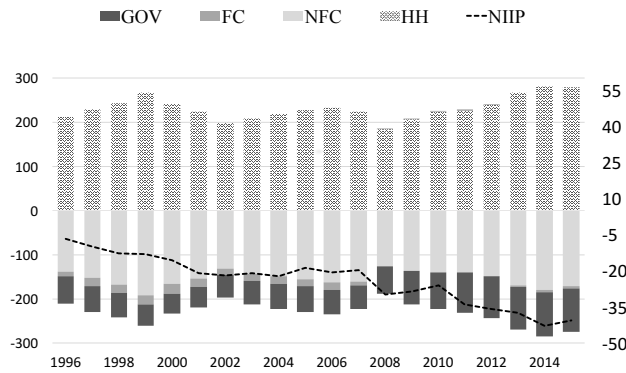
(c) Surplus Countries

Note: GOV: Government, FC: Financial Corporations, NFC: Non-Financial Corporations, HH: Households, CA: Current Account. Current account surplus countries are: France, Belgium, Sweden, the Netherlands, Canada, Denmark, Norway, Germany, Finland, Austria, and Japan. Current account deficit countries are: Portugal, Cyprus, the United Kingdom, Lithuania, Spain, Greece, Czech Republic, Hungary, the United States, Slovak Republic, Italy, and Estonia. In percent of GDP.

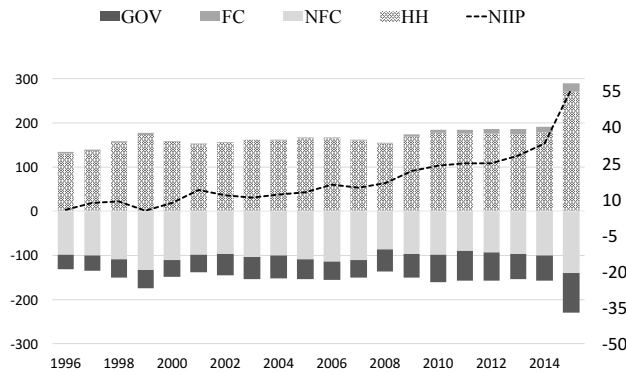
Figure 2: Sectoral Contribution to Net International Investment Positions



(a) All Countries



(b) Deficit Countries

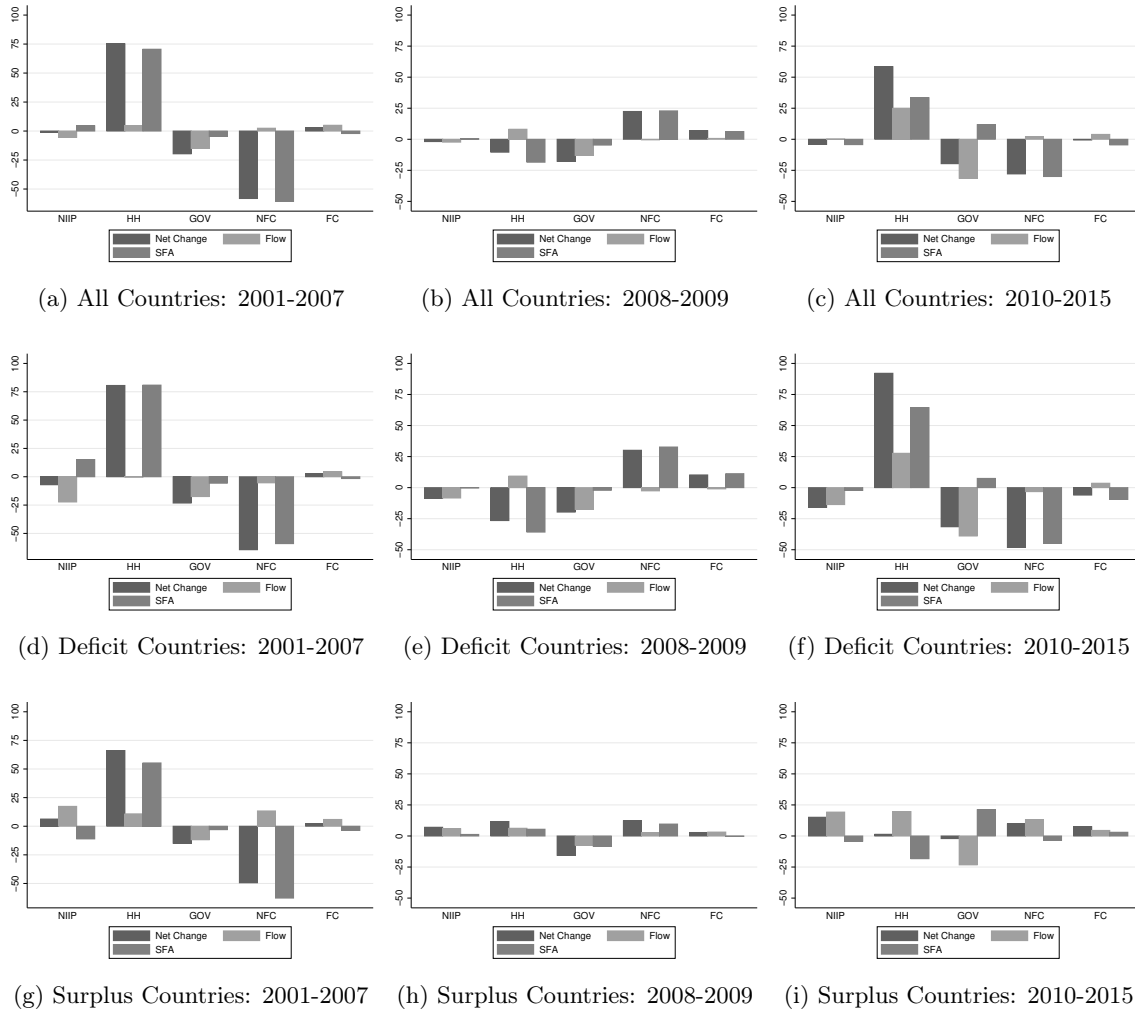


(c) Surplus Countries

Note: GOV: Government, FC: Financial Corporations, NFC: Non-Financial Corporations, HH: Households, NIIP: Net International Investment Position. Current account surplus countries are: France, Belgium, Sweden, the Netherlands, Canada, Denmark, Norway, Germany, Finland, Austria, and Japan. Current account deficit countries are: Portugal, Cyprus, the United Kingdom, Lithuania, Spain, Greece, Czech Republic, Hungary, the United States, Slovak Republic, Italy, and Estonia. The Net International Investment Position is on the right hand side axis. In percent of GDP.

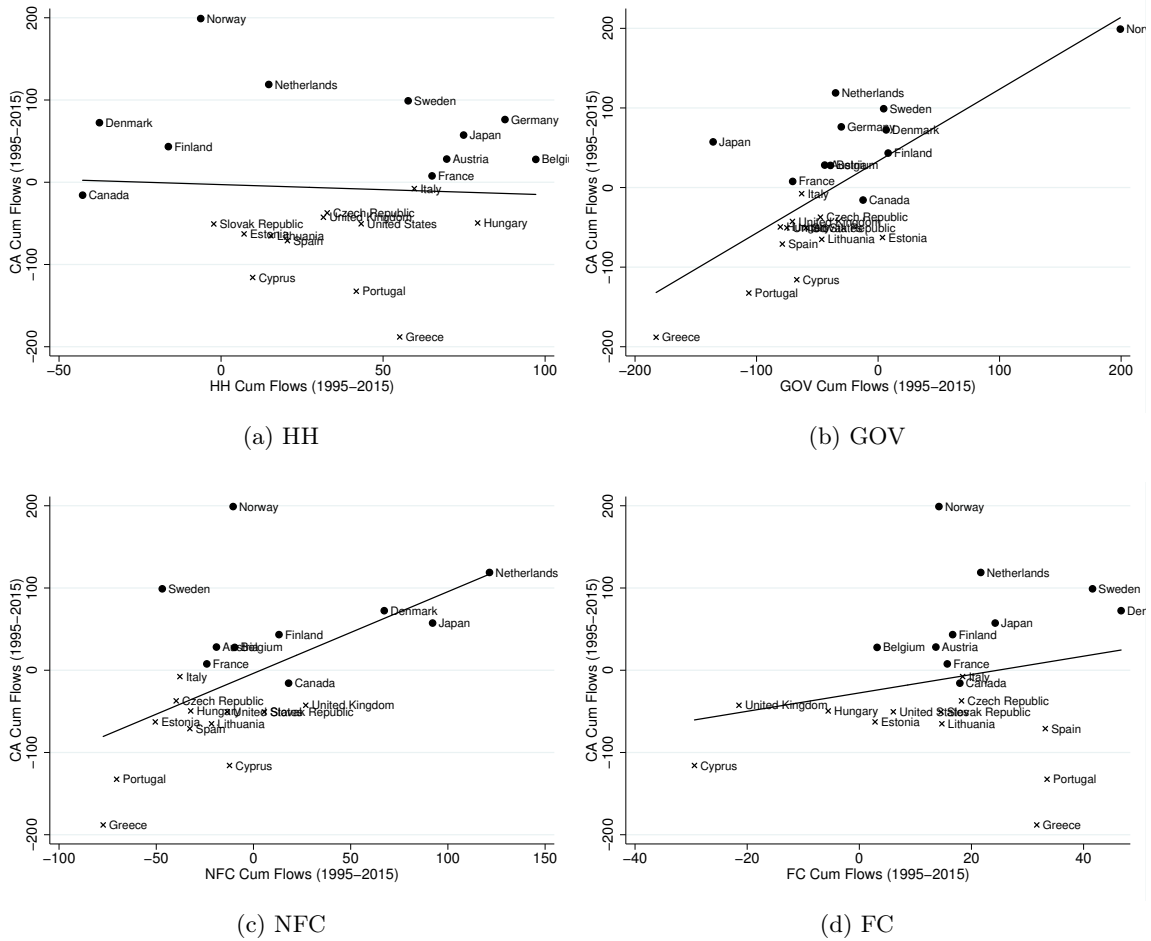


Figure 3: Flow and Stock-Flow Adjustments of Sectoral Balance Sheets



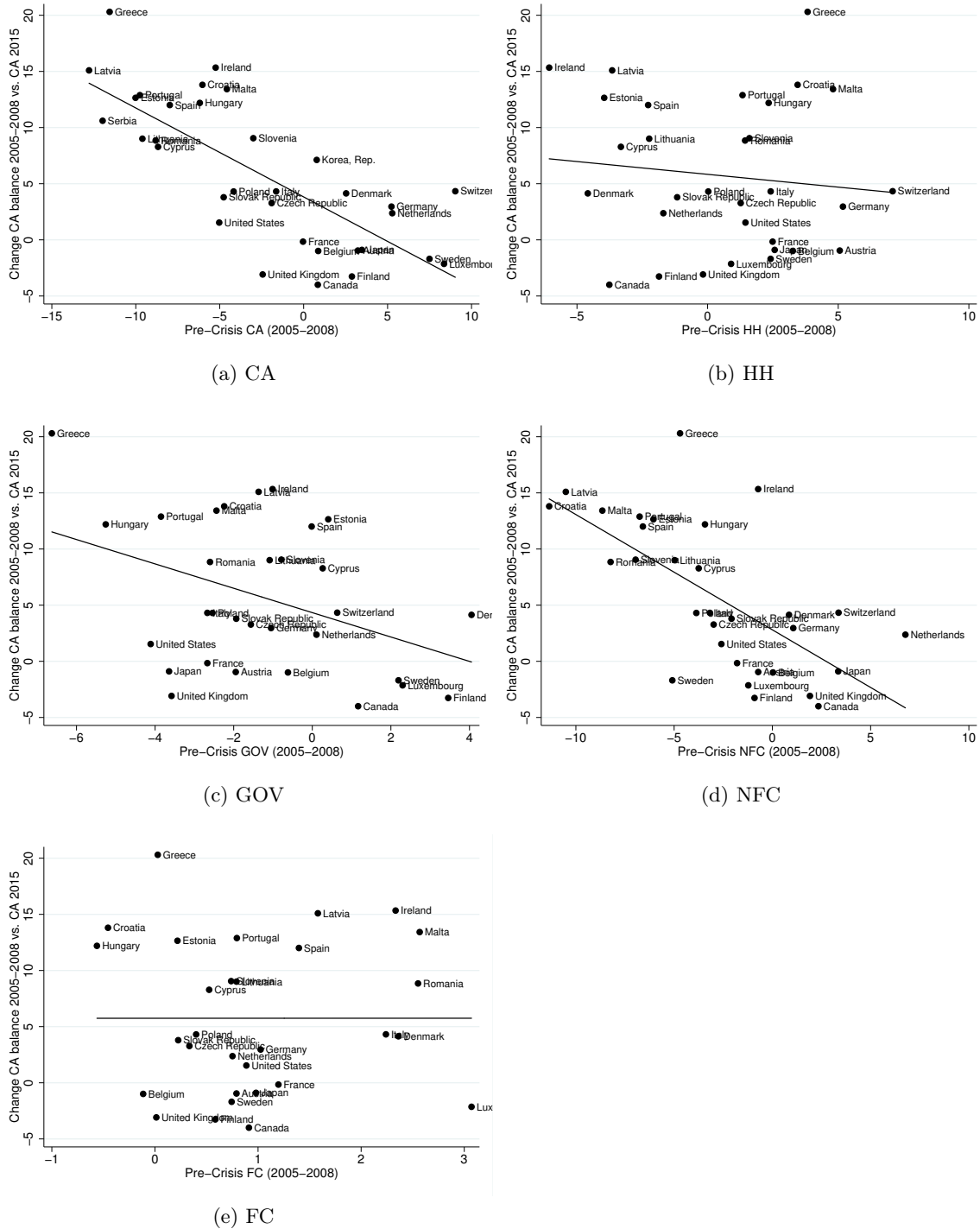
Note: HH: Households, NFC: Non-Financial Corporations, FC: Financial Corporations, GOV: Government. Net Change is the change in net financial position of the sector. Flow is the cumulated net financial balance and SFA is the residual Stock Flow Adjustment not due to transactions. Current account surplus countries are: France, Belgium, Sweden, the Netherlands, Canada, Denmark, Norway, Germany, Finland, Austria, and Japan. Current account deficit countries are: Portugal, Cyprus, the United Kingdom, Lithuania, Spain, Greece, Czech Republic, Hungary, the United States, Slovak Republic, Italy, and Estonia. In percent of GDP.

Figure 4: Cumulative Flows: Current Account versus Domestic Sectors



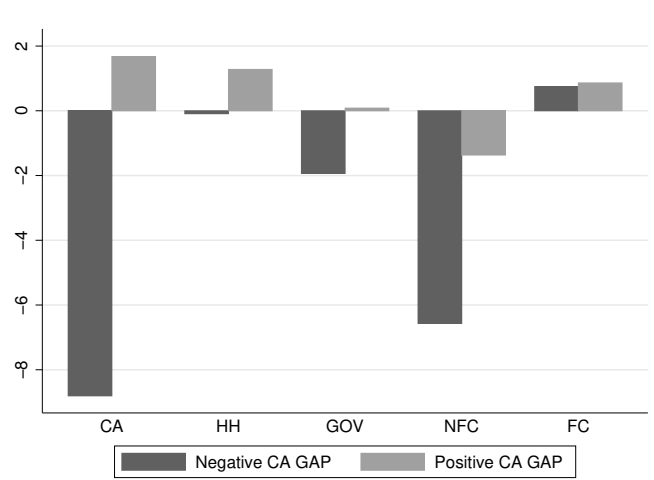
Note: HH: Households, NFC: Non-Financial Corporations, GOV: Government, FC: Financial Corporations. Cumulated net financial flows of each sector between 1995 and 2015 against the cumulated current account balance. In percent of GDP. Crosses represent current account deficit countries and circles represent current account surplus countries.

Figure 5: Adjustment Process of the Current Account vs Previous Imbalances

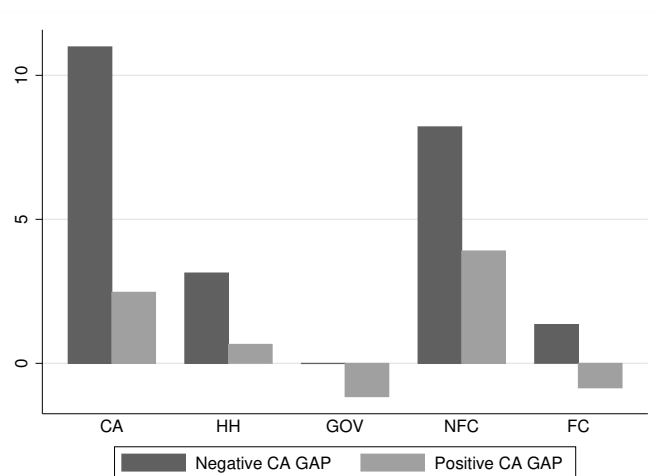


Note: CA: Current Account, HH: Households, NFC: Non-Financial Corporations, GOV: Government, FC: Financial Corporations. Relationship between the adjustment of the current account since 2008 (i.e. the change between the average current account balance between 2005-2008 average and its 2015 value) and the pre-crisis imbalance between 2005-2008 for the current account and each sectoral balance. In percent of GDP.

Figure 6: Average Adjustment Conditional on Pre-Crisis Current Account Gap



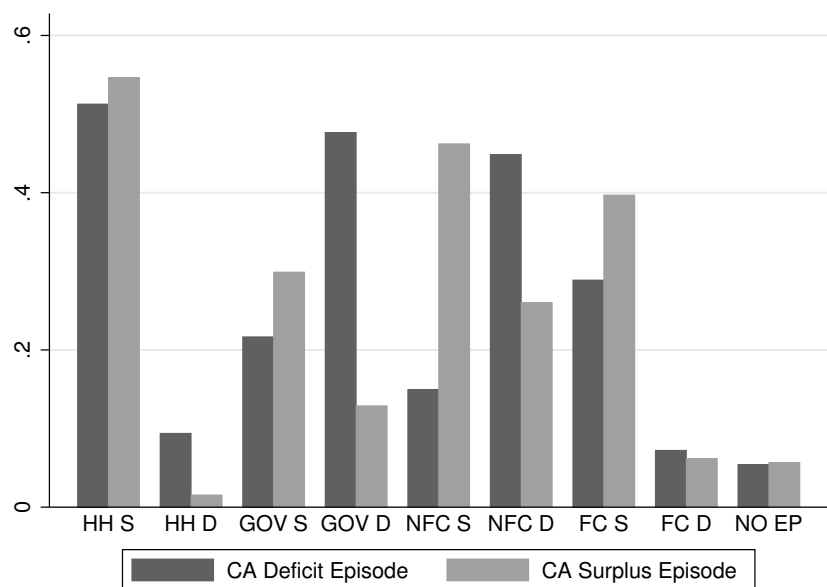
(a) Pre-Crisis Flows



(b) Post-Crisis Flows

Note: Figure (a) shows the average pre-crisis imbalance between 2005-2008 for the current account and each sectoral balance in percent of 2015 GDP. The countries are split into negative and positive pre-crisis current account gap. Figure (b) shows the average adjustment of the current account since 2008 (i.e. the change between the average current account balance between 2005-2008 and its 2015 value) in percent of 2015 GDP. The negative gap countries are: Bulgaria, Latvia, Greece, Ireland, Serbia, the United States, Lithuania, Romania, Portugal, Estonia, Spain, Malta, Cyprus, and the United Kingdom. The positive gap countries are: Slovak Republic, Luxembourg, Croatia, Slovenia, Hungary, Italy, Belgium, France, Poland, Denmark, Czech Republic, Canada, Finland, Austria, Korea, Rep., the Netherlands, Switzerland, Germany, Japan, Norway, and Sweden.

Figure 7: Percentage of Domestic Episodes Associated with Current Account Episodes



Note: The bars represent the proportion of significant domestic episodes occurring during (significant) current account surplus or deficit episodes. HH: Households, NFC: Non-Financial Corporations, FC: Financial Corporations, GOV: Government. Surplus (S) corresponds to periods when the current account is in surplus of 3 percent or more of GDP. Deficit (D) periods correspond to periods of deficits larger or equal to -3 percent of GDP. NO EP pertains to the cases where there are no significant sectoral episodes during a significant current account surplus or deficit episodes.

Table 1: Net Sectoral Financial Positions

	NIIP	HH	GOV	NFC	FC
<b>2002</b>					
<b>All</b>	-8.3	178.1	-51.3	-113.8	-8.6
<b>Surplus</b>	11.6	149.2	-50.6	-89.1	-0.2
<b>Deficit</b>	-21.9	197.9	-51.8	-130.8	-14.3
<b>2007</b>					
<b>All</b>	-5.5	196.2	-48.6	-137.5	-5.0
<b>Surplus</b>	14.7	157.6	-41.9	-104.5	0.8
<b>Deficit</b>	-19.7	223.2	-53.3	-160.4	-9.0
<b>2015</b>					
<b>All</b>	-12.6	242.1	-80.7	-148.8	-1.3
<b>Surplus</b>	55.7	154.5	-35.9	-95.8	8.2
<b>Deficit</b>	-40.7	278.3	-99.1	-170.7	-5.2

Note: Average sectoral net positions for the whole sample, the current account surplus countries sub-sample and the current account deficit countries sub-sample. Net positions are calculated as total financial assets minus financial liabilities in percent of GDP. HH: Households, NFC: Non-Financial Corporations, FC: Financial Corporations, GOV: Government, NIIP: Net International Investment Position.

Table 2: The Covariates of the Current Account Balance

	(1)	(2)	(3)	(4)	(5)
	CA	HH	GOV	NFC	FC
Terms of Trade	-0.075 (0.119)	0.250*** (0.075)	-0.224** (0.090)	-0.085 (0.098)	0.000 (0.063)
Private Credit	-0.077*** (0.022)	-0.027 (0.018)	-0.075*** (0.019)	0.054*** (0.020)	0.000 (0.024)
GDP Growth	-0.129 (0.097)	-0.050 (0.076)	0.132* (0.076)	-0.122* (0.066)	-0.068* (0.040)
Pop Growth	-1.238* (0.715)	0.765 (0.495)	-0.517 (0.453)	-1.778*** (0.564)	-0.728** (0.292)
GDP per capita	0.800*** (0.093)	-0.099 (0.061)	0.690*** (0.093)	0.077 (0.082)	0.070 (0.062)
Old	-0.319 (0.203)	0.513*** (0.136)	-0.382** (0.176)	-0.640*** (0.174)	-0.038 (0.135)
Ageing Speed	0.274 (0.197)	-0.204 (0.147)	-0.439*** (0.160)	0.626*** (0.180)	0.160 (0.145)
Lag NIIP	0.034 (0.034)	0.026 (0.018)	-0.031 (0.024)	0.064** (0.028)	-0.016 (0.023)
GFC	-13.675*** (3.771)	0.267 (2.831)	-10.579*** (3.102)	-1.865 (3.522)	-1.200 (2.229)
Observations	135	135	135	134	134
Adjusted $R^2$	0.60	0.16	0.57	0.39	0.04

Panel OLS estimation over the 1995-2015 period with 3 year non-overlapping averages and robust standards errors. Time fixed effects are included. The dependent variables are the current account balance (CA) and the net financial balances of the main domestic sectors (HH: Households, GOV: Government, NFC: Non-Financial Corporations, FC: Financial Corporations), in percent of GDP. See text for more information of the control variables. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 3: Adjustment Process of the Current Account vs Previous Imbalances

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	$\Delta CA_{0508-15}$	$\Delta CA_{0508-15}$	$\Delta CA_{0508-15}$	$\Delta CA_{0508-15}$	$\Delta CA_{0508-15}$	$\Delta CA_{0508-15}$	$\Delta CA_{0508-15}$
$CA_{0508}$	-0.862*** (0.140)						
$GAP_{0508}$			-0.284*** (0.067)	-0.316*** (0.075)	-0.268*** (0.064)	-0.218** (0.082)	-0.251*** (0.076)
$HH_{0508}$		-0.720* (0.356)		0.436 (0.291)			
$GOV_{0508}$		-1.199** (0.455)			-0.356 (0.400)		
$NFC_{0508}$		-0.842*** (0.259)				-0.581** (0.265)	
$FC_{0508}$		1.014 (0.878)					0.514 (1.137)
$NIIP_{0407}$	0.009 (0.037)	-0.046 (0.038)	-0.036 (0.037)	-0.043 (0.032)	-0.030 (0.038)	-0.011 (0.037)	-0.088** (0.039)
Observations	31	30	31	31	31	31	30
Adjusted $R^2$	0.55	0.60	0.47	0.49	0.46	0.54	0.53

Cross-section estimation with robust standards errors.  $\Delta CA_{0508-15}$  is the adjustment of the current account in the aftermath of the crisis (i.e. the change between the average current account balance between 2005-2008 and its 2015 value). GAP is the pre-crisis current account gap. HH: Households, GOV: Government, NFC: Non-Financial Corporations, FC: Financial Corporations. Sector balances are average flows between 2005-2008. We drop the following most extreme cases: Iceland, Norway and Bulgaria.  
\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$



Table 4: Sectoral Adjustments and Pre-Crisis Current Account Gap

	(1)	(2)	(3)	(4)	(5)
	$\Delta CA_{0508-15}$	$\Delta HH_{0508-15}$	$\Delta GOV_{0508-15}$	$\Delta NFC_{0508-15}$	$\Delta FC_{0508-15}$
$GAP_{0508}$	-0.284*** (0.067)	-0.102 (0.062)	-0.028 (0.037)	-0.107** (0.049)	-0.019 (0.096)
$NIIP_{0407}$	-0.036 (0.037)	0.004 (0.021)	-0.012 (0.016)	-0.058** (0.026)	-0.015 (0.065)
Observations	31	31	31	31	30
Adjusted $R^2$	0.47	0.07	0.00	0.31	0.00

Cross-sectional regression with robust standards errors. The dependent variable are the post-crisis adjustment of the Current Account (CA), and the net financial balances of the domestic sectors (i.e. the change between the average balance between 2005-2008 and its 2015 value). Households (HH), Government (GOV), Non-Financial Corporations (NFC), Financial Corporations (FC). GAP is the pre-crisis current account gap. We drop the following most extreme cases: Iceland, Norway and Bulgaria.\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 5: Average Net Sectoral Balance During Current Account Episodes

	CA	HH	GOV	NFC	FC
Current Account Surplus	7.0	3.2	0.6	0.5	1.3
Current Account Deficit	-7.0	2.0	-3.8	-4.9	-4.8
No Current Account Episode	-0.2	3.0	-3.2	-0.2	0.8

Note: Average net sectoral balance during current account episodes. In percent of GDP. Surplus corresponds to periods where the current account is in surplus of 3 percent or more of GDP. Deficit periods correspond to periods of deficits larger or equal to -3 percent of GDP. No Episode signifies the current account does not fall into the two categories above.

## Appendix A The Consistency between the Rest of the World Account and the Balance of Payments Statistics

The new methodology of the balance of payments statistics (BOP) and the rest of the world account (ROW) in the sectoral national accounts (BPM6 Appendix 7 and ESA 2010 Chapter 18) requires full consistency between the two statistics. However, some statistical discrepancies remain. For instance, discrepancies between the net lending of the quarterly Financial Accounts of the BOP and ROW account in the national accounts represented 2.2 percent of the European Union GDP in 2014, see Obrzut (2016).<sup>44</sup>

Recent Eurostat surveys in 2014 and 2015 (called the "BOP/ROW survey") showed different net recording practices (specifically for financial derivatives), differences in vintages and revisions and different compilation practices (for example some national statistics are compiled by national statistical offices while others are compiled by national central banks) were cited as the main explanations for the discrepancies.

The balance of payments is defined in BPM6 as summarizing transactions between residents and nonresidents during a period. It consists of the goods and services account, the primary income account, the secondary income account, the capital account, and the financial account.<sup>45</sup> The stock counterpart is the International Investment Position (IIP) defined as a statistical statement that shows at a point in time the value of: financial assets of residents of an economy that are claims on nonresidents or are gold bullion held as reserve assets; and the liabilities of residents of an economy to nonresidents. ESA 2010 defines the rest of the world account as a grouping of units without any characteristic functions and resources; it consists of non-resident units insofar as they are engaged in transactions with resident institutional units, or have other economic links with resident units. Its accounts provide an overall view of the economic relationships linking the national economy with the rest of the world. These relationships can be transactions between resident and non-resident institutional units (like in the case of the current account in the balance of payments) and the related stocks of assets and liabilities (similarly in the international investment position).

However, although the two statistics have been made consistent in terms of methodological standards, there are elements that differentiate them. First, the perspective of the rest of the world is that of a non-resident sector that has a relationship with a counterparty sector in the domestic

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<sup>44</sup>Five member states that contribute most prominently to the total discrepancies are Germany, France, Denmark, Italy, and Greece. The discrepancies in terms of stock positions represented 4.4 percent of GDP.

<sup>45</sup>The balance of payments must add to zero, with the Current Account (CA), the Financial Account (FA), the Capital Account (KA) and net Errors and Omissions (EO) in the following manner:

$$CA^{BOP} - (FA^{BOP} + KA^{BOP}) + EO^{BOP} = 0 \quad (10)$$

economy. The BOP/IIP is from the perspective of the resident sector. It follows that a current account (net international investment position) surplus of the resident economy is equivalent to a rest of the world financial balance (rest of the world financial position) deficit and vice versa.<sup>46</sup> Additionally, the net lending/net borrowing in the BOP financial account compares to net acquisition of assets/net incurrence of liabilities in the ROW account.

$$NFB^{ROW} = -FA^{BOP} = -(CA^{BOP} + KA^{BOP} + EO^{BOP}) \quad (11)$$

In terms of balance sheet positions, we have the following correspondence:

$$NFP^{ROW} = -NIIP^{IIP} \quad (12)$$

Second, in the rest of the world financial account, the primary classification is by the instrument of investment, whereas in the BOP/IIP financial account classification is given by functional category. A correspondence table maps the links between the functional categories to instrument categories in BPM6 Appendix 7, however, issues remain (Obrzut, 2016). For instance, some ESA 2010 financial instruments correspond to multiple BPM6 categories and other sector-specific instruments seem omitted.<sup>47</sup>

Even if the size of the discrepancy between the two statistics is relatively small, Figure B5 shows it can vary between countries, like the United Kingdom (with notoriously small discrepancies) and the United States (with larger discrepancies) for instance.

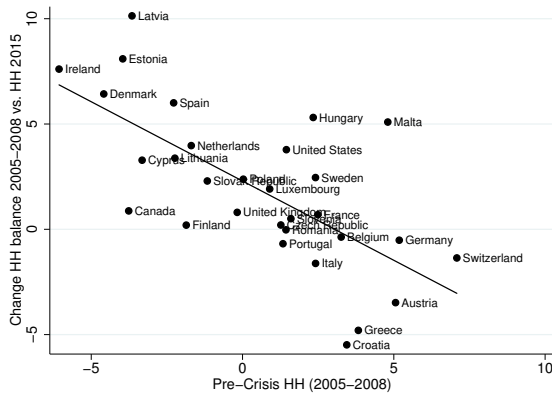
## Appendix B Additional Figures and Tables

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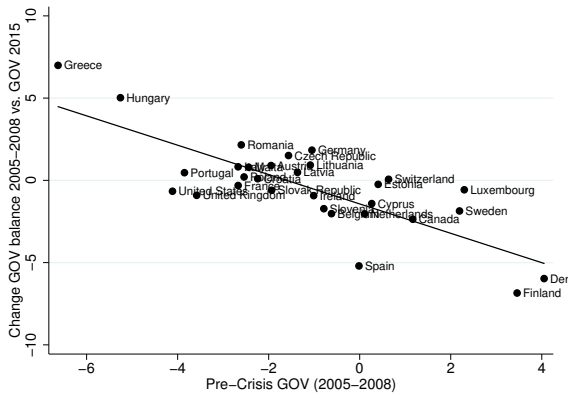
<sup>46</sup>Assuming the capital account (KA) and the net errors and omissions (EO) are equal to zero.

<sup>47</sup>F.5 "Equity" in ESA 2010 for example, could correspond to Direct Investment, Portfolio Investment and Other Investment in BPM6 depending on the nature of the equity.

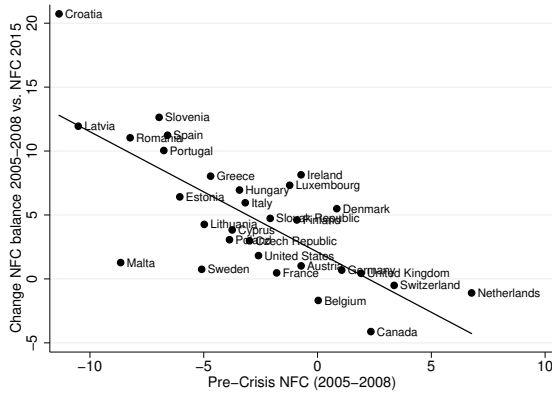
Figure B1: Post-Crisis Adjustment Process Within Sectors



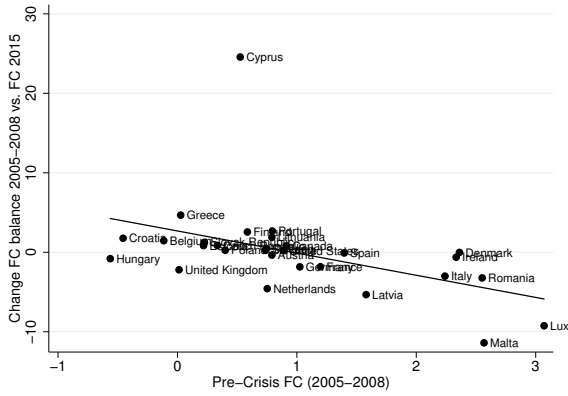
(a) HH



(b) GOV



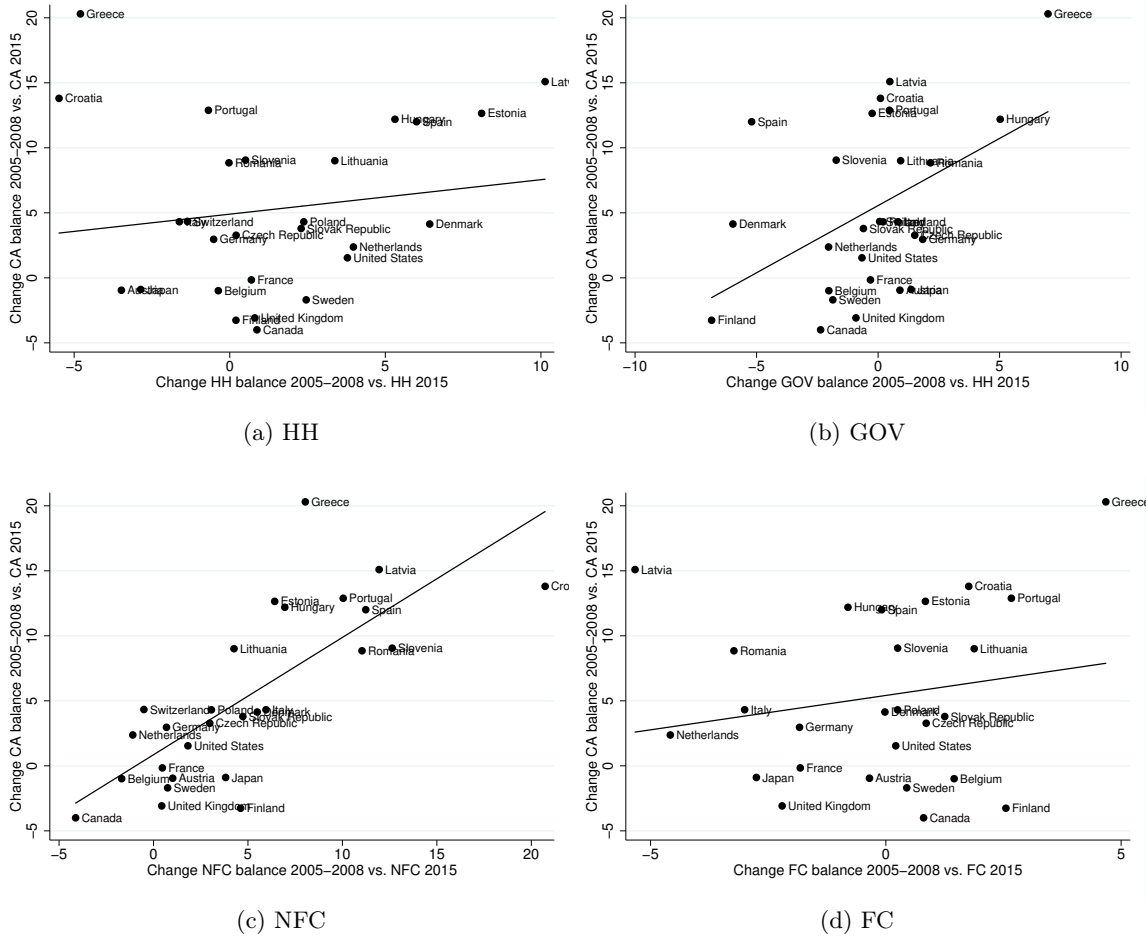
(c) NFC



(d) FC

Note: Scatter of the sector's average pre-crisis balance (between 2005 and 2008) and its the post-crisis adjustment (i.e. the change between the average balance between 2005-2008 and its 2015 value). Households (HH), Government (GOV), Non-Financial Corporations (NFC), Financial Corporations (FC). In percent of GDP.

Figure B2: Post-Crisis Adjustment of the Current Account vs Contemporaneous Sector Balance



Note: Plot of the post-crisis adjustment (i.e. the change between the average balance between 2005–2008 and its 2015 value) of the current account against the contemporaneous sectoral adjustment. Households (HH), Government (GOV), Non-Financial Corporations (NFC), Financial Corporations (FC). In percent of GDP.

Figure B3: Sectoral Flows During Persistent Current Account Surpluses

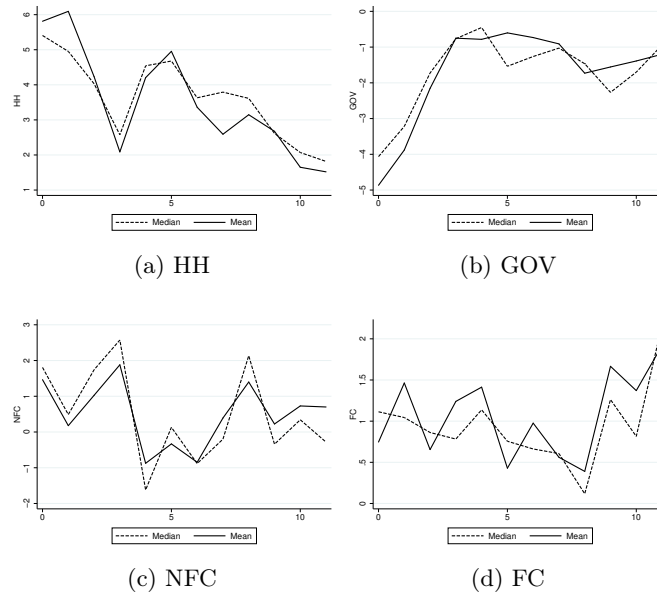
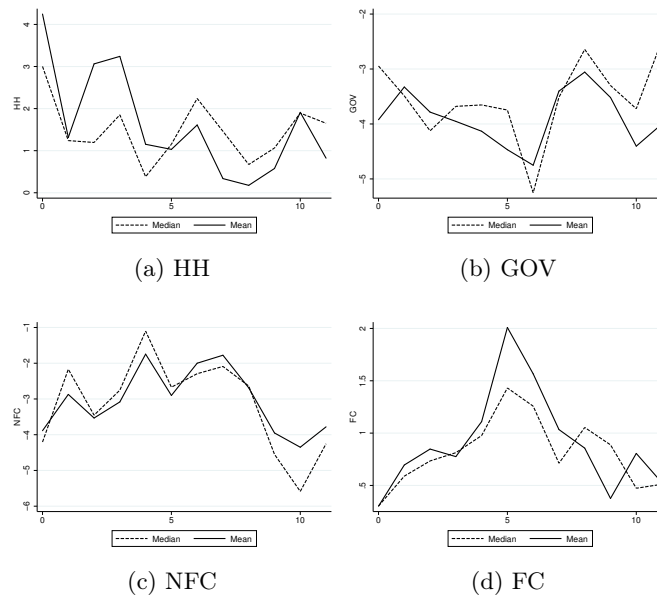


Figure B4: Sectoral Flows During Persistent Current Account Deficits

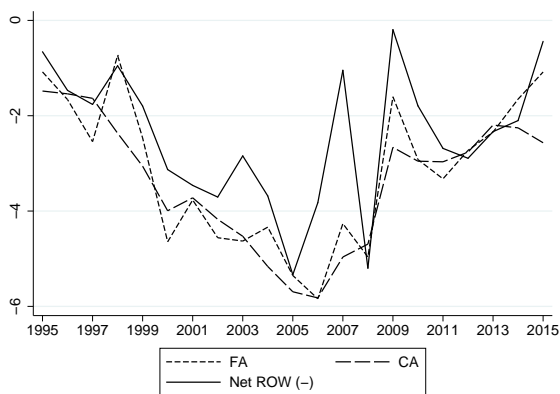


Note: Cross-country mean and median of each sector's net financial balance during the external episode. 0 marks the beginning of the episode. In computing the mean and median values, we drop the most extreme cases: Iceland, Norway, Bulgaria, Luxembourg, Malta, Cyprus and Ireland. See following Tables for a complete list of the external episodes. All Variables in percent of GDP.

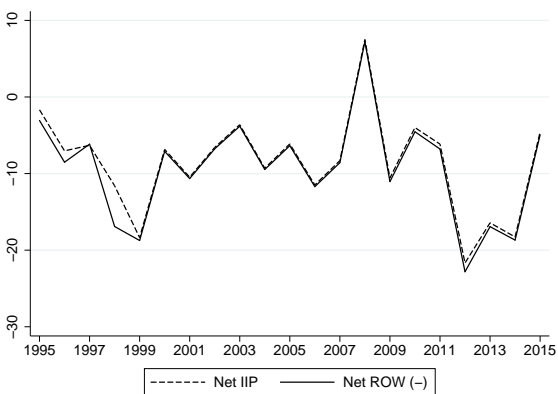
Figure B5: Discrepancies Between Sector Accounts and BOP/IIP



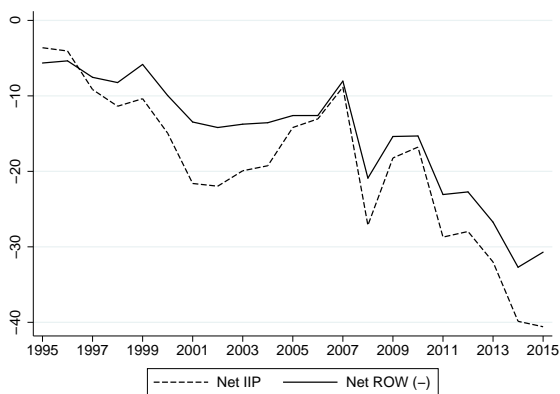
(a) Flow Balances-United Kingdom



(b) Flows Balances-United States



(c) Stock Positions-United Kingdom



(d) Stock Positions-United States

Note: The Financial Account (FA), Current Account (CA) and the Net International Investment Position (Net IIP) are from the Balance of Payments and Investment Position Statistics (BOP/IIP). Net ROW (-) is the Rest of the World net financial balance from the sector accounts in graph (a) and (b) and the net financial position in graph (c) and (d). In both cases, the variables' signs are changed. All Variables in percent of GDP.



Table B1: Correlation Matrices

<b>(1)</b>						<b>(2)</b>					
<b>Flow &amp; Stock-Flow Adjustment</b>						<b>Surplus &amp; Deficit Countries</b>					
Net Financial Position						Surplus Countries					
	NIIP	HH	GOV	NFC	FC		CA	HH	GOV	NFC	FC
NIIP	1.00					CA	1.00				
HH	0.31	1.00				HH	-0.02	1.00			
GOV	0.24	-0.62	1.00			GOV	0.65	-0.43	1.00		
NFC	0.27	-0.29	-0.08	1.00		NFC	0.15	-0.25	-0.21	1.00	
FC	-0.04	-0.08	-0.07	-0.03	1.00	FC	0.06	-0.16	-0.03	-0.22	1.00
Net Financial Balance						Deficit Countries					
	CA	HH	GOV	NFC	FC		CA	HH	GOV	NFC	FC
CA	1.00					CA	1.00				
HH	0.09	1.00				HH	0.29	1.00			
GOV	0.51	-0.37	1.00			GOV	0.04	-0.38	1.00		
NFC	0.52	-0.08	-0.03	1.00		NFC	0.59	0.07	-0.22	1.00	
FC	0.09	-0.32	-0.00	-0.17	1.00	FC	0.03	-0.39	-0.07	-0.23	1.00
Stock Flow Adjustment											
	SFA	HH	GOV	NFC	FC						
SFA	1.00										
HH	-0.19	1.00									
GOV	0.13	-0.31	1.00								
NFC	0.43	-0.71	-0.05	1.00							
FC	0.14	-0.29	-0.02	-0.11	1.00						

Note: Annual unconditional correlations. NIIP: Net International Investment Position, HH: Households, GOV: Government, NFC: Non-Financial Corporations, FC: Financial Corporations. The Net Financial Balance (NFB) is the flow adjustment and the Stock Flow Adjustment (SFA) is the non-flow adjustment.

Table B2: Persistent Current Account Deficits Episodes

	Start	Peak	End	N	Peak	Private			Public	Foreign	Type	
						HH	NFC	FC	Total	GOV		CA
Bulgaria	1999	2008	2009	11	-23	45	-120	-14	-88	0	-74	P
Canada	2009	2010	2015	7	-4	-19	2	9	-8	-18	-22	G
Croatia	1995	1997	2009	15	-11	57	-175	-6	-124	-68	-147	P
Cyprus	1996	1996	1997	2	-5	3	4	-6	1	-8	-9	G
Cyprus	2000	2008	2015	16	-16	3	-10	-21	-27	-43	-81	G
Czech Republic	1995	1996	2011	17	-6	73	-105	41	9	-119	-101	G
Estonia	1995	2006	2008	14	-14	-27	-63	4	-86	5	-86	P
Greece	1995	2008	2012	18	-16	37	-41	4	0	-93	-105	G
Hungary	1995	2000	2008	14	-8	99	-117	-8	-26	-147	-161	G
Ireland	2005	2008	2009	5	-7	-21	-5	19	-7	-17	-25	G
Italy	2008	2010	2011	4	-3	6	-10	3	-1	-16	-12	G
Latvia	1996	2006	2008	13	-20	-26	-66	9	-83	-9	-103	P
Latvia	2011	2012	2014	4	-3	26	2	-1	27	-7	-11	G
Lithuania	1995	2008	2008	14	-14	-1	-35	5	-31	-14	-60	P
Malta	2004	2006	2011	8	-9	98	-25	-32	41	-27	-44	G
Poland	1996	1999	2012	17	-8	42	-66	27	2	-109	-153	G
Portugal	1996	2008	2011	16	-13	24	-60	15	-22	-64	-104	G
Romania	1995	2007	2012	18	-13	40	-62	6	-16	-39	-68	G
Slovak Republic	1996	1996	2011	16	-10	-7	-47	31	-23	-182	-212	G
Slovenia	2007	2008	2008	2	-6	1	-18	2	-15	-1	-9	P
Spain	1999	2008	2011	13	-10	0	-32	13	-19	-30	-55	G
United Kingdom	2006	2015	2015	10	-5	15	23	-5	32	-59	-33	G
United States	1998	2006	2015	18	-6	53	-17	8	43	-95	-64	G

The sample covers the 1995-2015 period. Deficit periods correspond to periods of deficits larger or equal to -3 percent of GDP. Peak value corresponds to the value of the current account. Type G is when the Net Financial Balance of the Government sector is larger than the balance of the private sector (households, non-financial and financial corporations), Type P is when the private sector balance is larger than the public sector. There are 6 P-type episodes and 17 G-type episodes.

Table B3: Persistent Current Account Surplus Episodes

	Start	Peak	End	N	Peak	Private			Total	Public	Foreign	Type
						HH	NFC	FC		GOV	CA	
Austria	2005	2008	2010	6	5	29	1	4	35	-18	18	P
Belgium	1995	1999	2005	11	8	100	-9	-4	87	-20	55	P
Denmark	2001	2014	2015	15	8	-24	48	40	64	7	63	P
Finland	1995	2001	2008	14	8	-8	31	15	39	43	88	G
France	1997	1999	2001	5	4	21	-1	3	23	-12	18	P
Germany	2004	2015	2015	12	9	67	18	6	91	-16	77	P
Hungary	2013	2015	2015	3	4	22	6	0	28	-7	11	P
Iceland	2013	2013	2015	3	6	40	-56	21	6	2	14	P
Italy	1996	1997	1997	2	3	15	-5	2	12	-10	6	P
Japan	1999	2007	2011	13	5	45	52	19	117	-76	43	P
Korea, Rep.	2009	2015	2015	7	8	36	-20	8	24	6	29	P
Latvia	2009	2009	2010	2	8	24	1	-1	23	-17	10	P
Luxembourg	1995	2000	2015	21	12	74	-211	115	-21	33	303	G
Malta	2013	2015	2015	3	10	46	-7	-44	-5	-6	17	P
Netherlands	1995	2012	2015	21	11	15	110	20	145	-35	106	P
Norway	1995	2005	2015	21	17	-8	-14	18	-3	258	259	G
Slovenia	2012	2014	2015	4	7	7	15	20	42	-28	19	P
Sweden	1995	2008	2015	21	9	58	-43	43	58	0	100	P

The sample covers the 1995-2015 period. Surplus periods correspond to periods of surplus larger or equal to -3 percent of GDP. Peak value corresponds to the value of the current account. Type G is when the Net Financial Balance of the Government sector is larger than the balance of the private sector (households, non-financial and financial corporations), Type P is when the private sector balance is larger than the public sector. There are 15 P-type episodes and 3 G-type episodes.

Table B4: The Covariates of the Current Account Balance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	S	I	HH S	HH I	GOV S	GOV I	NFC S	NFC I	FC S	FC I
TOT	0.137 (0.141)	0.248*** (0.094)	0.172** (0.073)	0.014 (0.050)	-0.087 (0.120)	0.081* (0.042)	0.042 (0.096)	0.152 (0.093)	0.010 (0.035)	0.000 (0.011)
Private Credit	-0.139*** (0.027)	-0.051*** (0.017)	-0.045*** (0.017)	-0.007 (0.011)	-0.073*** (0.021)	-0.005 (0.006)	-0.061** (0.026)	-0.041*** (0.015)	0.040*** (0.015)	0.002 (0.002)
GDP Growth	-0.164 (0.129)	-0.070 (0.082)	-0.074 (0.065)	-0.067* (0.036)	0.096 (0.089)	-0.007 (0.024)	-0.097 (0.077)	0.008 (0.072)	-0.089** (0.040)	-0.004 (0.008)
Pop Growth	-1.761** (0.879)	0.795 (0.739)	1.691*** (0.502)	1.872*** (0.324)	-0.336 (0.487)	0.040 (0.173)	-3.761*** (0.694)	-1.194 (0.769)	0.637 (0.459)	0.074 (0.048)
GDP pc	0.694*** (0.115)	-0.279*** (0.082)	-0.055 (0.073)	-0.129*** (0.044)	0.606*** (0.101)	-0.022 (0.022)	0.262*** (0.089)	-0.122 (0.074)	-0.119** (0.060)	-0.006 (0.008)
Old	-0.638** (0.264)	-0.100 (0.190)	0.301** (0.141)	0.028 (0.113)	-0.447*** (0.179)	0.024 (0.052)	-0.347 (0.232)	-0.120 (0.203)	-0.146* (0.087)	-0.033** (0.016)
Ageing Speed	0.258 (0.249)	0.043 (0.178)	0.354** (0.143)	0.142* (0.085)	-0.465*** (0.170)	-0.050 (0.059)	0.378* (0.206)	-0.053 (0.166)	-0.007 (0.102)	0.005 (0.014)
Lag NIIP	0.124*** (0.040)	0.085*** (0.028)	0.074*** (0.023)	0.006 (0.014)	-0.024 (0.023)	-0.005 (0.008)	0.068** (0.031)	0.080*** (0.027)	0.007 (0.015)	0.005** (0.002)
GFC	-10.442** (4.800)	6.912** (3.353)	-1.449 (2.779)	2.080 (1.993)	-9.209*** (3.517)	1.456 (1.197)	-1.452 (3.584)	3.743 (2.830)	1.706 (1.994)	-0.353 (0.342)
Observations	132	132	132	132	133	133	132	132	133	133
Adjusted $R^2$	0.59	0.39	0.32	0.29	0.49	0.13	0.46	0.29	0.24	0.17

Panel OLS estimation over the 1995-2015 period with 3 year non-overlapping averages and robust standards errors. Time fixed effects are included. The dependent variables are the aggregate saving (S) and investment (I) and saving and investment of the domestic sectors (HH: Households, GOV: Government, NFC: Non-Financial Corporations, FC: Financial Corporations), in percent of GDP. See text for more information of the control variables. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$