Household Wealth & the Net International Investment Position

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Abstract

Aggregate household wealth dynamics are closely associated with fluctuations of the economy. However, the linkages between household wealth dynamics and cross-border financial holdings have remained unexamined. Thanks to the recent assembly of an essential dataset, this paper assesses these co-movements in selected advanced economies. We establish that increases in net household wealth are associated with deteriorations of the Net International Investment Position (NIIP). This pattern is primarily driven by valuation changes in wealth (mostly through house price appreciation). Overall, we find that capital gains on household wealth are strongly related to the accumulation of net external debt liabilities, a key indicator of financial vulnerability.

JEL-Code: F32, F34, E21

Keywords: household wealth, net international investment position, valuation effects, current account

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1 Introduction

This paper studies the link between two major stylized facts that have emerged since 1970 in advanced countries: (i) the rise in aggregate net household wealth, and (ii) the rise in international financial integration and the dispersion of net external positions (the value of foreign assets minus foreign liabilities). Past studies have established that swings in aggregate wealth are correlated with selected macroeconomic variables (Cooper and Dynan, 2013). However, this study is the first attempt to analyse the joint dynamics of changes in the Net International Investment Positions (NIIP) and household wealth.

In the past few decades foreign and domestic balance sheets have expanded considerably in advanced countries. The aggregate net wealth of the household sector, measured by the difference between total assets and total liabilities to national income, has increased on average from around 3 years of national income to 5 years in our sample of countries since 1970 (see Figure 1a), in large part due to house price appreciation (see for instance Piketty and Zucman, 2014 and Knoll et al. 2017) and it was accompanied by a similar trend in mortgage lending (Jorda et al. 2014 and Mian et al. 2015).[1] Moreover, the size of international balance sheets has risen dramatically from an average of 0.3 to over 6 years of national income, reflecting the considerable increase in the size of cross-border holdings and financial integration, (Lane and Milesi-Ferretti, 2007). This has led to diverging current accounts and net international investment positions, with the average net international investment positions reaching -40 percent of national income in 2013 in our sample (see Figure 1b). The aim of this paper is to document the linkages between these two key stylized facts.

This study is now possible due to recent assembly of a key dataset by Piketty and Zucman (2014), who have collected a dataset of harmonized wealth estimates measured at market value for selected advanced economies over the 1970-2013 period. We combine this with the External Wealth of Nations (EWN) from Lane and Milesi-Ferretti (2007). Whereas, previous studies have touched on the some of the individual components of household wealth (like house prices or stock prices), this paper explores the interlinkages between the aggregate net household wealth and the net international investment position both in terms of transactions and valuations.

What are the possible linkages between the dynamics of these two key variables? Households have direct exposures - through foreign deposits, bonds and real estate and funding from foreign banks - and indirect exposures - through their holdings and interactions with domestic banks and firms - to the rest of the world. For instance, unexpected (believed to be permanent) increases in household wealth, due to a rise in share prices or house prices above the general rise of prices for

[1] However, there remains considerable cross-country and time series heterogeneity in the composition of household holdings, but also in the valuation patterns of household wealth.

instance, can have ambiguous implications for the net external position. Namely, households could: (i) accumulate more international assets improving the stock of international assets, (ii) become less constraint and borrow more, leading to net debt inflows, or (iii) feel richer and therefore save less and spend more, deteriorating the current account.

In theory, under perfect capital markets households can smooth their consumption patterns over time and be less exposed to domestic output shocks through international risk sharing. Wealth will be allocated to the most productive economies (from high wealth to low wealth countries in search of higher returns). However, imperfections in the international capital markets and home bias in household portfolios could lead increases in wealth to act as a catalyst for domestic lending booms, or create bubbles in the non-tradable sector by miss-allocating capital inflows (see Lane and McQuade, 2012, Reis, 2013 and Piketty and Saez, 2013) or to have potentially negative effects on consumption and labour market outcomes.[2]

Accordingly, in order to get a clearer picture of these potential covariation patterns, this paper pursues three broad lines of analysis. First, we look at the relationship between changes in net international investment positions and net household wealth. Second, we use an accounting framework to decompose changes in wealth into cumulated flows and valuation adjustments, in order to assess if the increase in household wealth - due to saving induced wealth accumulation or capital gains - differentially affected a country's international holdings and transactions. Third, in order to investigate what category of asset or liability drives this co-movement, we decompose both net positions into their components. Namely, the net international investment position is broken down into net international equity and net international debt and household wealth is decomposed into housing assets, financial assets and financial liabilities. In addition, we provide a more detailed analysis of the contribution of capital gains associated with real estate.

What is the key empirical finding of this paper and how does it insert itself into the existing theoretical and empirical literature? To preview the results, this find that capital gains for the domestic household sector (mainly through house price appreciation) are associated with an accumulation of net international debt liabilities. Indeed, the data shows a striking negative correlation between changes in (lagged) household wealth and the net international investment position and the current account that survives the inclusion of the controls variables found in the literature. This relationship is driven by housing assets and financial liabilities components of household wealth (financial assets or even net financial assets are not found to be significantly correlated). Furthermore, it finds contrasting signs for the coefficient of savings induced wealth and valuation adjustments. Indeed, the savings induced wealth is positively associated with changes in the NIIP. However, the increase

[2]See the conceptual framework section for a more detailed discussion on the potential theoretical mechanisms linking household wealth to the NIIP.

in wealth due to capital gains is negatively linked with the external balance, giving some evidence of wealth or collateral effects, in line with Fratzscher et al. (2010). The results also show that the net international debt component of the NIIP-composed mostly of cross border bank loans- is an important driver of this co-movement.

Our analysis is in line with the expanding macroeconomic literature on balance sheets. In addition to the previously cited Lane and Milesi-Ferretti (2007) and Piketty and Zucman (2014), this research also builds on the literature analyzing transitory income shocks to the current account, see amongst others Kraay and Ventura (2000 and 2003), Tille and van Wincoop (2010) and Guo and Jin (2009). These papers focus on the shifts in international portfolios when countries are faced with an increase in savings, whereas this paper looks at the international implications of an increase in wealth due to savings and capital gains. The study of these imbalances are important as they are seen to be predictors of future crisis (Catao and Milesi-Ferretti, 2014) and can aggravate the impact of the crisis (Lane and Milesi-Ferretti, 2012).

Furthermore, considering the importance of real estate holdings for the household sector, this research is also related to the literature linking house prices to the current account and housing wealth effects. Concerning the former, there is no consensus on the direction of the causal link between capital inflows and house prices.[3] In relation to wealth effects, an array of papers show considerably different marginal propensity to consume out of different types of assets.[4] Given that real estate is a particular type of asset providing a potential return but also offering a service, an increase in its value yields various conflicting effects that depend on the development of mortgage markets (Skudelny, 2009) and tend to lead fluctuations in other variables (Slacalek, 2009).[5] On the other hand, Buiter (2010) argues there should be no real effects due to changes in house prices.[6] Additionally, given the distributional issues that arise with the increase in wealth, Kumhof et al. (2012) and Behringer and van Treeck (2015) who link the rise in inequality to the deterioration of current account balances are also pertinent.

This research has some potential policy implications for financial stability. Changes in household wealth can be associated with changes in net international equity position, leading to potentially more efficient risk sharing, or in the net international debt position, leading to an increase in the economy's external vulnerability. In our sample, the latter seems to prevail, potentially justifying macroprudential measures in order to mitigate these effects. In addition, if there is an increase

[3]Aizenman and Jinjarak (2009) argue that it is cross border capital inflows that affect house prices. On the contrary Favilukis et al. (2012) find this effect to be small in magnitude and Geerolf and Grjebine (2013) argue the causality goes in the other direction.

[4]See amongst others Ludwig and Slok(2004), Carroll (2004) and Aron et al. (2012).

[5]Particularities of real estate as an asset include its limited liquidity, the presence of an underlying mortgage, strong bequest motives and that it is predominantly held by residents.

[6]Buiter (2010) argues that house price appreciation increases by the same amount the cost of housing services, leaving no effect on aggregate demand.

exogenous or not in the (lagged) wealth-income ratio, policymakers should adjust their expectations for the net international investment position. Nevertheless, it is important to stress that we cannot talk about causality given the paper's setup.

The rest of this paper is structured in the following manner. First, it will analyze the conceptual framework and put forward the econometric specifications. Then, it will review the stylized facts and present the empirical results. Finally, it will conclude and give possible extensions.

2 Conceptual Framework

The aim of this paper is to build on the growing availability of data on stocks of assets and liabilities, in order to assess the impact of changes in household wealth on the external position. Given the potential heterogeneous behaviour between changes in balance sheet variables due to flows and valuation adjustments and also across the different categories of cross-border and household portfolios, this paper will breakdown both household wealth and international wealth. We do this in order to get a clearer picture of the underlying linkages.

In order to accomplish this, we will first present the simple accounting identity used to construct "notional" net international investment positions and saving induced wealth accumulation that are cleansed of their valuation component.[7] In a similar manner we will construct wealth-income ratios that are composed uniquely of valuation adjustments. We will then briefly outline the patterns that standard economic theory would lead us to expect.

2.1 Wealth Accumulation Methodology

Both international and household wealth can be decomposed into changes in *flows* and *valuation*, using a simple accounting framework. This identity states that the difference between the value of two stock variables between two dates is equal to the cumulated flows over the period and a valuation adjustment term. Piketty and Zucman (2014) and Lane and Milesi-Ferretti (2007) use this identity to derive the valuation term as a residual. Lane and Milesi-Ferretti use the cumulated current account as the flow and derive a Stock Flow Adjustment (SFA) term that encompasses both the valuation term and other statistical changes, see equation (1). Piketty and Zucman use constant private savings (encompassing household savings and firms' retained earnings) as the flow.[8] As they

[7] The "notional" NIIP consists of the cumulated current account balances added to the initial NIIP. Likewise for the "saving wealth-income ratio".

[8] Piketty and Zucman depart from the System of National Accounts (SNA) methodology by using private savings (household and firms) instead of household or personal savings. Modigliani and Miller (1958) famously showed there exists substitutability between corporate retained earnings and household savings. By using the SNA methodology, Piketty and Zucman find that capital gains are too large and correspond to the accumulation of corporate savings to finance new investment (ultimately increase stock prices), rather than to a true relative price effects. In our robustness checks we use both measures.

use constant values, the residual is a real capital gain, KG_t, that is the capital gains relative price effect vis a vis the GDP deflator, see equation (2).[9]

$$NIIP_{t+1} = NIIP_t + CA_t + SFA_t \tag{1}$$

$$W_{t+1} = W_t + S_t + KG_t \tag{2}$$

Using equation (1) and (2) respectively, we can then compute the valuation terms for both W_t and $NIIP_t$. Using this approach is not without its drawbacks (see Curcuru et al. (2008) amongst others). The KG_t and SFA_t terms also incorporate "net other" terms. For household wealth, it incorporates net other volume changes that contain new construction permits and the discovery of national resources for instance. However, the magnitude of these other volume changes is small in the countries that report them in our sample.[10] Similarly, for the decomposition of the NIIP, the residual includes net other adjustments that include data revisions, reclassifications and other statistical changes. We interpret the non-flow adjustment of the stock of wealth as a proxy for valuation changes by assuming statistical changes and errors do not follow a systematic pattern over time and countries. Moreover, it is important to note that the magnitude of these valuation adjustments can be sizable and dwarf the valuation adjustments on international wealth.

Furthermore, we construct a "notional", or a simulated wealth-income ratio that is cleansed of its valuation component, by simply adding the flows to the initial stock position, see equation (3). We also construct a capital gains induced wealth-income ratio, see equation (4), by adding the capital gains to the initial wealth income ratio (see the data appendix of Piketty and Zucman, 2014). We perform the same exercise to construct a notional net international investment position, see equation (5), by adding current account to the initial stock position. A drawback of this method is that it can be dependent on the choice of initial staring point. To account for this, we perform the exercise on multiple different initial dates without finding any significant difference.

$$\text{Sav } W_{t+1} = W_t + S_t \tag{3}$$

$$\text{KG } W_{t+1} = W_t + KG_t \tag{4}$$

$$\text{Notional } NIIP_{t+1} = NIIP_t + CA_t \tag{5}$$

[9]The authors compute two methods of decomposition, an additive method and a multiplicative method. We calculate both methods and see that using either measure does not alter the results.

[10]Total other volume changes (on financial assets + non-financial assets - liabilities) are small in magnitude. For instance, since 1979 total other changes average at 0.94 percent of national income per annum in France.

2.2 Theoretical Mechanisms

What does standard economic theory tell us about the expected correlations between net aggregate household wealth the Net International Investment Position? In a world with perfect capital markets, standard international macroeconomics predicts that domestic wealth would equalize across countries, as countries with high domestic capital stock would invest some of that capital in countries with low domestic capital in search of a higher marginal product of capital, building up a positive NIIP, and countries with low domestic capital stock would then run negative external balances. However this is not observed in the data, as summarized by Obstfeld and Rogoff (2001) for instance. Imperfections in international capital markets and home bias in household portfolios are sources of friction that could also lead to the buildup of domestic asset price booms.

A key question is do households believe the increase in wealth to be transitory or permanent? In the case of transitory positive shock, consumption theory predicts that households would increase their savings. We can build on the literature on portfolio growth versus re-balancing of the current account in cases of income shocks, where it is assumed that temporary increase in wealth equates to an increase in savings.[11] This strand finds that countries invest their marginal unit of savings abroad in the short run and both at home and abroad in the long run, keeping their portfolios share stable. The expected correlation between changes in wealth due to savings and the external balance is positive in the short run.

However, household wealth also varies because of fluctuations in the valuation of the assets.[12] Empirically, increases in capital gains wealth are relatively persistent, leading us to believe households could view them as permanent increases in wealth. Accordingly, we can build on the large literature on wealth and collateral effects. In this case, the expected co-movement between changes in wealth due valuation changes and the external balance is ambiguous. When the value of assets increases (due to a rise in share or in housing prices for instance), households may feel richer and spend more by increasing their lifetime consumption (of both domestic goods and foreign goods), deteriorating the external balance.[13] However, households could also save and increase their foreign asset holdings, thus improving the net international investment position. Moreover, on the liabilities side, an increase in net worth will relax households' liquidity constraints. Indeed, if household assets are worth more, they can borrow more, this is the classic "financial accelerator effect".[14] This can affect the external balances directly and indirectly. Households can directly borrow from abroad, or borrow from domestic banks that could in turn fund themselves abroad. Ultimately, this will

[11] See Kraay and Ventura (2000 and 2003), Tille and van Wincoop (2010) and Guo and Jin (2009).

[12] Kraay and Ventura (2000 and 2003) do not differentiate between increases in wealth due to savings and capital gains.

[13] However, wealth is more concentrated than income, thus the effect could be dampened as the holders of wealth have a lower marginal propensity to consume.

[14] See amongst others Bernanke (2009).

lead to a deterioration of the net international debt position of the country. This effect falls in line with the micro evidence of over-accumulation of debt in face of housing booms (see Mian and Sufi, 2009 for instance). Likewise, banks and firms see their financial constraints loosen and can borrow more as their assets are also worth more. Hence, the lending channel will impact the capital inflows and outflows of the country. Therefore, there can be self-reinforcing effects between the lending and demand channels.

3 Empirical Strategy

3.1 Econometric Specifications

As the focus of this paper is to assess the linkages between household wealth and the net international investment position, it performs a pooled panel OLS estimation of the following equation:

$$\Delta NIIP_{it} = \alpha + \beta \Delta W_{it-1} + \gamma X_{it} + \epsilon_{it} \tag{6}$$

Due to the presence of non-stationarity in our variables, we take the changes in both the dependent variable, the net international investment position ($\Delta NIIP_{it}$), and the independent variable, lagged household wealth (ΔW_{it-1}).[15] We use both annual data and a sample split into lower frequencies of two, three and four-year periods respectively. In order to reduce fears of endogeneity bias and to take into account the expected "sluggishness" of the link, we take the lagged value of our explanatory variable.[16] As this paper does not aim to establish new fundamental shifters of the NIIP, but simply to assess the additional explanatory power of household wealth in determining changes in the net international investment position, we control for the macroeconomic fundamentals of the existing literature, building upon Lane and Milesi-Ferretti (2002). Thus X_{it} represents real USD per capita national income (in natural log form), the demographic structure (the ageing speed) and the change in public debt (see Lane and Milesi-Ferretti 2002 and 2012).[17]

Accordingly, our econometric strategy is in three steps. Our first step is to regress the changes in the net international investment position on the lagged change in household wealth, controlling for other variables. Second, we will then decompose the right and left hand side stock variables in terms of flows and valuation effects. In other words, we break down the net international investment

[15] After first differencing the variables, one can reject the hypothesis that the residuals contain a unit root using standard panel unit root tests. Additionally, panel cointegration reveal no statistically significant relationship.

[16] In addition, to address the problem of omitted variable bias we also perform an OLS regression with country fixed effects and multiple other controls, the results remain similar in magnitude and significance, see robustness checks section.

[17] We also control for additional demographic variables like old and young age dependency ratios. However, Lane and Milesi-Ferretti (2012) argue that ageing speed is a better indicator for the NIIP. Ageing speed is constructed as the projected difference between the old age dependency ratio in year t+20 and the ratio in year t.

position into the cumulated current account and its valuation component, whereas household wealth is split into changes in wealth due to the accumulation of savings and capital gains. Third, we disaggregate both the right and left hand side variables into their respective components, with the wealth-income ratio divided into gross housing assets, financial assets and liabilities and the net international investment position into net international equity and net international debt.[18] Importantly, our econometric specification does not allow us to identify a causal link between our variables, only covariation patterns.

3.2 The Data

We draw on two key datasets, the updated versions of the External Wealth of Nations (EWN) and the Wealth and Income database (WID). Piketty and Zucman (2014), in the updated WID, have compiled a dataset of harmonized wealth estimates measured at market value following the accounting recommendations of the U.N. System of National Accounts (SNA 1993 and 2008).[19] The series covers 11 countries from 1970-2013, and 14 countries for shorter time series.[20] These countries represent a large part of the developed world, totalizing between 60 and 70 percent of world GDP between 1970 and 2013. In the EWN dataset, Lane and Milesi-Ferretti derived estimates of external balance sheets for 145 countries over the 1970-2014 period using a consistent valuation methodology. All variables are in percent of net national income.

According to the SNA guidelines, the net wealth of a sector of an economy, or "net worth", is the difference between assets and liabilities of the residents of the country in that sector. The national accounts statisticians estimate the value of net wealth for households and NPISH, the corporate sector, the public sector and the foreign sector.[21] These assets and liabilities can be broken down into financial and non-financial assets and in turn into subcategories. Financial assets are decomposed into currency, deposits, bonds and loans, equities and fund shares and life insurance and pension fund. Whereas non-financial assets can be of three sorts, housing assets, business assets and other non-financial assets. Housing assets can be divided into land underlying dwellings and dwellings (when the split is available in the data), whereas business assets are decomposed into agricultural land and other domestic capital (primarily composed of offices, structures, machines, patents, etc.). Each component of household wealth has varying degrees of volatility and liquidity. The market value of business assets for example is very stable in most countries. This is also the

[18]The net international equity (debt) is the difference between total international equity (debt) assets and total international equity (debt) liabilities.

[19]This definition of wealth does not account for human capital (like households' knowledge and skills or future expected earnings) given the difficult to assign monetary value to it.

[20]The results of our regressions do not change significantly if we use the balanced or unbalanced sample of countries. List of countries in the full sample: United States, United Kingdom, Denmark, France, Germany, Italy, Sweden, Canada, Japan, Spain, Australia. The Unbalanced sample has Greece, Korea, and Czech Republic in addition.

[21]Non-profit Institutions Serving Households (NPISH) are merged with the household sector by convention.

case for currency, deposits, bonds and loans, which are less subject to valuation effects than equities for instance. Additionally, it should be noted that real estate is a particular type of asset that provides a service but also a potential return, remains relatively illiquid vis-a-vis other assets and is predominantly held by residents.[22]

From the outset, it is important to stress that while there is a growing availability of both international and sectoral balance sheets, there still exits several limitations to our study pushing us to be prudent in our conclusions. For instance, we do not have time series data on the direct foreign exposures of the different sectors and particularly households prior to 2001.[23] Indeed, the wealth estimates of Piketty and Zucman (2014) are compiled on the residency basis and thus we cannot distinguish between foreign held or domestically held assets of the households. Households' direct exposures to the rest of the world (though foreign deposits, bonds and real estate and funding from foreign banks) are relatively small in magnitude, as the bulk of cross border transactions are undertaken by banks.[24] Nevertheless, households are also indirectly exposed through their interactions with domestic banks or corporations.[25] Hence, given the nature of the financial linkages and data available, looking at the co-movement between household wealth and the external position seems like the best approximation to study the time series of the ultimate exposures of households to financial integration.[26] Another drawback is that the data on foreign wealth and transactions do not capture all the cross border transactions and holdings of households, as Zucman (2013) shows that rich residents can hold an increasing amount of assets in tax heavens that do not appear in the official net international investment positions and in our results.[27] Cross-border holdings of high wealth households that are not intermediated by the domestic financial system are also not directly captured in Balance of Payments or International Investment Position surveys. Furthermore, given the aggregate nature of our explanatory variable, we cannot say much regarding the distribution of wealth in our setup.

[22]There exists limited coverage of cross-border residential real estate transactions and exposures in balance of payments data, although recent efforts have been made to take into account these transactions and holdings, see Curcuru et al. (2008).

[23]The year 2001 marked the beginning of large scale reporting of the Coordinated Portfolio Investment Survey (CPIS).

[24]Households held a relatively stable portion of around 3% of total foreign portfolio holdings between 2004 and 2014, see Galstyan et al. 2015, indirect holdings through mutual funds for instance can be larger.

[25]Either directly through their equity holdings of these domestic firms or by the behaviour of these firms. For instance, Lane and McQuade (2014) show that net foreign debt fuelled an increase in domestic lending in the Euro area through an increase in domestic banks balance sheets.

[26]Additionally, it is housing and not financial assets that drives our results, mitigating fears that our specification only captures a mechanical correlation due to the net foreign exposures of households.

[27]It is not possible to measure the portfolio securities entrusted by households to offshore custodian banks, estimated to be around 6% of household financial wealth globally.

4 Stylized Facts

This paper investigates the joint dynamics between household wealth and the net international investment position. As discussed above, net household wealth has increased considerably on average in our sample, as the average external balance has deteriorated. However, these trends hide considerable heterogeneity across countries in terms of levels of net wealth, the composition of holdings and the contribution of transactions and valuation adjustments to changes in the levels of wealth.

4.1 The Net Household and External Positions

Figure 3a plots the change in the net household wealth between 1973 and 2007 against the change in the net international investment position. We see there is a negative bivariate relationship between the two variables. Whereas household wealth has increased in our sample, with median values increasing in our sample increasing from around 3 years of national income to 5 years since 1970 (Figure 1a), the median net international investment position has deteriorated, (see Figure 1b). We subsequently study these two patterns and the cross-country heterogeneity behind them.

Figure 1a shows the considerable increase in net aggregate household wealth since 1970, documented by Piketty and Zucman (2014).[28] Across countries, values of net household wealth ranged from 2 and 4 years of national income in 1970 and between 4 and 6 year in 2013. Piketty and Zucman (2014) put forward two main channels that explain this increase, a recovery of unusually low asset price (helped by a series of financial deregulation policies) and high saving rates coupled with low growth rates.[29] In spite of this relatively homogeneous increasing trend, patterns across countries can differ considerably, due to a multitude of factors like different cross-country trends in real estate or stock market prices or differences in national pension schemes for instance.[30] There has been big increases in net wealth in Spain and Italy, but more moderate rises in Canada, Germany and Japan (since the 90s, after the end of the bubble).[31] For instance, the increasing value of housing was the main driver in the increases in wealth in Italy, Spain, Australia and France, whereas financial assets appreciation dominated in Canada and the United States. Interestingly, Japan followed both of these trends, with housing consisting of the bulk of the rise prior to the 1990

[28] The size of household balance sheets, measured by the ratio of total assets and total liabilities to national income, has also increased on average from around 3.5 years of national income to 7.5 years since 1970, see Figure A1.

[29] The increase in household wealth could also be partly due to transfers from the corporate or public sector. Accordingly, it is important to study their joint dynamics. We control for the change in public debt in our main specifications and the net lending of the corporate sector in our robustness checks.

[30] There exists a variety of explanations for the disparity in levels of wealth between advanced countries. These include household participation to financial markets, social security, cultural norms influencing the level of debt, see Bonis et al. (2013).

[31] The composition of household holdings also varies considerably across countries. Some countries holding a higher share of housing (France for instance) and others with higher equity ownership (the United States and the United Kingdom for example).

crisis and financial assets post crisis.[32] Digging deeper into housing assets, we see large part of the increase in the stock is due to the value of the land underlying dwellings as opposed to the value of the dwellings themselves.[33] However, this general rise in house prices was absent in Germany and Japan, where house prices fell in real terms during that period. This was notably attributed to excessive supply after a construction boom following the reunification in Germany and the bursting of the housing bubble in the early 1990s in Japan's case.

On the financial liabilities side, even if households' net position has improved, they have also considerably increased their indebtedness, confirming the trend in depicted by Jorda et al. (2014). Mortgage markets have also become progressively developed and deregulated, increasing the liquidity of housing wealth as it has become easier for households to adjust their portfolios and borrow against housing wealth. In our sample, the mean household financial liabilities increased from 47 percent of national income in 1970 to 108 percent in 2010, with Australia, Japan and the United Kingdom on the high end of the spectrum, and relatively moderate increases in France and Canada (36 and 28 points respectively), and very low increases in Germany (11 percentage points). A closer look at German household financial liabilities show they have decreased over the 1970-2013 period 68 to 66 percent of national income, with a slight increase in late 1990s to 85 percent of national income. In Japan, there was a large buildup of liabilities until the early 1990s and since then they have been stable at around 100 percent of national income.

Moreover, the size of international balance sheets has risen dramatically from an average of 0.3 to over 6 years of national income, reflecting the considerable increase in the size of cross-border holdings and financial integration, (Lane and Milesi-Ferretti, 2007). This has led to diverging current accounts and net international investment positions. Figure 1b shows that the median net international investment position has gradually deteriorated, mostly due to an accumulation of net international debt. In our sample, the number of countries undergoing deteriorations and improvements of their external balance is relatively balanced since 1980.[34]

The large accumulation of net international assets in Japan and Germany is in stark contrast to the accumulation of net international liabilities in Spain. Indeed, Figure 2 shows that the country with the highest (lowest) household wealth is the country with the biggest net international investment position deficit (surplus). Whilst most of the countries in our sample had positive net international equity positions in 2007, Japan, Spain and Australia have negative balances, with

[32]Breaking down household financial assets, we see some disparity within our sample that can be traced back to the pension schemes in place. In some countries, life insurance and pension funds wealth is the largest component of financial wealth, like in the United States, Australia and Canada. However, currency, deposits, bonds and loans represent the largest component in Germany, France, Japan, Spain and Korea. Additionally, some countries like Germany have particularly low equity holdings vis-a-vis the sample median.

[33]The breakdown is not available however for all countries.This confirms the findings of Knoll et al. 2017.

[34]The United States, the United Kingdom, France, Italy, Spain and Australia have suffered deteriorating balances, whilst Denmark, Sweden, Canada, Japan and Germany have experienced improvements.

Japan being the only country in our dataset with a positive net international debt position.[35] In terms of change, all countries bar Japan and Germany have experienced a negative change in their net foreign debt balance since 1980, indicating increased reliance on debt liabilities as a source of external finance (see for instance Lane and Milesi-Ferretti, 2014). However, Spain is an outlier as in has experienced a deterioration of both its external debt and equity positions.

4.2 Flow and Non-Flow Adjustments of Household and International Balance Sheets

Turning to the adjustment of wealth in terms of flows and valuation changes, we plot the change in the net household wealth due to savings (Figure 3c) and capital gains (Figure 3b) against the change in the net international investment position. We see that the capital gains (savings) wealth-income ratio is negatively (positively) associated the net international investment position.

In relation to the decomposition of household wealth, Figure 1a shows the median savings wealth-income ratio increase from 300 percent to 400 percent of national income. However, despite the general rise in wealth, the saving induced wealth-income ratio is decreasing in a number of countries since the 1980s and 1990s, like in the United States, the United Kingdom, Australia, and Spain. We see that the accumulation of savings is rising but at a slower pace than total wealth in Denmark, France, Italy and Japan, giving rise positive capital gains. This is in stark contrast to the accumulation profile of Germany (or to a lesser extent Sweden) for instance, who have consistently experienced capital losses on household wealth since 1970, (see Table 1). Furthermore, these valuation patterns can be very large in magnitude and dwarf the valuation adjustments on international wealth. Indeed, on the eve of the global financial crisis, the cumulated capital gains on household wealth in the United States reached nearly 200 percent of national income, whereas the cumulated SFA on international wealth was under 50 percent of national income.

Moving to the relative role of cumulated current account balances and valuation effects in the dynamics of the net international investment positions. Table 2 shows that all countries apart from Japan and Germany were ruining negative net international investment positions on the eve of the crisis. However, only the United States, the United Kingdom, Spain and Australia ran cumulated current account deficits over the 1980-2007 period. Moreover, the cumulated SFA term only contributed positively to the change in external position in the Anglo-Saxon countries (the United States, the United Kingdom, Australia and Canada). All the other countries in our sample experienced losses on their cross-border wealth over that period.

In summary, net household wealth dynamics - and particularly capital gains- seem to be closely tied to net international investment position - and particularly net international debt positions- in

[35]Indeed, Japan is "long debt, short equity", unlike most advanced countries who are "short debt, long equity".

our sample of countries over the 1970-2013 period.

5 Empirical Results

5.1 The Net International Investment Position and Household Wealth

Table 3 shows a clear negative association between changes in the lagged value of the household wealth and the net international investment position of the countries of our sample over the 1971-2013. This relationship survives the inclusion of the literature's set of control variables. Additionally, the results hold at lower frequency patterns, splitting the sample into two, three and four year periods, and multiple other specifications (Table 6 and A2).[36]

We find that an increase of 10 percent of the change in the lagged wealth-income ratio is associated with a negative change in the net international investment position to national income ratio of 0.7 percent. The sign, significance and magnitude of this coefficient survives across all specifications. In terms of magnitude of the coefficients, an increase in one standard deviation of lagged household wealth decreases the net international investment position by 0.2 standard deviations, everything else constant.[37] Post 1990, 10 percent increase in the change of wealth leads close to a 1 percent deterioration in both the yearly and split samples, see Table 7. We do take note of a considerable jump in R^2 when looking at the current account. We see that between column (1) and (4), the R^2 jumps from 6 to 17 percent. This may be due to the considerable noise of the SFA term.[38]

Decomposing wealth, we see the change in the saving induced wealth-income ratio is positively associated with the two dependent variables (insignificantly however in the first case), in line with Kraay and Ventura (2000 and 2003). In contrast, the change in capital gains induced wealth-income ratio is negatively associated with changes in the NIIP and the current account. A 10 percent increase in the lagged change of capital gains induced wealth is correlated with a deterioration of 0.8 percent of the change in NIIP and 0.4 percent of the current account, everything else equal. In contrast, an increase of the same amount in the saving induced wealth income ratio is associated with an increase of 2.8 percent of the change in the current account.

Following the permanent income hypothesis, one would expect a wealth increase due to capital gains to have contrasting effects depending on if the gain is seen to be temporary or permanent. Households would be more likely to increase savings in response to the increase in temporary "excess wealth", leading to a current account surplus. On the other hand, a permanent increase in lifetime

[36] As shown in Table 6, narrowing our sample down to the post 1990 period, we see that the magnitude of our results are considerably strengthened.

[37] This is higher than any of the control variables.

[38] A related topic is the possible stabilization or destabilizing role of the SFA term. In other words, in light of an increase in household wealth does the valuation of foreign wealth co-move in the same direction. Here, the effect seems to be slightly dampened when we cleanse the NIIP of the SFA.

wealth would push households to consume or borrow more, leading to a current account deficit and a deterioration of the net international investment position. There is strong persistence in the changes of the observed change in household wealth, in the savings induced wealth and the valuation wealth.[39] This indicates that households may believe these changes to be permanent. Overall, we find suggestive evidence of a relaxation of constraints.

Turning to the control variables, the sign of the coefficients seem to be somewhat in line with the predictions of theory. The coefficient of the change in public debt (non-significant for the NIIP regressions but significant for the current account) is negative, in line with the literature where the Ricardian equivalence does not hold. Income does not seem to matter in our main specification, which could be expected given the advanced nature of the economies in our sample. Turning to our demography variable, we see that ageing speed is positively associated with changes in the net international investment position. This is to be expected as countries where the population is getting old more rapidly would tend to increase their savings, improving the external position everything else equal.[40]

5.2 Decomposing the NIIP and Household Wealth

Considering that net household wealth incorporates both financial and non-financial assets, but also the indebtedness of households, we desegregate the wealth-income ratio into housing assets, financial assets and liabilities, and perform the same regressions stated in equation 1, in order to assess if the different components of household wealth have different covariation patterns with the external position. Table 4 shows that changes in housing assets and financial liabilities are the main drivers of the correlation with the net international investment position. Surprisingly, financial assets do not play a role in the association.[41] The magnitude of the effect increases further when we look at the post 1990 period.[42]

Controlling for other factors, we see that a 10 percent increase in the lagged change housing assets relative to national income is associated with negative change in the NIIP of 1.2 percent of national income. On the other side, an increase in the change of household financial liabilities is also significantly negatively associated with the change of both the observed and the current account. This could be in line with the literature on "over-borrowing" in times of housing booms.

Next, we decompose our dependent variable. The net international investment position can be divided into net international equity and net international debt positions. This allows us to

[39] For all our sample, the AR(1) of the change in household wealth is 0.63, savings wealth 0.89 and capital gains wealth 0.61. Results available upon request.

[40] We take the lag of all our control variables as a robustness check and the results do not change.

[41] Further decomposing financial assets, we see a significantly positive effect of life insurance and pension fund wealth.

[42] Results available upon request.

check through which channel the increase in household wealth affects the external position. We find that by and large the relation linking household wealth (in its capital gains induced accumulation but also in its housing component) to the net international investment position goes through the net international debt position, see Table 5. Like before, the magnitude of the coefficients are reinforced when analyzing the post 1990 period. We find that a 10 percent increase in the lagged change of household wealth is associated with a deterioration of 0.6 percent in the change of the net international debt position. However, the effect on net international equity is nonexistent. Additionally, it is the capital gains wealth income ratio that drives the correlation, with the savings induced wealth having no significant effect, everything else constant. If we further decompose the net international debt position into net other investment and net portfolio debt, we see that the former is responsible for the negative association, in line with our easing of financial constraints narrative as net other investment is primarily cross-border bank loans.[43]

Furthermore, looking at the breakdown of the different components of household wealth and the net international equity and net international debt positions, we see that it is again the housing assets and liabilities components that drive the correlation and financial assets are not significantly associated with either net equity or net debt.

Finally, we look at the accumulation of housing assets in particular. In Table 6, we apply the same accounting framework to the variations in the value of the housing stock.[44] Decomposing between residential investment and a residual capital gains term, we see that both components are negatively correlated with the change in the net international investment position. This is in line with the current account literature, where residential investment is traditionally a good predictor of the current account balance. The effect also gets larger in magnitude after 1990. On the net international investment position side, net international debt is responsible for the correlation, with the lagged change in residential investment induced housing wealth-income ratio strongly negatively correlated with the change in the net international debt position.

5.3 Extensions and Robustness Checks

There are several candidates for omitted variable bias in our analysis. Although our sample includes exclusively developed countries, there remains substantial differences in institutions and regulation between countries. For instance, mortgage markets structures or social pension systems can vary considerably within our sample of countries and other country-specific competing explanations are

[43]However, no household wealth variables (components or decomposition) are significantly associated with net foreign portfolio debt. Results available upon request.

[44]Due to lack of data, we assume a uniform residential depreciation rate of 1 percent, in order to compute the net residential investment flow. We also perform robustness checks for 0.5 and 1.5 and the results are very similar.

also possible.[45] With all this in mind, we estimate our main econometric specification using country fixed effects in Table 7. The sign, magnitude and significance do not change compared to our original results. Additionally, financial deregulation might also be an omitted variable. To control for this, we use the Economic Freedom index (both the total score and the sub-score related to regulation of credit, business and labour) and the Financial Reform Index constructed by Gwartney et al. (2015) and Abiad et al. (2008) respectively.[46] However, the magnitude of the effect does not change. Table 7 also shows that changing the initial date of our wealth decomposition from 1970 to 1980 (or later depending on data availability) does not change our results. Moreover, we perform additional robustness checks by splitting the sample into two, three and four year periods with results reported in Table 7. For completeness we also lag all our controls, without altering the results. Finally, if we use the flow of savings and capital gains instead of the change in notional stock positions the results are unchanged.

Additionally, fluctuations in the valuation of international assets could have an impact on rich households that hold foreign assets. However, the magnitude of valuation changes of foreign wealth (SFA) is relatively small vis-a-vis capital gains on household wealth. Also, as documented by Zucman (2014), a proportion of the "super rich" have a tendency to hide their assets in tax havens, which could complicate the identification of their reaction to SFA changes.

6 Concluding Remarks

In this paper, we relate the rise in household wealth to deteriorations of the net international investment position in advanced countries over the 1970-2013 period. In particular, we establish that capital gains for the domestic household sector (mainly through house price appreciation) are associated with an accumulation of the net international debt liabilities.

In relation to our main findings, we observe conflicting patterns between the two channels of wealth accumulation (changes in savings and the valuation adjustments) and cross-border financial holdings. Indeed, we find that (lagged) saving induced wealth accumulation is not correlated with the net international investment position and the cumulated current account, whereas capital gains on wealth are the force driving the overall negative associaton.[47] Moreover, breaking down aggregate household wealth into its housing assets and financial assets and liabilities components, we see the

[45] Mortgage markets differ on the method of fixation of rates (fixed versus variable), on the maximum loan to value ratio or on taxation for instance. Wealth estimates are constructed using national sources, thus permanent differences in accounting methodology could also potentially drive the results.

[46] For the Economic Freedom index, as there are only values every five years for the years prior to 2000, we linearly interpolate.

[47] A related issue is the extent to which households believe that the increase in wealth due to capital gains is transitory or permanent? Following the permanent income hypothesis, households would be more likely to increase savings in response to the increase in temporary "excess wealth", leading to a current account surplus. However, as capital gains are persistent over time, households could be led to believe these adjustments are permanent.

negative correlation is driven by housing assets and financial liabilities (mainly mortgage loans for households). Indeed, household financial assets are surprisingly not significantly correlated with the net international investment position. Similarly, if we look at the net international debt and equity positions, we see that household wealth is also negatively associated with the net international debt position also through its housing components (assets and liabilities). This gives further evidence that real estate dynamics and external vulnerabilities are strongly linked.

In turn, these findings have implications for the design of macroprudential policy framework and the monitoring of excessive imbalance. Overall, the main channel driving the negative relationship between household wealth and the external balance operates through valuation adjustments of household wealth (particularly on housing assets) and the net international debt (and particularly net other investment) position. This gives suggestive evidence of a collateral effect, where households could increase their borrowing when faced with an increase in the value of their assets. The accumulation of net international debt liabilities could create potential vulnerabilities in cases of shocks, given the non-state-contingent nature of debt. Moreover, it is the net other investment category of the external debt balance that drives the results, indicating an important role of bank loans and cross-border banking and a possible motivation for macroprudential measures. Accordingly, particular attention should be given to increases in household wealth - especially due to capital gains- in order to enable policymakers and regulators to identify and monitor the buildup of vulnerabilities and enact the appropriate macroprudential policies.

Due the limitations of the data, we can only look at the covariation patterns in an indirect manner. Future extensions will look to build upon the recent advances in data collection of net external exposures of different sectors of the economy and the increasing availability of bilateral data. Additionally, another angle that merits further investigation is the distributional issues arising from the rise in household wealth and their link to the external balance. Indeed, in our setup we capture the aggregate effect of wealth swings. However, the distribution of wealth varies over time and between different types of people, who are more or less financially constraint or have different marginal propensity to consume for instance. In turn, this could lead to heterogeneous effects on the external balance of an economy. The growing data on the distribution of wealth should help disentangle the conflicting effects across income group.

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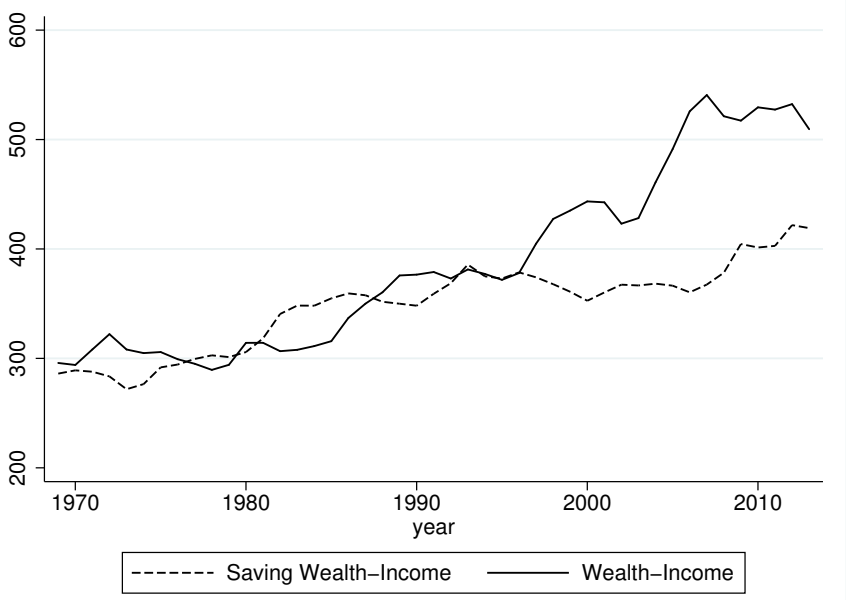
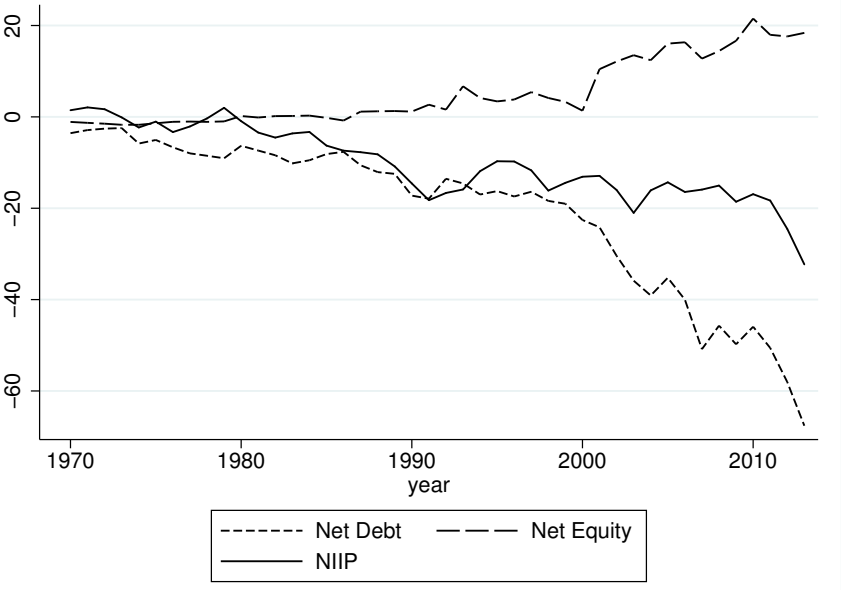
Figure 1: Household and International Net Positions



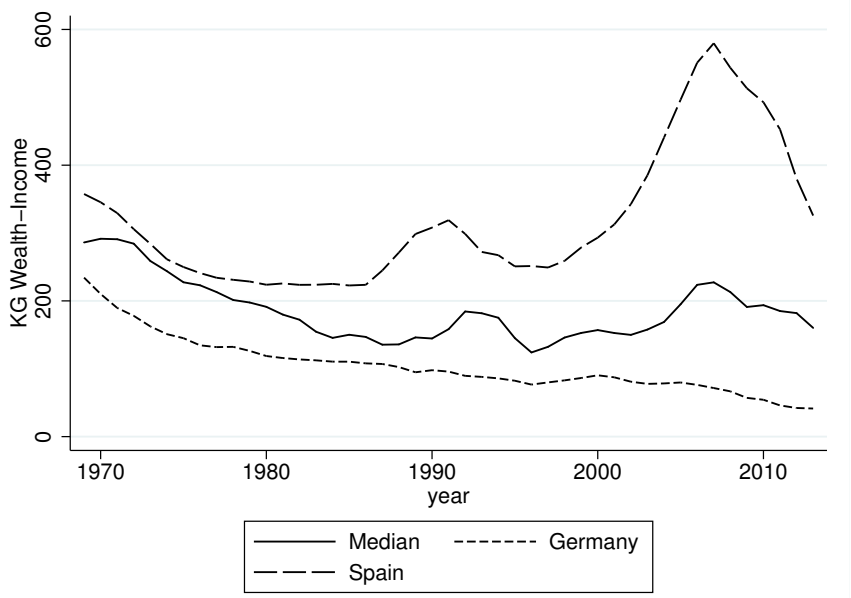
(a) Household Wealth-Income Ratio



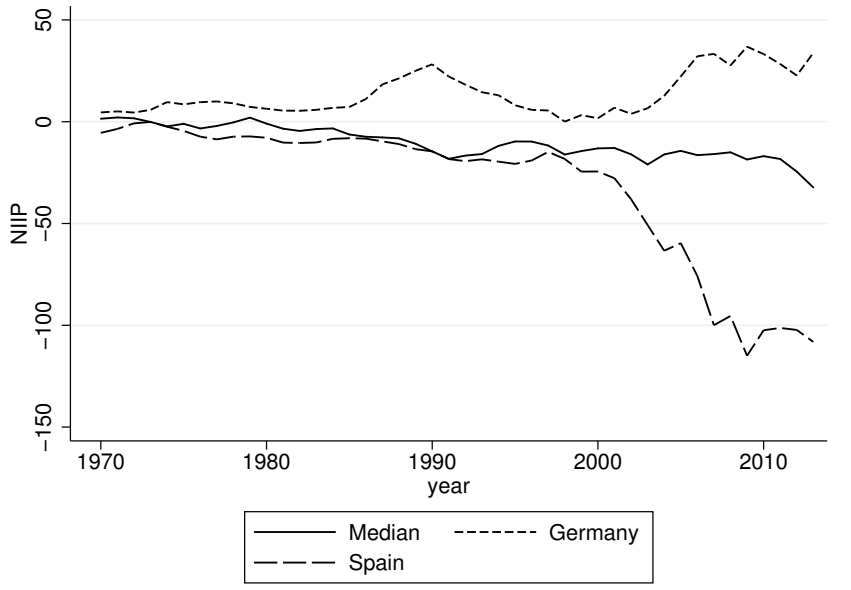
(b) Net International Investment Position

Note: Median values for sample of countries, in percent of national income. Household wealth-income ratio is the difference between assets and liabilities. The saving household wealth-income is the initial wealth-income ratio plus the cumulated saving flows. The Net International Investment Position (NIIP) is the difference between foreign assets and liabilities. The Net Debt Position is the difference between international debt assets and international debt liabilities. The Net Equity Position is the difference between international equity assets and international equity liabilities.

Figure 2: Capital Gains Wealth-Income and the NIIP



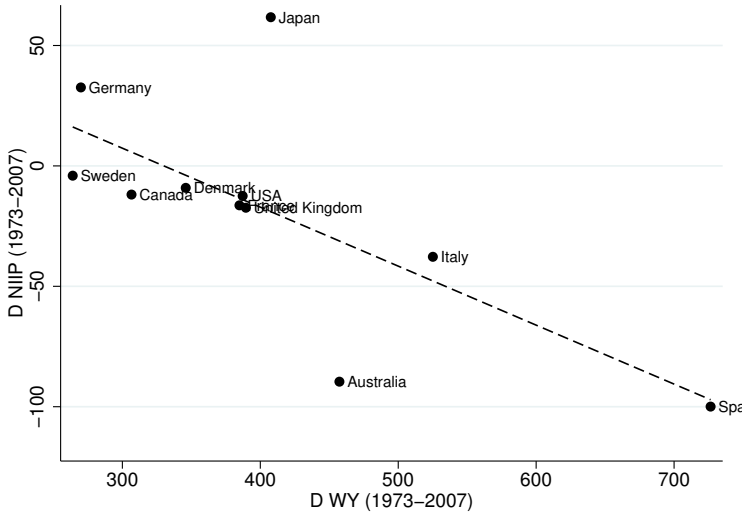
(a) Capital Gains Wealth-Income Ratio



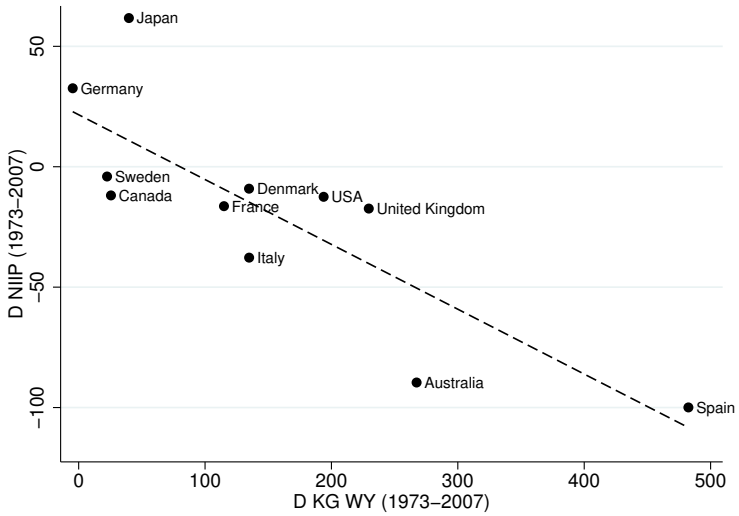
(b) Net International Investment Position

Note: Median, values for sample of countries in percent of national income. The capital gains household wealth-income is defined as the initial wealth-income ratio plus the cumulated capital gains. The Net International Investment Position (NIIP) is the difference between foreign assets and liabilities. As of 2007, Germany had the minimum (maximum) value for the capital gains wealth income ratio (net international investment ratio) and Spain the maximum (minimum) value for the capital gains wealth income ratio (net international investment ratio).

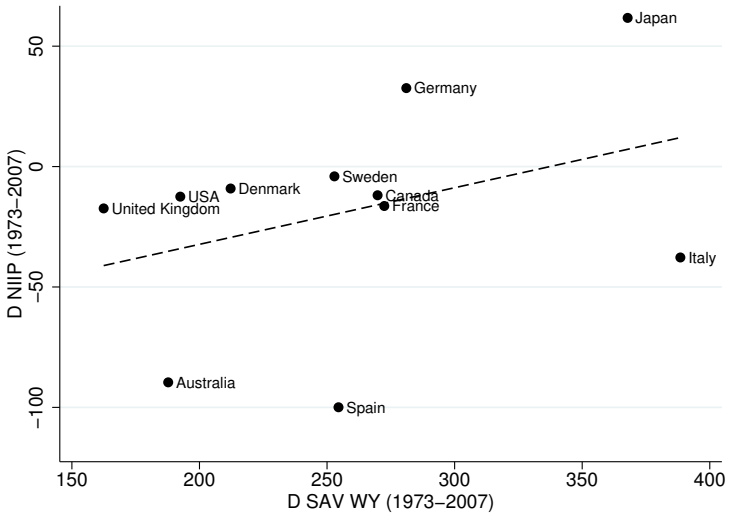
Figure 3: Bivariate Relationship between Household and International Wealth



(a) Household Wealth & NIIP (1973-2007)



(b) Capital Gains Wealth-Income & NIIP (1973-2007)



(c) Saving Wealth-Income & NIIP (1973-2007)

Table 1: Household Wealth Decomposition 1980-2007

	Country	**1980**	**2007**	**Δ1980-2007**	**ΔSaving**	**ΔResidual**
Valuation Gains	USA	337	509	172	-63	89
	UK	291	541	250	-5	130
	Denmark	207	438	232	85	74
	France	314	545	231	113	58
	Italy	317	646	329	186	74
	Spain	372	842	470	0	356
	Australia	338	581	243	-69	178
Valuation Losses	Sweden	216	358	142	98	-38
	Canada	264	402	137	64	-56
	Japan	434	578	145	134	-80
	Germany	253	373	120	96	-47
	1st Quartile	278	420	144	-26	-14
	Median	317	541	231	64	74
	3rd Quartile	355	580	247	106	120

Note: Δ Savings is the percentage point difference between the savings induced wealth income ratio 1980-2007 and Δ residual is the point difference of the capital gains induced wealth income ratio. The initial date for the decomposition of the wealth accumulation is 1970.

Table 2: International Wealth Decomposition 1980-2007

Country	**1980**	**2007**	**Δ1980-2007**	**ΔCA**	**ΔSFA**
USA	5.8	-12.2	-18.0	-55.8	37.9
UK	7.0	-16.9	-23.9	-26.0	2.1
Denmark	-48.6	-12.2	36.4	63.6	-27.2
France	4.3	-16.5	-20.8	12.4	-33.2
Sweden	-17.3	-3.7	13.6	72.4	-58.8
Canada	-41.9	-15.9	26.0	20.1	5.9
Japan	1.2	62.0	60.8	72.1	-11.2
Germany	6.4	33.3	26.9	27.6	-0.6
Italy	-0.9	-37.8	-36.9	0.0	-36.9
Spain	-7.9	-100.0	-92.1	-45.0	-47.1
Australia	-37.5	-91.1	-53.6	-60.9	7.3
1st Quartile	-39.7	-27.4	-30.4	-35.5	-35.1
Median	-0.9	-15.9	-18.0	12.4	-11.2
3rd Quartile	5.1	-8.0	26.5	45.6	4.0

Note: Δ CA is the percentage point difference between the notional NIIP constructed as the cumulated current account balances 1980-2007 and Δ SFA is the point difference of the valuation induced NIIP. The initial date for decomposition of the NIIP is 1970.

Table 3: OLS-Main Specification: Annual Sample 1971-2013

	(1) ΔNIIP	(2) ΔNIIP	(3) ΔNIIP	(4) CA	(5) CA	(6) CA
Lag Δ Wealth-Income	-0.071***			-0.036***		
	(0.022)			(0.013)		
Lag Δ Sav Wealth-Income		0.083			0.280***	
		(0.094)			(0.049)	
Lag Δ KG Wealth-Income			-0.080***			-0.047***
			(0.022)			(0.013)
Ageing Rate	0.160***	0.146***	0.159***	0.203***	0.196***	0.202***
	(0.036)	(0.037)	(0.036)	(0.020)	(0.019)	(0.020)
Income per capita	-0.775	0.102	-0.521	-0.932**	0.236	-0.818*
	(0.684)	(0.769)	(0.678)	(0.436)	(0.471)	(0.435)
Δ Public Debt	-0.061	0.057	-0.072	-0.176***	-0.137***	-0.189***
	(0.072)	(0.083)	(0.073)	(0.041)	(0.037)	(0.042)
Observations	531	533	532	531	533	532
Adjusted R^2	0.06	0.03	0.07	0.17	0.21	0.19

OLS regression with robust standard errors in parentheses. The dependent variable is the change in NIIP from col (1)-(3) and the current account balance from (4)-(6). The wealth-income ratio is decomposed into a savings induced accumulation and capital gains accumulation. All stock variables are in changes. Income per capita is real USD national income per capita and is in natural logs. All variables are in percent of National Income. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: OLS-Wealth Components Annual Sample 1971-2013

	(1) ΔNIIP	(2) ΔNIIP	(3) ΔNIIP	(4) CA	(5) CA	(6) CA
Lag Δ Housing Assets	-0.125***			-0.086***		
	(0.033)			(0.016)		
Lag Δ Financial Assets		0.005			0.015	
		(0.039)			(0.021)	
Lag Δ Financial Liabilities			-0.341**			-0.381***
			(0.145)			(0.077)
Ageing Rate	0.149***	0.148***	0.164***	0.203***	0.198***	0.216***
	(0.036)	(0.037)	(0.038)	(0.019)	(0.020)	(0.020)
Income per capita	-0.558	-0.134	-0.189	-0.786*	-0.321	-0.398
	(0.704)	(0.696)	(0.700)	(0.445)	(0.440)	(0.449)
Δ Public Debt	-0.062	0.056	-0.011	-0.157***	-0.113***	-0.192***
	(0.070)	(0.082)	(0.100)	(0.037)	(0.039)	(0.051)
Observations	483	529	529	483	529	529
Adjusted R^2	0.09	0.03	0.05	0.23	0.14	0.21

OLS regressions on yearly sample. All variables are in % of National Income. Robust standard errors in parentheses. The dependent variable is the change in NIIP from col (1)-(3) and the current account balance from (4)-(6). The wealth-income ratio is decomposed into its subcomponents housing assets, financial assets and liabilities. All stock variables are in changes. Income per capita is real USD national income per capita and is in natural logs. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: OLS- NIIP Breakdown Annual Sample 1971-2013

	(1) ΔNet Equity	(2) ΔNet Equity	(3) ΔNet Equity	(4) ΔNet Debt	(5) ΔNet Debt	(6) ΔNet Debt
Lag Δ Wealth-Income	0.003			-0.062***		
	(0.013)			(0.016)		
Lag Δ Sav Wealth-Income		-0.021			0.092	
		(0.071)			(0.076)	
Lag Δ KG Wealth-Income			0.000			-0.067***
			(0.014)			(0.017)
Ageing Rate	0.104**	0.102**	0.104**	0.031	0.020	0.030
	(0.045)	(0.044)	(0.045)	(0.042)	(0.042)	(0.042)
Income per capita	2.129***	2.122***	2.115***	-2.749***	-1.964***	-2.525***
	(0.636)	(0.732)	(0.640)	(0.591)	(0.752)	(0.596)
Δ Public Debt	-0.086	-0.072	-0.090	0.025	0.118*	0.019
	(0.066)	(0.062)	(0.068)	(0.061)	(0.065)	(0.062)
Observations	531	533	532	531	533	532
Adjusted R^2	0.02	0.02	0.02	0.05	0.02	0.05

OLS regressions on yearly sample. All variables are in % of National Income. Robust standard errors in parentheses. The dependent variable is the change in Net Foreign Equity from col (1)-(3) and the change in Net Foreign Debt from (4)-(6). The wealth-income ratio is decomposed into a savings induced accumulation and capital gains accumulation. All stock variables are in changes. Income per capita is real USD national income per capita and is in natural logs. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

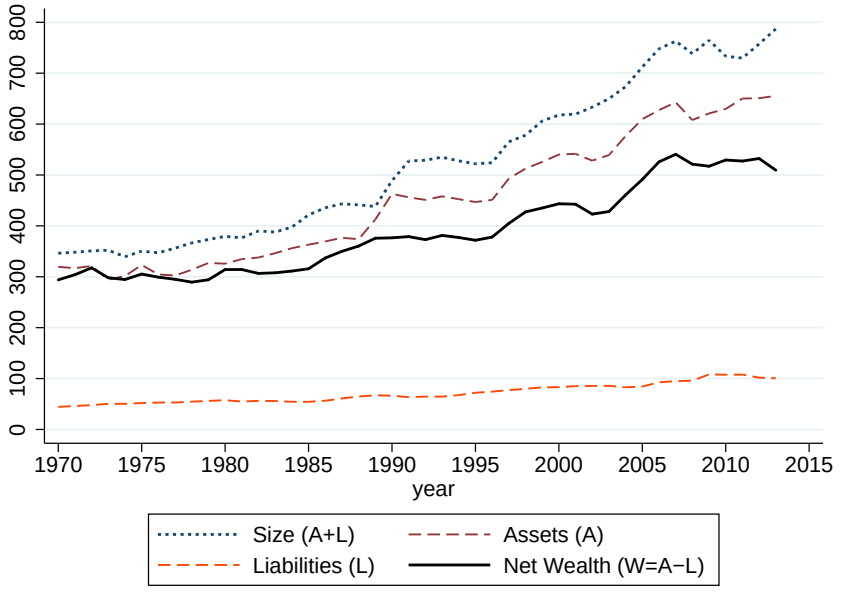
Table 6: Robustness Checks

Model Specifications	**Estimated Coefficient**		
	Δ Wealth-Income	Δ Sav Wealth-Income	Δ KG Wealth-Income
No Controls	-0.069^{***}	0.098	-0.078^{***}
SE clustered by country	-0.071^{***}	0.083	-0.080^{***}
SE clustered by year	-0.071^{**}	0.083	-0.080^{***}
SE HAC robust	-0.071^{***}	0.083	-0.080^{***}
Post 1990	-0.085^{***}	0.182	-0.097^{***}
Country FE	-0.070^{***}	-0.028	-0.076^{***}
2-year sample	-0.079^{***}	0.127	-0.086^{***}
3-year sample	-0.088^{***}	0.075	-0.095^{***}
4-year sample	-0.080^{**}	0.063	-0.094^{***}

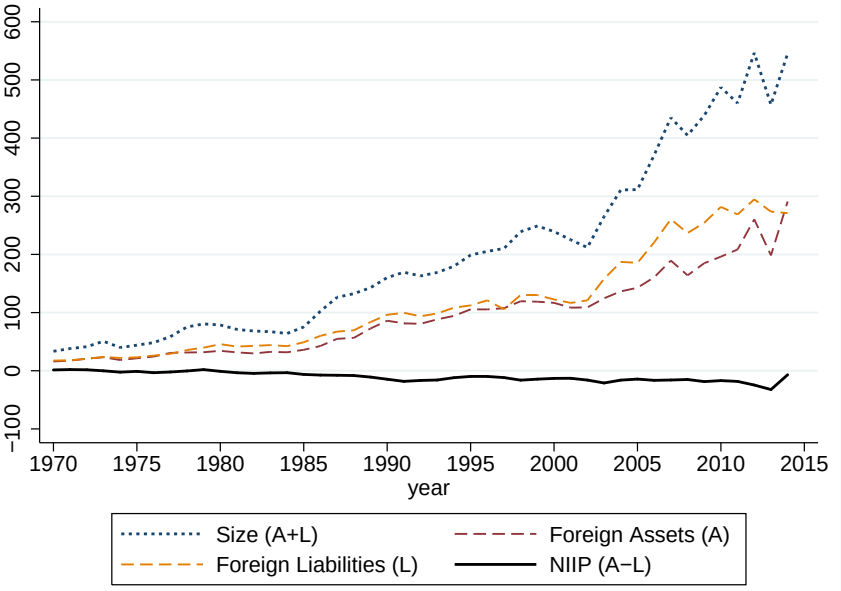
Note: OLS regressions with robust standard errors unless stated otherwise. Dependent variable is the change in NIIP. The Wealth-Income variables are lagged for line (1)-(8). For the 3-year and 4-year sample we use the contemporaneous wealth-income variable.

A Figures and Tables

Figure A1: Household and International Assets and Liabilities



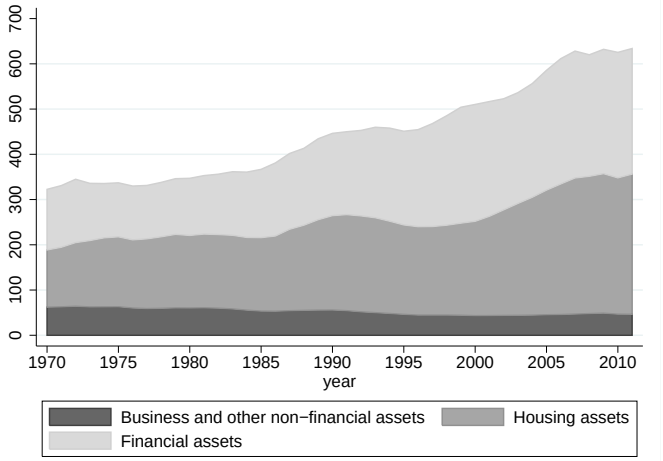
(a) Household Balance Sheet (Assets + Liabilities)



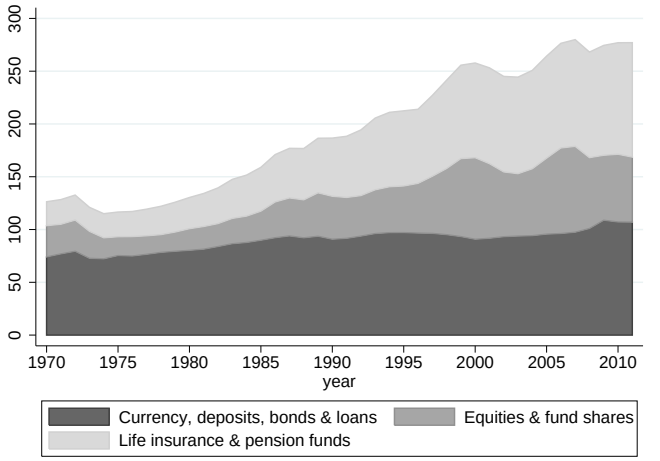
(b) International Balance Sheet (Assets + Liabilities)

Note: Median values for sample of countries, in percent of national income. Household assets comprise of the market value of financial assets (currency, deposits, bonds and loans, equities and fund shares and life insurance and pension fund holdings) and non-financial assets (dwellings, the underlying land, agricultural land and other domestic capital such as offices, structures, machines, patents for instance) and financial liabilities (mostly mortgages). The international balance sheet is the sum of foreign assets and liabilities of a country evaluated at market value.

Figure A2: The Composition of Household Assets



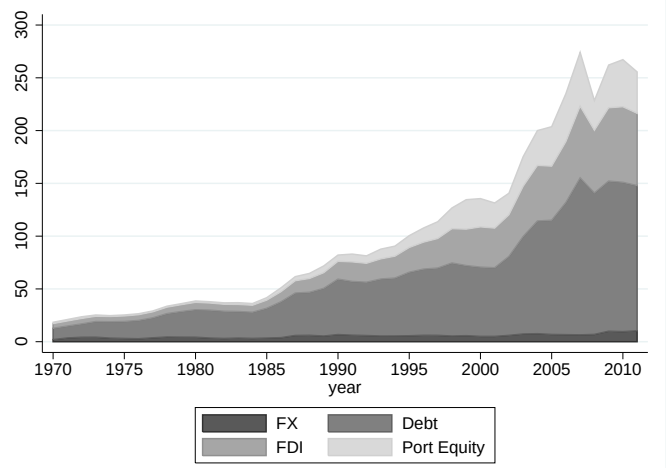
(a) Household Assets



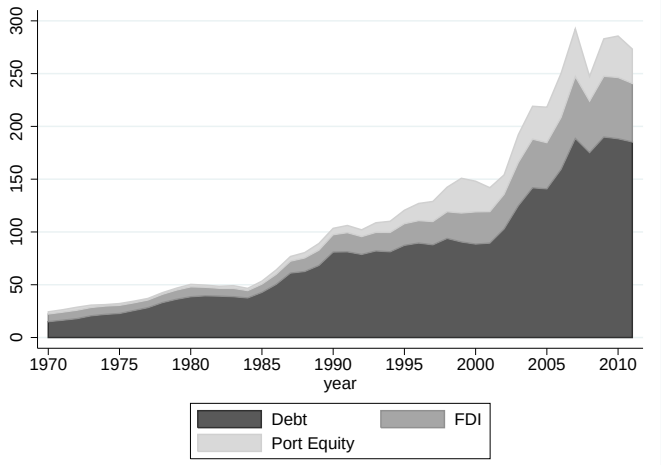
(b) Breakdown of Financial Assets

Mean values for sample of countries, in percent of national income. Assets are evaluated at market value. Business and other non-financial assets is constituted of agricultural land and other domestic capital such as offices, structures, machines, patents for instance. Housing is composed of dwellings and the underlying land. Financial assets are broken down into currency, deposits, bonds and loans, equities and fund shares and life insurance and pension fund holdings.

Figure A3: The Composition of International Assets and Liabilities



(a) International Assets



(b) International Liabilities

Note: Mean values for sample of countries, in percent of national income. FX: Foreign Exchange Reserves, Debt: Foreign Debt, FDI: Foreign Direct Investment, PEQ: Foreign Portfolio Equity.

Table A1: Robustness Checks: OLS- Sample Three Year Periods

	(1) Δ NIIP	(2) Δ NIIP	(3) Δ NIIP	(4) Cum CA	(5) Cum CA	(6) Cum CA
Δ Wealth-Income	-0.088***			-0.041**		
	(0.030)			(0.020)		
Cumulative Savings		0.075			0.188***	
		(0.077)			(0.057)	
Cumulative Capital Gains			-0.095***			-0.054***
			(0.030)			(0.020)
Ageing	0.402***	0.390***	0.391***	0.634***	0.614***	0.629***
	(0.119)	(0.118)	(0.118)	(0.093)	(0.086)	(0.091)
Δ Public Debt	-0.223*	-0.061	-0.222*	-0.481***	-0.399***	-0.496***
	(0.119)	(0.100)	(0.117)	(0.102)	(0.086)	(0.102)
Relative Income	-1.584	-0.382	-0.705	1.276	3.155*	1.777
	(2.476)	(2.069)	(2.517)	(2.136)	(1.845)	(2.131)
Observations	169	188	169	169	188	169
Adjusted R^2	0.12	0.04	0.13	0.28	0.30	0.30

OLS regressions on a sample split into 3-year periods. In % National Income. Robust standard errors in parentheses. The dependent variable is the change in NIIP from col (1)-(3) and the cumulated current account balances from (4)-(6). Stock variables are differenced, flows are cumulated values and we take the average of Ageing Rate and Relative Income. The wealth-income ratio is decomposed into a savings induced accumulation and capital gains accumulation. Relative Income in natural logs. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2: OLS-Housing Breakdown Annual Sample 1971-2013

	(1) Δ NIIP	(2) Δ NIIP	(3) Δ NIIP	(4) CA	(5) CA	(6) CA
Lag Δ Housing Assets	-0.125***			-0.086***		
	(0.033)			(0.016)		
Lag Res Inv		-0.424***			-0.519***	
		(0.131)			(0.087)	
Lag Housing KG			-0.076**			-0.047***
			(0.030)			(0.015)
Ageing Rate	0.149***	0.134***	0.141***	0.203***	0.189***	0.202***
	(0.036)	(0.037)	(0.037)	(0.019)	(0.019)	(0.020)
Income per capita	-0.558	0.621	-0.528	-0.786*	-0.062	-0.673
	(0.704)	(0.578)	(0.683)	(0.445)	(0.406)	(0.422)
Δ Public Debt	-0.062	0.071	-0.031	-0.157***	-0.087***	-0.129***
	(0.070)	(0.073)	(0.067)	(0.037)	(0.033)	(0.035)
Observations	483	593	494	483	588	494
Adjusted R^2	0.09	0.05	0.05	0.23	0.23	0.18

OLS regressions on yearly sample. All variables are in % of National Income. Robust standard errors in parentheses. The dependent variable is the change in NIIP from col (1)-(3) and the current account balance from (4)-(6). We assume a 1% housing depreciation rate (we also perform the regression with 0.5% and 1.5% rate). All stock variables are in changes. Res Inv is the flow of residential investment and Housing KG is the adjustment in valuation of the change in stock. Income is real USD national income per capita and is in natural logs. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$