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House Prices Drive Current Accounts: Evidence from Property Tax Variations

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Abstract: We study the causal link between house prices and current accounts. Across time and countries, we find a very large and significant impact of house prices on current accounts. In order to rule out endogeneity concerns, we instrument house prices for a panel of countries, using property tax variations. A 10% instrumented appreciation in house prices leads to a deterioration in the current account of 1.7% of GDP. These results are very robust to the inclusion of the determinants of current accounts. Following a house price increase, private savings decrease, through wealth effects rather than consumer-finance based mechanisms, while non-residential investment rises through a relaxation of financing constraints for firms.

Résumé: Nous montrons l'effet très large et significatif des prix de l'immobilier sur les comptes courants pour 34 pays sur la période 1970-2010. Pour résoudre les problèmes d'endogénéité, nous instrumentons les prix de l'immobilier pour un panel de pays, en utilisant les variations de taxes foncières. Une augmentation (instrumentée) des prix de l'immobilier de 10% conduit à une détérioration du compte courant de 1,7% du PIB. Ces résultats sont très robustes à l'inclusion des déterminants traditionnels des comptes courants. Suite à une hausse des prix immobiliers, l'épargne privée décroit, à travers des effets-richesse, tandis que l'investissement non-résidentiel augmente en raison de l'allègement des contraintes de financement des firmes.

House Prices Drive Current Accounts: Evidence from Property Tax Variations

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Abstract

We study the causal link between house prices and current accounts. Across time and countries, we find a very large and significant impact of house prices on current accounts. In order to rule out endogeneity concerns, we instrument house prices for a panel of countries, using property tax variations. A 10% instrumented appreciation in house prices leads to a deterioration in the current account of 1.7% of GDP. These results are very robust to the inclusion of the determinants of current accounts. Following a house price increase, private savings decrease, through wealth effects rather than consumer-finance based mechanisms, while non-residential investment rises through a relaxation of financing constraints for firms.

Keywords: Current accounts

JEL classification: F32, F36, F40

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Introduction

In a speech at the Annual Meeting of the American Economic Association, on January 3, 2010, Chairman Ben Bernanke presented a scatterplot showing a negative relationship between changes in current account and changes in real house prices between 2001 and 2006, in a cross-section of 20 advanced economies: "This simple relationship requires more interpretation before any strong conclusions about causality can be drawn; in particular, we need to understand better why some countries drew stronger capital inflows than others." This paper takes up Bernanke's proposal to investigate the causal relationship between house prices and current accounts. A better understanding of the determinants of current accounts is key in many policy debates such as global imbalances, or the eurozone crisis.

We show that house prices are a key determinant of current accounts, using a new instrumental variable for house prices (property taxes), that varies across countries and time. Our identification strategy relies on the fact that property tax changes are driven by local politics rather than macroeconomics, so that they are orthogonal to macroeconomic factors which might otherwise determine the current account. To the best of our knowledge, we are the first to instrument house prices in a panel of countries. This is important, since no previous paper has been able to rule out that expected positive productivity shocks would drive both house price growth and current account deficits; or that the causality would go the other way around, from capital inflows to house price booms. In contrast, we treat very carefully the business cycle dimension of house price movements.

The IV estimation yields similar estimates as the OLS estimation: a 10% increase in house prices yields to a deterioration in the current account of 1.7% of GDP. This is an economically very large effect, as the standard deviation of house prices is 30.4% in the whole sample, while that of current accounts is 4.89% of GDP. The variance decomposition therefore displays a very high explanatory power of house prices on current accounts. Moreover, in contrast to the previous literature using OLS or VAR techniques, our sample contains the universe of available country-year data for house prices and current accounts; our conclusions are therefore valid across 34 countries and between 1970 and 2010.[1]

We investigate empirically which theoretical mechanisms are at the source of the causal relation between house prices and current account deficits. We decompose the current account into four components which we analyse separately: private and public savings, residential and non-residential investment. Most notably, private savings decrease, but this is not the consequence of the availability of home-equity extraction, nor of high Loan-To-Value (LTV) ratios. Non-residential investment increases more in countries where the private sector is more credit constrained, thus suggesting that firms use real-estate assets to obtain financing, as corporate

[1] Other papers, more theoretical in scope, also present evidence only for the last episode of the 2000s. See, Ferrero (2012), or Adam et al. (2011). In contrast, we use all available data on house prices and current accounts. For example, our OLS regression uses 833 country-year observations, and our IV regression uses 769, while existing work has relied more on less than 30 observations.

finance with asymmetries of information suggests. This is consistent with firm-level evidence from Chaney et al. (2012).

Related literature. We shall not review here the very vast literature on the current account, which comprise the intertemporal approach (surveyed in Obstfeld and Rogoff (1995)) and the international real business cycles approach (Backus et al. (1992)). The theoretical mechanism behind our empirical analysis is closer to Caballero et al. (2008*b*), as it emphasizes the role of asset supply in shaping current account patterns. Closer to our paper, many commentators outside academia indeed have noted that the countries which experienced the worst housing booms were also those which ran current account deficits during the run-up in house prices. This observation is difficult to interpret because both house prices and current accounts can be expected to be affected by the business cycle, as the international RBC literature would suggest in particular. Some academic papers have started to address this issue more rigorously, but most explorations of the relationship are theoretical, and motivated the particular circumstances of the years 2000-2007. In Ferrero (2012), a shock to borrowing constraints is shown to be able to generate both house price increases and current account deficits. In the same theoretical vein, Adam et al. (2011) show that different expectations about asset prices can generate housing booms and current account deficits in those countries which are bullish about housing. Those are only two examples in a longer series of theoretical papers, which all use rough cross-correlation of cumulative increases in house prices and deterioration of net foreign asset positions as illustrative examples. This is also the case of Laibson and Mollerstrom (2010), in which (behavioral) asset price bubbles help explain the cross-country correlation between 2000 and 2006. There is a limited number of paper which look at the issue empirically. Aizenman and Jinjarak (2009) use data from $1990-2005$, and favor the reverse causality explanation. Their identification strategy relies mostly on Granger causality, and an instrumental strategy using real exchange rates or old dependency ratio to instrument current accounts.[2] The direction of causality has also started to be discussed separately for the US in the recent period : Favilukis et al. (2012) argue that changes in international capital flows played, at most, a small role in driving house price movements in the last fifteen years in the US, which is consistent with the conclusion of our paper. Some papers have also used structural VAR model for specific countries, or for a subsample of OECD economies, among which Fratzscher (2010) and Punzi (2007)). For example, Fratzscher et al. (2010) analyze the role of asset prices in comparison to other factors, in particular exchange rates, as a driver of the US trade balance. Gete (2010) shows that housing demand shocks identified in a SVAR model help to explain the trade balance in a sample of OECD economies.

Outline. The rest of the paper proceeds as follows. In Section 1, we present the database

[2] However, one might worry that real exchange rates are endogenous to current accounts, and old dependency ratios directly affect house prices. Moreover, they cannot reject reverse causality for the US and the UK, and even suggest a consumption channel in the United States: "The US findings may be a case of a large real estate market in a large country, "driving" the business cycles...To the extent that it does, this finding might suggest that increased perceived wealth drives up prices and also drives up consumption and current account deficit." (p85-86) In this paper, we find evidence for this channel in the average country.

we have constructed on house prices and current accounts which, to the best of our knowledge, we are the first to use in a comprehensive way. We use HP-filtering to avoid spurious regression problems and compute HAC (heteroscedastic and autocorrelation) robust coefficients, since house prices and current accounts display some serial correlation. In Section 2, we present our OLS results, controlling for determinants which have been previously used in the literature, and using country fixed-effects. In Section 3, we present our Instrumental Variable results, which are not significantly different from OLS results. We use property taxes as an instrumental variable for house prices. We discuss very carefully exclusion restriction, which is that those property taxes do not result from macroeconomic factors. Consistent with this hypothesis, the instrumental variable we use is not correlated to GDP (see column (1) of Table A.6). In Section 4, we decompose the current account between public savings, private savings, residential investment and non-residential investment to understand better the channels through which house prices impact the current account. In Section 5, we analyse different theories of house price and current-accounts comovements. In Section 6, we perform a simulation exercise to understand how far one can go towards explaining current accounts with changes in national house prices. Finally, in Section 7, we perform some robustness checks.

1 Data and estimation technique

Data. We construct a yearly house price database for 34 countries[3] for the period 1970-2010. We have 833 observations in total for the pair house prices / current accounts (average per country: 29 years). The data for house prices was drawn from a number of different sources[4]. We notably use the property price statistics from the Bank for International Settlements which cover a large number of countries but only for a short period of time. To complete the database, we then bring together data from various national sources (central banks, national statistical agencies, etc.). There are issues of comparability across time and countries of this house price data: house prices sometimes refer to the price of residential structures in several big cities only. However, house prices are very correlated in the same country as we show in our online Appendix. Data for the current account are taken from the World Bank.

The main specification of our paper is:

$$CA_{it} = \alpha H_{it} + \beta X_{it} + \delta_i + \nu_t + u_{it}.$$

CA_{it} and H_{it} are current accounts and house prices of country i in year t respectively. More precisely, CA_{it} denotes the current account as a percentage of GDP. H_{it} denotes an index of real house prices (that is, deflated by the CPI), in base $1 = 2005$. X_{it} are controls for current

[3]Our sample comprises Australia, Austria, Belgium, Canada, China, Czech republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Indonesia, Ireland, Israel, Italy, Japan, Korea, Mexico, The Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, South Africa, Spain, Sweden, Switzerland, United Kingdom, the United States.

[4]A precise description of the database is provided in Appendix B.

accounts.[5] Following the literature on the current accounts, we will alternatively use Public sector surplus, Initial Net Foreign Asset Position, Relative income, the square of relative income, young relative dependency ratio, old relative dependency ratio, financial deepening, an oil dummy, real interest rates, real exchange rates. Note that some of these controls are clearly endogenous variables, jointly determined with current accounts. For example, real exchange rates, relative income, or interest rates are clearly jointly determined with current accounts. However, we will use them in some regressions, in order to compare our results to the existing literature. δ_i and ν_t are country and year fixed-effects. Country-fixed effects are included in all the regressions of this paper, and enable us to identify the effect of house prices on current accounts from the time-series dimension. We therefore control for any unobserved factor that may lead countries to have both high house prices and current account deficits. Country-fixed effect also control for the fact that house price indices may not be comparable across countries, so that we are only left with interpreting the difference from the country-mean. Finally, we also add year fixed-effects in robustness check tables (Table A.13 to Table A.18).

Stationarity problems. Due to data limitation on housing prices, most of the economies we consider are advanced economies. A first problem with regressing current accounts on housing prices is that current accounts have a downward trend (advanced economies tend to borrow from emerging countries on aggregate), while house prices have an upward trend. We therefore use a HP-filter with a smoothing parameter of 400 to detrend our data, to remove the very low-frequencies.[6] Using augmented Dickey-Fuller and Phillips-Perron tests, we can then reject the hypothesis that current account series contain a unit root. Moreover, after regressing current accounts on house prices, we can reject the null hypothesis that residuals contain a unit root at reasonable confidence intervals, for all series in which we have a sufficiently large sample. Therefore, we are confident that we do not have spurious regressions problems.

Estimation technique. Since both current accounts and house prices are serially correlated, we must be careful to use robust estimation procedures, or we would be overestimating the precision of our coefficients. In this paper, we only present standard errors which are robust to heteroscedasticity and autocorrelation (HAC). We use the Bartlett kernel-based (or nonparametric) estimator, also known as the Newey and West (1987) estimator. We use a bandwith of 2, which leads that to the inclusion of autocovariances up to 1 lag. Note that automatic lag selection as in West (1994) is not available here since we use panel data. However our result are robust to different choices, for example inclusion of 2 lags. See Hayashi (2000) for more on GMM estimation with serial correlation.

[5] A precise description of all the variables is provided in Appendix B.

[6] Our results carry on when using first differences instead of a HP filter. We discuss the choice of the HP filter parameter in robustness checks in Section 7. The relationship between smoothing parameter and frequency under which data is kept is $\lambda = \frac{1}{\left[2\sin\left(\frac{\pi}{f}\right)\right]^4}$.

2 OLS Results

The baseline regression yields the estimates displayed in Table 1. The correlation is very significant at the 1%. According to the simplest specification (column (1) of Table 1), an increase in house prices of 10% is associated with a deterioration of the current account of about 1.06% of GDP. The explanatory power of this regression is high: $R^2 = 18.1\%$ with house prices alone. Moreover, adding our house price variables to usual determinants of current accounts increases the R^2 by more than 13 percentage points (compare column (3) to column (2) in Table 1).

In columns (2), (3), (4) and (5) of Table 1, we follow the literature on the current account to compare the explanatory power of house prices with other variables usually put forward in the literature (see Chinn (2003) and Chinn and Ito (2007), and Obstfeld (2012) for recent references). In columns (2) and (3), we add the following variables:

- *Public surplus.* This corresponds to yearly public primary surplus, as a percentage of GDP. The intuition is that public borrowing increases overall borrowing from abroad, which can increase current account deficits. Note however that in a ricardian world, this must be offset by more private savings.
- *Relative income* (and the square of relative income). This is a way to control for different stages of development. According to neoclassical theory, capital should flow from rich to poor countries where returns are higher.
- *Relative dependency ratio.* The young/old dependency ratio determines how much the population must save for retirement. Note however that this depends on whether the pension system is funded or pay-as-you-go.
- *Financial deepening.* It is more easy to finance current account deficits when the financial system is deep.
- *Initial net foreign asset positions.* From a buffer stock perspective, higher levels of initial net foreign assets should be associated with subsequent lower current account balances.
- *Oil dummies.* Oil exporters often build up reserves, which determines a positive current account balance - for example, Norway. Oil dummies were therefore added in current account regressions by researchers trying to assess the potency of the intertemporal approach to the current account.

However, note that many of these variables are somewhat endogenous - for example, relative income may depend a lot on whether a country is opened to trade, hence on his current account balance. A take from Table 1 is that these 8 variables explain only 4.4% of the variance in the current account, which is quite low when compared with the 17.7% explained if we add house prices.

Table 1: House prices and Current Accounts. OLS Regressions.

	(1)	(2)	(3)	(4)	(5)
	CA	CA	CA	CA	CA
House Prices	-10.61***		-9.887***		-8.310***
	(1.068)		(1.461)		(1.272)
Public Surplus		-0.103*	-0.0257	-0.0526	0.00542
		(0.0625)	(0.0580)	(0.0738)	(0.0706)
Initial NFA		9.182	8.705	5.924	7.053
		(9.205)	(7.485)	(9.096)	(7.783)
Relative income		-8.213	3.303	-4.603	3.459
		(8.186)	(7.959)	(8.855)	(9.011)
Relative income sq.		-74.24	-7.868	-230.5	-111.0
		(201.4)	(177.7)	(262.6)	(238.4)
Relative dependency ratio (Young)		-0.253	-0.451*	-0.428	-0.715***
		(0.255)	(0.241)	(0.261)	(0.249)
Relative dependency ratio (Old)		0.368	-0.0346	0.988**	0.370
		(0.445)	(0.440)	(0.473)	(0.474)
Financial deepening		0.00715	0.00972*	0.00681	0.00842
		(0.00661)	(0.00585)	(0.00606)	(0.00572)
Oil Dummy		-0.174	-0.345	0.341	0.0412
		(0.816)	(0.774)	(0.796)	(0.773)
Real interest rates				0.139	0.180
				(0.162)	(0.156)
Real exchange rates				-0.0580***	-0.0310**
				(0.0180)	(0.0152)
Observations	833	465	465	396	396
R^2	0.181	0.044	0.177	0.086	0.174

Notes: HAC robust (Heteroscedasticity and AutoCorrelation robust) standard errors are in parentheses (we use Bartlett kernel-based filter with bandpass parameter 2). *** p<0.01, ** p<0.05, * p<0.1. Country fixed effects included in the regressions. Some of the controls are endogenous, notably real interest rates, real exchange rates and public surplus; but we include the controls which are common in the literature on current accounts.

Pitfalls with the baseline regression. Both current accounts and house prices are equilibrium quantities, which are jointly determined. Therefore, there are several issues with the OLS regression which prevent an interpretion of this correlation in a causal sense, from house prices to current accounts. The first issue is reverse causality: it is sometimes argued that a current account deficit could facilitate financing, hence a housing boom in a country (see references in Introduction).

Second, there is potentially an omitted variable problem, since many factors could drive both house price booms and current account deficits. For example, the expectation of a productivity shock in the country could both lead the country to borrow from abroad to finance present consumption and investment, and lead to house price appreciation, if housing supply is not perfectly elastic.[7] This omitted variable would lead to an overestimation of α in absolute value.

[7]Ownership of housing is usually tied to the ownership of land, which in most countries is available in inelastic

Another potential explanation would involve financial deregulation. This could lead at the same time to increased foreign borrowing, hence a current account deficit; while at the same time easing credit constraints on local borrowers, hence driving house prices up. This would also lead to an overestimation of α (in absolute value).

Third, there is a clear problem of measurement errors in house prices. This is another reason to use an Instrumental Variable approach.

3 Instrumental Variable

A key contribution of this paper is to propose a new instrument for house price changes. Our instrument is property taxes as a percentage of total taxes (we will also be using other scaling variables). Because of capitalization, unexpected increases in property taxes are immediately translated into a decrease of house prices. Of course, an ideal variable would be constituted by a single flat tax rate, which would be levied on all estates, differ across countries, and change over time. However, taxes are highly multidimensional, nonlinear, with several brackets, and exemptions below a certain threshold. We therefore use the share of revenues brought about by property taxation in total taxation of a country. These data are produced by the OECD. A very important element of our taxation series is that property taxation essentially uses fiscal values (as opposed to market values) which are rarely revised to reflect market values[8]. Since we will observe a negative coefficient in the first stage, this will not be an issue: if anything, the more frequent revision of fiscal values towards market values would only weaken our first stage instrumentation, and go against our results.

3.1 Data

The taxation variable we use comes from OECD Revenue Statistics. We use a particular sub-heading: recurrent taxes on immovable property. This sub-heading covers taxes levied regularly in respect of the use or ownership of immovable property. Since all the details of this tax are important, let us quote the *Revenue Statistics* in full length: "these taxes are levied on land and building, in the form of a percentage of an assessed property value based on a national rental income, sales price, or capitalised yield; or in terms of other characteristics of real property, such as size, location, and so on, from which are derived a presumed rent or capital value. Such taxes are included whether they are levied on proprietors, tenants, or both. Unlike taxes on net wealth, debts are not taken into account in their assessment." As already mentioned, an important feature of the tax we use is how its tax base is assessed, and in particular that it is not endogenously affected by house prices. Otherwise, it would be difficult to measure the negative impact of tax collection on house prices. By contrast, we estimate a negative relationship between

supply.

[8] We describe in Table B.22 the frequency of revision of cadastral values for our sample of countries.

our taxation variable and house prices.[9] The possible dependence of our taxation variable on market prices is therefore not sufficiently important to overturn this negative correlation, and this effect, if existent, would go against our conclusions.[10]

This property taxation variable is available at OECD as an absolute amount of collected taxes, as a percentage of GDP or as a percentage of total taxation revenues. We use property taxation as a percentage of total taxation receipts, because we want to capture variations in property taxation that keep total tax receipts constant, since changes in total tax receipts could impact the current account directly through government borrowing. We discuss the issue of exclusion restriction after presenting the first stage, in section 3.3.

3.2 First Stage Regressions

The 1st stage equation. We use Two stage least squares (2SLS), with exogenous variation of real-estate property taxation T_{it} as an instrumental variable for house prices in the first stage. That is, the price of housing is given by the iteration equation:

$$H_{it} = \frac{H_{it+1}}{1+r} + R_{it}(T_{it}) - T_{it}.$$

The price of housing is the actualized resale price of housing tomorrow $\frac{H_{it+1}}{1+r}$ plus the rental dividend $R_{it}(T_{it})$ (either housing services provided to the owner occupying his home, or rents paid by the renter), diminished by the tax on property $T_{it}(H_{i0})$ with T_{it} an increasing function, whose tax base H_{i0} was set at the beginning of the period 0, once and for all (as this is the case for the countries we consider). In the remaining, we drop the dependence in H_{i0}. Note that the introduction of a tax T_{it} may change rents charged by owners, if housing supply is not completely elastic. In effect, the real-estate tax reduces the number of homes constructed in equilibrium, as agents want to avoid the burden of the tax, and this increases the equilibrium rents $R_{it}(T_{it})$. More precisely, partial equilibrium tax incidence analysis tells us that if $Q^d_{i\tau}(R_{i\tau})$ denotes the demand for housing at time τ as a function of its price (rental price $R_{i\tau}$), and if $Q^s_{i\tau}(R_{i\tau})$ denotes the supply of housing, then denoting the respective demand elasticity and supply elasticity by

$$\epsilon_D = \frac{R_{i\tau}Q^{d'}}{Q} \quad \epsilon_S = \frac{R_{i\tau}Q^{s'}}{Q}$$

then, for small taxes, the net of tax rent is to the first order

$$R_{it}(T_{it}) - T_{it} = R_{it}(0) - \frac{\epsilon_S}{\epsilon_D + \epsilon_S} T_{it}$$

If housing supply is not completely inelastic that is $\epsilon_S \neq 0$, then the tax is not in the end borne by renters only, but also at least partly by proprietors. We indeed find in the data that our real

[9] This explains why we cannot use as instrumental variable non-recurrent taxes (real estate capital gain taxes, transaction taxes) as they are are endogenously affected by house prices (Table A.5).

[10] A similar line of reasoning would argue that housing values as a basis of estate taxation are sometimes reassessed, and that this would also lead the taxation share as a function of GDP to be endogenous to house prices. However, once again, this would go against our conclusions: our instrument would be far more powerful and negatively related to house prices, if we divided it by house prices themselves.

estate tax has some negative effect on house prices, which means that renters do not bear all the tax. Iterating forward (and ruling out rational bubbles) yields:

$$H_{it} = \mathbb{E}_t \sum_{\tau=t}^{\infty} \frac{1}{(1+r)^{\tau}} (R_{i\tau}(T_{i\tau}) - T_{i\tau}) = \mathbb{E}_t \sum_{\tau=t}^{\infty} \frac{1}{(1+r)^{\tau}} \left(R_{i\tau}(0) - \frac{\epsilon_S}{\epsilon_D + \epsilon_S} T_{it} \right).$$

For the last equality, we assume that the tax is set once and for all, and that changes are unexpected[11] :

$$\forall \tau \in \{t+1, t+2, ...\}, \mathbb{E}_t T_{i\tau} = T_{it}.$$

We check in the first stage regression that this instrument is indeed related negatively to house prices, estimating the equation by least squares:

$$H_{it} = \gamma T_{it} + \delta X_{it} + \delta_i + \nu_t + v_{it}. \quad (1)$$

Magnitude of the 1st stage. This regression leads to the estimates displayed in Table 2. Note that the orders of magnitude of the change in house prices following an increase in property taxes are very high. A 1% increase in the share of property taxation in total taxes leads to a decrease in house prices of about 3.7%. Our instrumentation is very efficient, our first stage displays large and economically significant estimates. Our T-statistic for this 1st stage is about 4.2 (higher than the Yogo rule-of-thumb), so that we do not suffer from weak instrumentation.

What do we instrument? Back-of-the envelope calculations suggest that a 1% increase in property taxes (as a percentage of total taxes) represents about 0.4% of GDP (assuming a tax take at 40% of GDP). However this change is known not to be permanent (perhaps for political economy reasons), because real estate taxes as a function of total taxes are not a random walk. Rather, tax cuts or rises approximately last about 5 years (estimating an AR(1) yields an autocorrelation coefficient $\rho \simeq 0.8$, or 2% of GDP). According to our first-stage regression estimates, and assuming rational expectations from the part of investors, a tax rise of 1% as a percentage of total taxes leads to a decrease in house prices of 3.7%, which is about 7.4% of GDP in capitalized losses (with a housing stock evaluated at 200% of GDP). There could be two explanations to this effect of taxes that goes beyond the fundamental effect. Either agents do not have rational expectations about the true data generating process governing taxes - for example taking tax changes as being permanent, even though they tend to mean-revert. Or our instrument may capture both fundamental and bubbly components of house prices[12].

[11] For simplicity, we assume here a random walk for property taxes, but all that we need is that the process for tax changes is somewhat persistent to have an effect on house prices. In practice, we one can see that real world tax changes do have some persistence (see Figure 1 for the case of Spain).

[12] It is unclear what pushes people to become bullish at the sames time, but changes in taxes could be an element of this coordination. In particular, if there is competition between countries for being the locus for stores of value, taxes could be an element of this competition.

Table 2: Instrumental Variable Approach

	(1)	(2)	(3)	(4)	(5)
1st Stage	House	House	House	House	House
Property tax	-3.697***	-3.611***	-3.587***	-3.394***	-3.216***
	(0.881)	(0.970)	(0.962)	(1.003)	(0.994)
Relative dependency ratio (young)		-0.0323***	-0.0304***	-0.0286***	-0.0305***
		(0.00730)	(0.00773)	(0.00716)	(0.00760)
Relative dependency ratio (old)		-0.0111	-0.00886	-0.0119	-0.0150
		(0.0158)	(0.0155)	(0.0157)	(0.0161)
Oil Dummy		0.00640	0.0172	0.00625	-0.0107
		(0.0252)	(0.0273)	(0.0278)	(0.0287)
Relative income			0.178***		
			(0.0640)		
Relative income sq.			3.125		
			(7.724)		
Real exchange rates				0.00361***	
				(0.000693)	
Financial Deepening					0.00180***
					(0.000405)
2nd Stage	CA	CA	CA	CA	CA
House Prices	-17.10***	-17.76***	-18.05***	-21.04***	-21.05***
	(4.588)	(5.084)	(5.063)	(5.661)	(5.886)
Relative dependency ratio (young)		-0.268	-0.255	-0.413*	-0.491**
		(0.234)	(0.227)	(0.239)	(0.238)
Relative dependency ratio (old)		-0.187	-0.167	-0.352	-0.0439
		(0.316)	(0.317)	(0.348)	(0.350)
Oil Dummy		0.393	0.722	0.406	-1.174
		(0.872)	(0.898)	(0.916)	(1.036)
Relative income			1.981		
			(2.412)		
Relative income sq.			-153.8		
			(200.4)		
Real exchange rates				0.0198	
				(0.0258)	
Financial Deepening					-0.0221
					(0.0165)
Observations	769	599	599	575	553
Cragg-Donald	23.50	19.00	19.08	17.90	14.54

Notes: HAC robust (Heteroscedasticity and AutoCorrelation robust) standard errors are in parentheses (we use Bartlett kernel-based filter with bandpass parameter 2). *** p<0.01, ** p<0.05, * p<0.1. House Prices are an indice of house prices, normalized at 1 in 2005. CA denotes Current Account. Country fixed effects included in the regressions. All series are HP-filtered.

3.3 Exclusion restriction

For our instrument to introduce purely exogenous variations in house prices, property tax changes must not result from an omitted third factor, like economic conditions (GDP for example).[13] Our first argument in favor of exclusion restriction is that property taxes are usually set by local governments, and are not a tool used for macroeconomic policy.[14] And indeed, we verify empirically that business cycle factors such as GDP do not correlate at all with our instrumental variable (column (1) of Table A.6). As an additional robustness check, we show that controlling for GDP (through our variable of relative income) does not alter our results in any significant way (see column (3) of Table 2). In the Appendix, we also show that controlling by other measures of GDP like GDP growth and GDP per capita yields similar results (see Table A.7).)

A second potential concern with using our tax variable as a percentage of total taxation is that real-estate property taxation variations could be driven by changes in the value of other taxes, which would affect (although mildly) the share of property taxes in total taxation. However, we check that this is not a problem. 95% of changes in our taxation measure come from an increase in the amount collected by property taxes, not from an increase in total taxes (in frequency terms). In the same line of thought, we show also in the Robustness section 7, and in particular in Table A.8B, that smoothing our denominator does not alter the results in any way. In particular, we take an averaged value of total tax or we smooth total tax taking the trend component of a HP filter to remove business cycle frequencies. Moreover, we show that choosing other scaling variables for property taxes does not alter the results either.[15]

Finally, increases in total taxes, which correlate negatively with our instrument (column (4) of Table A.6), could have effects on current accounts through increasing public surplus. However, this would go against our results, as it would both lead to current account surpluses, and be identified as increasing house prices in our sample. On the contrary, the purpose of the paper is to show a decreasing relationship between those two variables.

A narrative approach: the example of Spain. A very important assumption for our IV strategy to be valid is that changes in the share of property taxation in the total taxes are uncorrelated with current accounts. We take the example of Spain where it is possible to shed light on four different property tax shocks over the last thirty years (Figure 1 and Figure 2)[16]. A first shock was the result of the decree law of 1979 which introduced an extensive package of measures for the reorganization of local treasuries, ranging from doubling the base of some property taxes (the Urban Land Tax) and the subsequent revision of all cadastral values. This decree law authorized gradual increases in property taxation, in particular with the law of 1983,

[13] Falling GDP could lead for example to fiscal austerity, and higher property taxes.

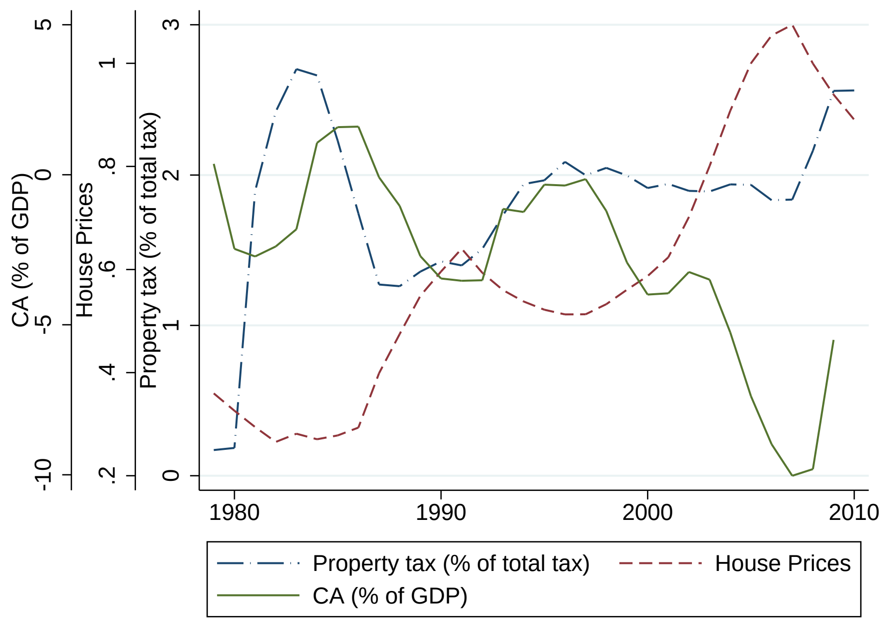
[14] It is only recently that some governments have started to use property taxes as a means to cool down housing markets (for example, Shanghai and South Korea). However, we do not use this very recent data and to the best of knowledge, such a macroprudential tool has only been used after the 2008 real estate crisis.

[15] This method of using many different scaling variables is very common in the empirical finance literature, where dividends also need to be scaled, for example for estimating asset pricing equations - and where several scaling variables such as price or earnings are used to guarantee exclusion restriction.

[16] A precise description of the 4 shocks and of their consequences is provided in the online Appendix.

whose consequence was a gradual decrease of house prices and an improvement of the current account. The reason for this change (reorganizing local treasuries) is likely to be orthogonal to other macroeconomic factors. A second shock was a sentence of the constitutional court of 1985 which overturned the law of 1983 and stopped the permanent increase in property taxation that had started in 1979. It resulted in an increase in house prices. Once again, it is very likely that the sentence of the constitutional court was orthogonal to other macroeconomic factors in the country. A third policy shock was the consequence of a law of 1987 which enabled local authorities to increase property tax rates. This possibility was first used in 1991 after the municipal elections. Between 1991 and 1993 local authorities showed a high level of activity, increasing rates annually from 0.588 in 1990 to 0.664 in 1993. This explains that the increase in property taxation was gradual in this period. These increasing rates were largely attributable to the absence of cadastral value revisions in this three-year period. When revisions were resumed effective 1 January 1994, we observe that the average rate went down that year to 0.658, and the house price decline stopped. Finally, the fourth policy shock was the consequence of a new tax reform at the end of 2006 which was aiming at preventing tax frauds. In practice, the new law led to an increase of the local property tax (Impuesto de Bienes Inmuebles).

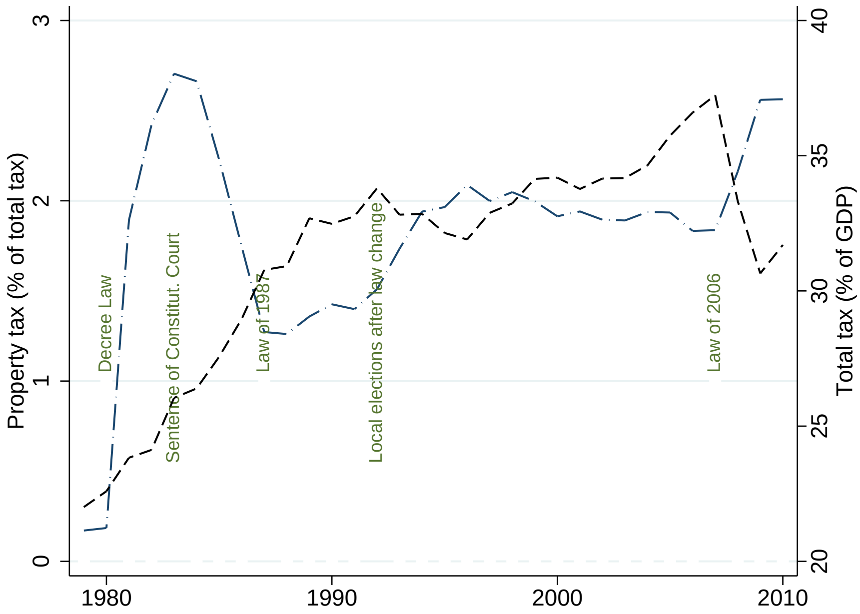
Figure 1: Instrument, house prices and current accounts in Spain



Testing for weak instrument. We have already discussed (by means of an example) the fact that the effect of taxation on house prices is first order. We also check that the Angrist-Pischke multivariate F-test of excluded instruments is about 18, so that our instrument is not a weak instrument.[17]

[17] Our IV strategy also passes underidentification tests (the Kleibergen-Paap rank LM statistic is 18.98 for the main specification of column (1) in Table 2), and weak identification tests Cragg-Donald Wald F statistic is 24.46,

Figure 2: Property Taxes as a % of total tax (Blue), Total tax as a % of GDP (Black), and Policy shocks in Spain



3.4 Second stage results

Using the property tax as an instrument for house prices with (1) as a first stage gives the results in Table 2. Looking at the column (1) of the 2nd stage, we get that a 10% increase in house prices yields to a deterioration in the current account of 1.7% of GDP . Note again that we present standard errors which are robust to heteroscedasticity and autocorrelation (HAC), use the Bartlett kernel-based (or nonparametric) estimator, also known as the Newey and West (1987) estimator, with a bandwith of 2. This estimation by GMM (which for simplicity, we simply call "Instrumental Variable", even though it is a GMM generalization of IV) is not significantly different from that obtained by ordinary least squares. Comparing column (1) (2nd stage) in Table 2 with column (1) in Table 1, we interpret the increase in the coefficient with respect to OLS (in absolute value) by the fact that house prices are mismeasured and that OLS estimates are therefore biased towards 0. This suggests also that reverse causality is not at work in the data (current account deficits do not generate higher housing prices).

4 Decomposition of the current account

Before testing different theoretical channels for explaining the causal relation we documented, we look more carefully at the components of the current account. In particular, we decompose

and Kleibergen-Paap Wald rk F statistic is 17.58. In the second-stage, the underidentification test Kleibergen-Paap rk LM statistic is 18.979 and the Cragg-Donald Wald identification test F statistic is 24.460, while the Kleibergen-Paap rk Wald F statistic is 17.581.

the current account into four components: private savings S_p, public savings S_g (which together make up for total savings $S = S_p + S_g$), residential investment I_r and non-residential (business) investment I_b (which add up to total investment $I = I_r + I_b$). The current account equals $CA = S - I$. The results are displayed in Table 3.

Table 3: DECOMPOSITION OF THE CURRENT ACCOUNT

	(1) OLS	(2) OLS	(3) OLS	(4) IV	(5) IV	(6) IV
	Table A: Current Account = Savings - Investment					
	CA	Saving	Invest. .	CA	Saving	Invest.
House Prices	-10.35***	2.618***	14.07***	-17.66***	17.78***	38.29***
	(1.136)	(0.953)	(1.154)	(5.075)	(6.195)	(7.543)
Observations	721	721	721	721	721	721
R^2	0.156	0.020	0.305			
	Table B: Savings = Private Savings + Public Savings					
	Saving	Pr. Sav.	Pu. Sav.	Saving	Pr. Sav.	Pu. Sav.
House Prices	2.203***	-5.321***	8.375***	27.16***	-17.01***	46.38***
	(0.855)	(0.925)	(1.332)	(9.791)	(6.383)	(14.38)
Observations	621	621	621	621	621	621
R^2	0.016	0.073	0.113			
	Table C: Investment = Residential + Non-residential Investment					
	Invest.	R Invest.	NR Invest.	Invest.	R Invest.	NR Invest.
House Prices	11.49***	4.605***	6.829***	33.68***	1.475	32.17***
	(1.046)	(0.378)	(0.923)	(9.154)	(2.825)	(9.417)
Observations	591	591	591	591	591	591
R^2	0.273	0.365	0.134			

Notes: HAC robust (Heteroscedasticity and AutoCorrelation robust) standard errors are in parentheses (we use Bartlett kernel-based filter with bandpass parameter 2). *** p<0.01, ** p<0.05, * p<0.1. Country fixed effects included in the regressions. All series are detrended using a HP-filter.

House prices have a causal negative impact on private savings and a positive impact on non-residential investment.

Residential investment. The effect on residential investment is rather muted compared to that of non-residential investment, as an increase of 10% in house prices yield to increase of the residential investment rate of about 0.46% of GDP (Column (2) of Table 3C) . The IV estimate of this number is not significant, confirming that it is in any case a rather muted effect (Column (5) of Table 3C). The OLS result could be interpreted as a result of more expensive homes, which drives up construction volumes, keeping construction costs constant. For example, Spain in the 2000s witnessed a construction boom; new houses were built, often with imported capital, and that contributed to a deterioration of the current account. The take from our regressions is that this effect might be part of the story, but explains only a very thin part of it.

Non-residential investment. Less mechanic and more interesting is the rise in non-residential investment following house price increases. According to Column (3) of Table 3C, non-residential investment increases by 0.68% of GDP following a house price increase of 10%. Using the Instrumental Variable estimator yields a much higher estimate of 3.21% of GDP (Column (6) of Table 3C).

Private savings. Private savings decrease when house prices increase according to the instrumental variable specification: about 1.7% of GDP for each 10 points rise in the house price index (Column (5) of Table 3B). This is the well-known consequences of housing booms, and the much commented "wealth effect".[18] In light of the effect of house prices on public savings, it could also be that households are partially ricardian.

Public savings. Another component of a nation's savings is savings by the government. Public savings are mostly the result of a political choice, even though automatic stabilizers make public savings somewhat procyclical. The determinants of public savings are a complex issue which we do not want to examine in the main part of this paper ; we however give some insights in the section 7.

5 The role of credit constraints

Our data enables us to test two different channels through which house prices affect current accounts.

The first channel is the consumer-financing channel. Many papers in the literature have emphasized the potential role of borrowing constraints for driving both an increase in foreign borrowing and a run-up of house prices. According to these papers, in the 2000s, the US experienced a decrease in credit constraints. At the same time, houses saw their collateral value increase and the United States borrowed more to the rest of the world.[19] Interestingly, our data enables us to test whether the relaxation of borrowing constraints might have triggered current account deficits, together with an increased value of housing collateral (for its collateral services). We use measured maximum Loan-to-Value (LTV) ratios and show the relationship between cur-

[18]Note however that this "wealth effect" is far from obvious theoretically, as housing is both an asset and a necessary outlay. In this respect, housing wealth is very different from stock-market wealth. Anticipating a bit, the rise of consumption following increases in housing wealth could be interpreted as an evidence for a rational bubble.

[19]Note that there are theoretical issues to this explanation: it is unclear why constrained consumers, or investors, could not previously sell their house for the whole of their value, instead of buying a home and then use this home as collateral. In Ferrero (2012), as well as other papers of the like, in particular Iacoviello (2005), there is no such issue since homeowning is necessary for consuming housing services - there are no renters. Second, financial liberalization started in the 2000s , but the relationship between house prices and current accounts is not confined to the last boom, or to advanced economies, so that this explanation cannot be an explanation for the correlation before that.

Table 4: CONSUMER AND FIRM CREDIT CONSTRAINTS

Table A	(1) CA (OLS)	(2) CA (OLS)	(3) CA (OLS)	(4) CA (OLS)	(5) CA (OLS)	(6) CA (IV)	(7) CA (IV)
House Prices	-13.93***	-11.55***	-18.21**	-12.07***	-11.18***	-17.20**	-101.9
	(1.999)	(1.528)	(7.571)	(1.560)	(1.684)	(8.702)	(314.3)
House*LTV			0.0622				
			(0.0880)				
Observations	416	417	604	500	333	416	353
R^2	0.261	0.340	0.275	0.365	0.281		
LTV	$< 80\%$	$> 80\%$				$< 80\%$	$> 80\%$
Extraction				No	Yes		

Table B	Invest. (OLS)	R Invest. (OLS)	NR Invest. (OLS)	Invest. (IV)	R Invest. (IV)	NR Invest. (IV)
House Prices	7.017***	5.103***	1.935			
	(2.080)	(1.313)	(1.906)			
House*1/PCGDP	581.6***	50.76	529.3***	3,513***	123.9	3,371***
	(190.4)	(86.90)	(174.9)	(879.9)	(308.1)	(928.0)
Observations	664	664	664	664	664	664
R^2	0.477	0.429	0.354			

Notes: HAC robust (Heteroscedasticity and AutoCorrelation robust) standard errors are in parentheses (we use Bartlett kernel-based filter with bandpass parameter 2). *** p<0.01, ** p<0.05, * p<0.1. Country and year fixed-effects are included. For LTV ratios, the threshold we use (80%) is the median.

rent accounts and house prices is no higher in countries with high LTV ratios than those with low LTV ratios. According the estimated displayed in columns (1) to (3) of Table 4A, and (6)-(7) of Table 4A, whether a country has low LTV or high LTVs makes no difference to the correlation. In columns (4)-(5) of Table 4, we show that the availability of home-equity extraction does not increase the relationship between those two variables either. The consumer-financing channel does not seem to be a feature of our data.[20]

A second channel is the firm-financing channel. We test whether rising housing values help relaxing financial constraints for firms[21]. In order to assess whether investment rises more with house prices where financial constraints are more stringent, we use as a proxy for the potential

[20] The fact that home-equity extraction funds have been shown to be used for consumption in many microeconomic studies does not contradict our results in principle. Availability of home-equity extraction could just push more people into becoming homeowners even though they have high discount rates. These would have consumed nonetheless.

[21] Note however that this explanation does not explain jointly the rise in house prices and current account deficits, but only the fact that rising housing prices lead to current account deficits. In order to explain jointly the rise of house prices and current account deficits as in Ferrero (2012), one would need to assume that there was a firm-financing liberalization shock, which authorized more firms to take on loans backed by housing collateral.

tightness of credit constraints, the ratio of private credit to GDP. This is a standard measure of financial development in the finance-and-growth literature, and provides substantial time-series and cross-sectional variation in our panel (Aghion et al. (2010)). We construct an interaction variable between house prices and the ratio of private credit to GDP. The simultaneous influence of two variables is significant for total investment and non-residential investment, as columns (1) and (3) of Table 4B show in OLS and columns (4) and (6) of Table 4B show using IV. These results confirm that the effect goes through a relaxation of financing constraints for firms. It is interesting to notice that the interaction variable is not significant in explaining residential investment. Since it is not construction firms who are the final investors in residential structures, it does not matter whether construction firms are financially constrained. Furthermore, this is consistent with the fact that houses are much less entrepreneur-specific investments, and that information asymmetries creating the need for collateral are quantitatively very low in housing investment. One can compare our estimate to other estimates found in particular through microeconomic studies of firm investment, as in Chaney et al. (2012): in their study, the representative US corporation invests \$ 0.06 out of each dollar of collateral. If 10% of house price increases corresponds to 20% of GDP of collateral because the housing stock is equal to 2 times GDP, then Chaney et al. (2012)'s estimate would predict a macroeconomic effect on investment of about 1.2% of GDP, which is the same order of magnitude as both our OLS and our IV estimators.

6 Simulating Current Accounts

Movements in house prices can be due to many factors - risk aversion, expectational shocks (bubbles), etc. Taking these movements as given, we can recover the current account patterns which would be generated by our very parcimonious linear model. An argument in favour of considering house prices as the source of exogenous shocks is that taking Ordinary Least Squares or Instrumental Variable estimates yields very comparable estimates. There does not seem to be much more to the relationship between house prices and current accounts than these shocks to house prices.

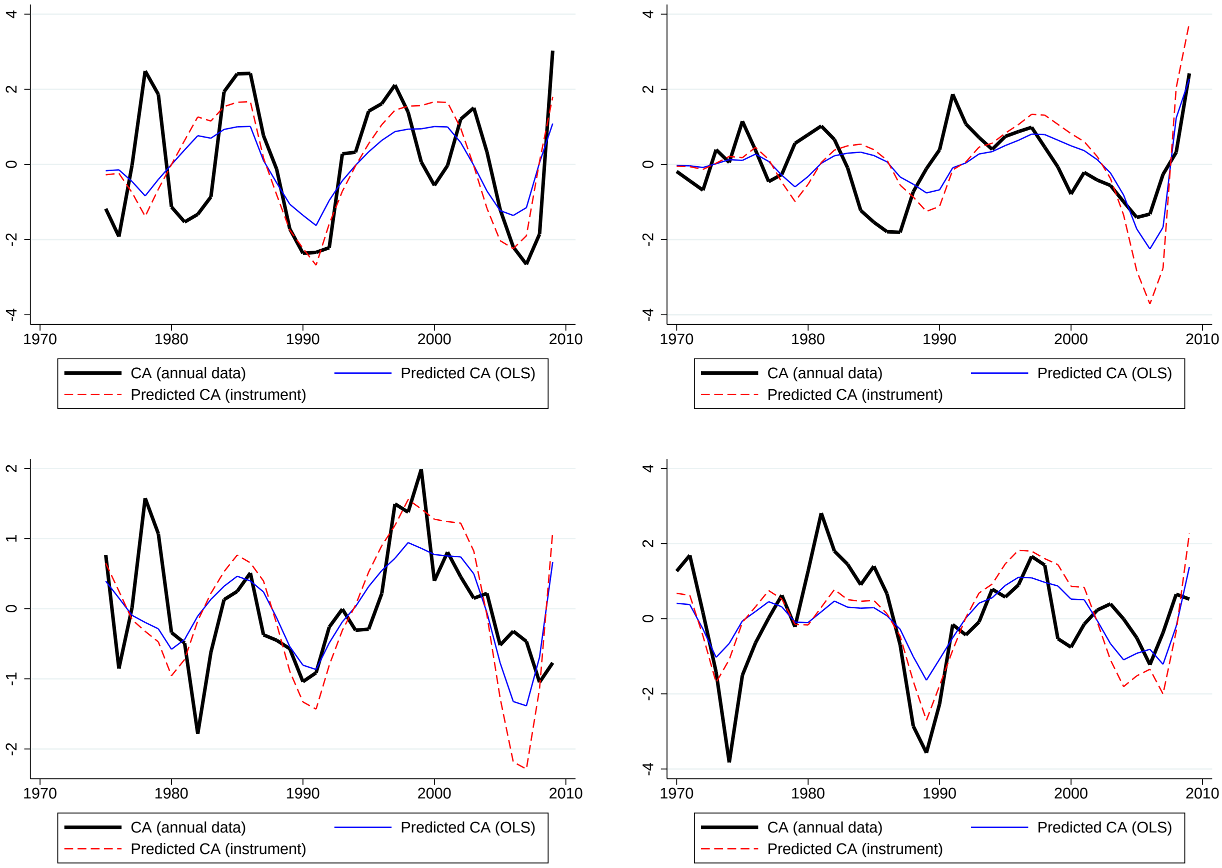
The results of this simulation exercise are summarized in Figure 3. For most countries, and in particular those which have been at the center of very important policy debates recently, such as Spain, France, Germany, the UK and the US, predicted patterns of the current accounts match actual ones reasonably well.

7 Robustness checks

For the sake of brievety, tables corresponding to robustness checks are in the Appendices.

Granger causality. In this paper, we have used an instrumental variable approach to alleviate the issues of endogeneity and omitted variables. We also check in this section that Granger causality tests confirm that house prices cause current accounts and not the other way

Figure 3: Simulated current accounts and actual ones for Spain, the United States, France, and United Kingdom



Notes: Predicted CA (OLS) is calculated using column (1) of Table 1. Predicted CA (instrument) is calculated using column (1) of Table 2. The top-left panel is for Spain, the top-right for the United States, the bottom-left is for France, and the bottom-right for United Kingdom. All series are HP filtered.

around. Table A.1 shows that fitting simple VAR with either 1 lag or 2 lags[22] confirm this result: a positive shock to house prices does cause a deficit in the current account in the period after (columns (1), (3) and (5)) while capital inflows (a negative shock to CA) does not cause increases in house prices as can be seen in columns (2), (4), (6). One may note a very small effect of the second lag of capital inflows (only significant at 10%), but which goes in the other direction. Once again, the view that capital inflows cause housing bubbles seem refuted by the data. We have not pursued this empirical strategy in the remainder of the paper, even though it seems to yield the same conclusions qualitatively, because Granger causality is not *strictly* causality, and more importantly because the coefficients are impossible to interpret quantitatively. Since a very important take from our paper is that the house price variable we introduce is a very good predictor of Current Accounts, VAR techniques clearly would not lead us as far as the instrumental variable. We check also that our instrumental variable causes house prices. Table A.2 confirms that property taxes cause house prices and not the other way around.

[22] To determine the number of lags, we use the Akaike Information Criterion (AIC) and the Schwarz' Bayesian Information Criterion (SIC/BIC/SBIC). For most countries, they indicate 2 lags.

Public savings. In Table A.3, we analyse more precisely why house prices are strongly positively correlated to public savings, and even cause an increase in public savings (see column(6) of Table 3B). Since public savings are less the results of market forces, investigation into the issue is more tentative. Our data seems to point to an effect of house prices through investment then unemployment[23]. We have established in section 5 that non-residential investment increased more consecutive to house price increases when countries were more financially constrained: this is reminded in column (2) of Table A.3A. Using then our property tax as an instrument for investment in column (3) of Table A.3A points to a decrease in unemployment following investment booms. In column (3) of Table A.3B, we show that less unemployment is also associated with less spending by the government, which is intuitive, as a big part of welfare state entitlements come from unemployment benefits. This is reflected into overall government savings in column (2) of Table A.3B. To sum up, our data explains the pro-cyclicality of public savings with respect to housing booms by an increase in investment leading to a decrease in unemployment. In contrast, when housing prices go down, investment also plunges because financial frictions increase and unemployment increases.

Falsification tests. In Table A.4 and A.5, we perform falsification tests using other taxes available from the OECD to instrument house prices. Since those taxes are not (in principle) related to housing, we should not be getting anything out of these exercises, which is what we verify in Table A.4. In Table A.5, we show that most other tax takes related to housing are positively correlated to housing prices. As housing prices go up, these tax takes mechanically increase. It is therefore not possible to isolate the negative impact that tax rates shocks have on housing prices. Once again, fiscal values used for property taxation are seldom revised, which enables us to estimate the negative effect tax rates shocks have on housing prices.

Examining exclusion restriction: more specifications. As already discussed previously, we show in Table A.6 that GDP is not correlated with the property tax. In fact, measures of property taxation as a percentage of the total tax (column (1)) or as a percentage of GDP (column (2)) do not correlate with the GDP. So changes in property taxes do not have to do with the economic outlook. We show also that an increase in our instrumental variable does not imply increasing government revenues. Indeed, our property taxation variable correlates negatively with total tax revenues (column (4)).

Controlling by different measures of GDP. Our results do not depend on the measure of GDP used. In most tables, we control with relative income as it is the variable commonly used in the literature (notably in Chinn (2003) and Chinn and Ito (2007)). But our results are robust to other measures of GDP. In Table A.7 , we show that we could have controlled by real GDP, real GDP per capita or GDP growth without changing the results of our instrumental strategy.

Other scaling variables. In Table A.8A, we show that using as an instrumental variable the share of property taxation as a percentage of GDP instead of using the share of this tax as a percentage of total taxes does not change the results. The results are also robust if we measure the

[23] We investigate more fully this mechanism in Geerolf and Grjebine (2013).

property tax with other scaling variables, such as investment (column (2)) or private consumption (column (3)). In Table A.8B, we show also that smoothing total tax does not alter the results. In particular, we take an averaged value of total tax (column (1)). We smooth also total tax using the trend component of a HP filter. For robustness we check with parameters 10 and 100 that are commonly used to remove business cycle frequencies (columns (2) and (3)) with yearly data (Ravn and Uhlig (1997)). Finally, we use as scaling variable an averaged value of the property tax (column (4)).

Other asset prices. One could wonder whether the negative relationship we uncover would not be true for other types of assets. In Table A.9, we show that this correlation is not valid for equity prices. We use two variables to measure share prices. The first measure is Market capitalization (also known as market value). It is the share price times the number of shares outstanding as a percentage of GDP (source: WDI). The correlation between market capitalization and house prices is not significant (column (1) of Table A.9). There is a slight difference when we use instead the other measure, Share prices (source: OECD). We find a very small negative relationship between share prices and current account variations, only significant at 10% (column (2) of Table A.9). This very slight significance can itself be explained by the very strong correlation between house prices and share prices (column (3) of Table A.9). If we first take the residual of the regression between houses price and share prices, and if we then run the regression between this residual and the current account, the relationship disappears. Intuitively, this fact can certainly be rationalized by the fact that contrary to most other assets, houses are geographically located assets. In contrast, differences in world share prices are arbitraged away in international capital markets. While share price cycles are strongly correlated at the world level, house prices are much less correlated: regressing share prices over year fixed effects in a panel of countries yields to a R^2 of 64%, while the same regression yields to a R^2 of only 31% for house prices.

Choice of HP filter parameter. The relationship we uncover in this paper is robust to several specifications of the cutoff frequency. Table A.10 displays the result of our basic specification using different values for the HP-parameter. Any HP-filter parameter in the range $10-1600$ yields the same results with very good confidence intervals. There is some disagreement in the literature as to which filter to use for frequencies different from quarterly data - for quarterly data, a common practice in the literature is to use a parameter of 1600. We have used 400, as in Tomz and Wright (2007). Our results are robust to other lower proposed values of 6.25 (Ravn and Uhlig (1997)), 100 in Backus (1992) or higher, such as 1600. Note that this is not very important here, as we are interested only in first moments, not in second moments, for which the choice of the HP filter is more crucial - this is in fact, what the discussion in Ravn and Uhlig (1997) is all about - notably Backus (1992)'s claim that output volatility had increased after the Second World War. When choosing our smoothing parameter, we have only two requirements in mind: that it be not too small, because we are interested in medium term patterns of the data (not only those that occur at the quarterly frequency) - that is why we do not take up propositions in the lower range, and that it be not too high, because we want to remove the trend from the data (the lower frequencies) - long run growth, which we do not seek to explain - and because we do not want our series to be non-stationary, which would cause problems of spurious regressions.

Country groupings. We also test whether the relationship we uncover in this article is specific to a certain type of countries, or whether it is robust across groups of very different countries. As Table A.11 shows, the relationship is robust. The relationship is true in Euro or non-Euro countries (columns (2) and (3) of Table A.11), and in low-income and high-income countries (columns (4) and (5)). This is also important as previous determinants of the current accounts were often specific to advanced or developing countries. Moreover, it is important to check for robustness that excluding several countries does not change the results in a significant way.

Credit constraints: further regressions. In Table A.12, we run more regressions to examine the robustness of our findings in section 5. In columns (7) and (8) of Table A.12A, we show that private savings are not more correlated to house prices in countries with high LTV ratios than in countries with low LTV ratios, further undermining consumer-financed based explanations of the correlation. In Table A.12B, we check if our results on firm-credit constraints and collateral are robust to the inclusion or exclusion of country- and year- fixed effects.

Year fixed-effects. We did not include year-fixed effects in the baseline regression because we do not have the full sample of countries in our dataset.[24] But results and comments of previous sections are robust to the inclusion of year fixed-effects (Table A.13 to Table A.18). For example, a 10% (instrumented) appreciation in house prices leads to a deterioration of the current account of -2.4% (table A.13, column (8)). First stage regressions of the instrumental strategy are also very robust to the inclusion of year fixed effects. A 1% increase in property taxes is associated with a depreciation of house prices of -1.9% (table A.15, column (2)) . In the second stage of the IV strategy, the regressions are still very robust even with the inclusion of the current account controls and with year fixed effects (table A.16, columns (4),(6), (8) and (10)). In tables A.17 and A.18, we check that our instrumental variables strategy is robust for explaining investment and saving with the controls and fixed effects. For instance, the second stage instrumental regressions are very robust for explaining investment even with the inclusion of the current account controls and with year fixed effects (table A.17, columns (4), (6), (8) and (10)). In particular, 10% (instrumented) appreciation in house prices leads to an increase of investment of 4.7% (columns (4) and (6)).

Frequency of revision of cadastral values. In Table A.19, we show that our results do not depend on the frequency of revision of cadastral values. In particular, the negative relationship between house prices and the property tax (first stage of the instrumental strategy) is no weaker in countries where fiscal values are reassessed at least every five years.

[24]These fixed effects would capture the current account that our sample countries collectively run with the rest of the world. When house prices in our sample are above trend on average, we can capture that our sample countries are running deficits with the rest of the world.

Decades. In Table A.20, we show that our results are valid all over the last 40 years, and in each decade. House prices have a causal effect on current accounts not only in the last housing cycle (column (6)), but also in the nineties (column (5)), and before 1990 (column (4)).

Real Exchange Rates. In Table A.21, we show that capital inflows driven by house prices could lead to exchange rate appreciation. This explains that house price increases are positively correlated with exchange rate appreciations (column (2)), and that in the IV, real exchange rates are not significant in explaining current accounts (column (1)). Granger causality tests confirm that house prices cause real exchange rate fluctuations (column (3)).

Conclusion

In this paper, we establish that house prices are an important factor in the determination of current accounts, probably the variable with the largest explanatory power of current accounts over the last 40 years. Our new instrumental variable for house prices allows us to control for potential reverse causality or omitted variable problems. An instrumented increase in 10% of house prices leads to a deterioration in the current account of 1.7% of GDP. Not only are house prices strongly significantly correlated to current accounts, and the coefficient precisely estimated; but this point estimate is economically very large, suggesting that house prices are the main factor determining current accounts.

We investigate empirically which theoretical mechanisms are at the source of this causal relationship. We decompose the current account into its components that we can analyse separately. Private savings decrease following house price increases, but consumer-financing explanations are not consistent with the data, as this effect is not greater in countries where financing is easier. In contrast, we show a large increase of non-residential investment following house price increases, which we demonstrate goes through a collateral effect. Housing collateral therefore plays a big role in driving the correlation between house prices and investment, confirming the predictions of Caballero and Krishnamurthy (2006) in particular.

We then simulate current accounts. Taking house price shocks as given enables to recover extraordinarily well movements in current accounts. There are many reasons to think that house prices could have a life of their own: changes in risk aversion, in the stochastic discount factor, etc. Among other stories, our results are consistent with a view of (country-specific) expectational shocks on housing as a driving force for changes in asset supply. Real-estate bubbles are both theoretically plausible, as short-sales constraints are very high on real-estate, so that pessimists are at corner and cannot express a negative opinion (as in Harrison and Kreps (1979)); and a potential participant in banking crises (see Reinhart and Rogoff (2008)). The relationship between increases in asset supply and current account deficits would then be similar to Caballero et al. (2008*b*), in which a decrease in asset supply a China (corresponding to a relative increase in asset supply in the United States) leads to current account deficits in the United States.[25]

[25] It is very important for this result that the environment be non Ricardian, or an increase in asset supply would lead to an offsetting increase in asset demand.

Similarly, country-specific house price bubbles could increase asset supply which leads to deficit. Bubbles would move from one real-estate market to the next, as in Caballero et al. (2008*a*), leading to capital flows. Those bubbles would decrease private savings, as in Tirole (1985); and increase investment through alleviating financial constraints as in Farhi and Tirole (2011).

The policy implications of our results are potentially important. Current account imbalances were on top of the macroeconomic research agenda in the year 2000s, when the US were running unprecedented current account deficits (up to 6% of GDP). If once admits that house prices had overshooted their long-run level by about 20% (this is a rather conservative estimate), then our results would suggest that house prices contributed to these deficits up to 3.4% of GDP. But after the financial crisis, understanding the determinants of the current account is no less central (see Obstfeld (2012)). In particular, since current account capital flows have shown to be a major destabilizing factor in the fate of the euro, we believe our paper can bring important insights in the context of the Eurozone crisis.

Finally, the welfare implications of potential house price bubbles are not clear. While rational bubbles solve the problem of dynamic inefficiency (as in Tirole (1985)), housing bubbles can come at cost, triggering capital flow reversals as in Caballero and Krishnamurthy (2006). This is an interesting route for future empirical and theoretical research.

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A Appendix : Robustness checks

Table A.1: Granger causality

	(1) CA	(2) House Prices	(3) CA	(4) House Prices	(5) CA	(6) House Prices
Current Account (L1)	0.435***	0.000322	0.466***	-0.000595	0.365***	0.00171
	(0.0976)	(0.00132)	(0.0942)	(0.00125)	(0.0586)	(0.00122)
Current Account (L2)	-0.160	0.00154	-0.174*	0.00208*		
	(0.103)	(0.00134)	(0.102)	(0.00123)		
House Prices (L1)	-10.82***	1.278***	-9.981***	1.189***	-6.040***	0.780***
	(2.809)	(0.0515)	(2.883)	(0.0496)	(1.344)	(0.0385)
House Prices (L2)	5.733**	-0.630***	4.961*	-0.547***		
	(2.816)	(0.0530)	(2.849)	(0.0466)		
Observations	673	673	673	673	697	697
R^2	0.276	0.727	0.335	0.780	0.291	0.682
Country FE	No	No	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	Yes	Yes	Yes

Notes: Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Series are HP filtered.

	(1) Saving	(2) House	(3) Saving	(4) House	(5) Investment	(6) House	(7) Investment	(8) House
Saving (L1)	0.774***	0.000386	0.786***	0.00190				
	(0.0455)	(0.00147)	(0.0461)	(0.00147)				
Saving (L2)	-0.382***	0.00259	-0.328***	0.00291*				
	(0.0440)	(0.00162)	(0.0460)	(0.00158)				
House Prices (L1)	5.127***	1.266***	2.745**	1.179***	13.95***	1.270***	9.455***	1.165***
	(1.063)	(0.0491)	(1.066)	(0.0453)	(1.606)	(0.0578)	(1.465)	(0.0533)
House Prices (L2)	-7.222***	-0.645***	-3.683***	-0.562***	-13.75***	-0.642***	-8.514***	-0.554***
	(1.220)	(0.0518)	(1.176)	(0.0430)	(1.520)	(0.0550)	(1.368)	(0.0471)
Investment (L1)					0.640***	0.000839	0.706***	0.00263*
					(0.0614)	(0.00158)	(0.0586)	(0.00159)
Investment (L2)					-0.263***	-0.000608	-0.263***	-0.00128
					(0.0611)	(0.00177)	(0.0628)	(0.00160)
Observations	673	673	673	673	673	673	673	673
R^2	0.468	0.728	0.575	0.783	0.516	0.725	0.631	0.780
Country FE	No	No	Yes	Yes	No	No	Yes	Yes
Year FE	No	No	Yes	Yes	No	No	Yes	Yes

Notes: HAC robust (Heteroscedasticity and AutoCorrelation robust) standard errors are in parentheses (we use Bartlett kernel-based filter with bandpass parameter 2). *** p<0.01, ** p<0.05, * p<0.1. Series are HP filtered.

Table A.2: Granger causality (Cont.)

	(1) Property Tax	(2) House Prices	(3) Property Tax	(4) House Prices
Property Tax (L1)	0.892***	-0.00758**	0.638***	-0.0107**
	(0.0649)	(0.00356)	(0.0693)	(0.00446)
Property Tax (L2)	-0.373***	0.00226		
	(0.0502)	(0.00300)		
House Prices (L1)	-0.364	1.195***	0.192	0.754***
	(0.302)	(0.0456)	(0.198)	(0.0341)
House Prices (L2)	0.466*	-0.570***		
	(0.255)	(0.0433)		
Observations	673	673	697	697
R-squared	0.552	0.779	0.471	0.684
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Notes: HAC robust (Heteroscedasticity and AutoCorrelation robust) standard errors are in parentheses (we use Bartlett kernel-based filter with bandpass parameter 2). *** p<0.01, ** p<0.05, * p<0.1. Series are HP filtered.

Table A.3: House Prices, Unemployment and Public Saving

Table A	(1) Unemployment (2sls)	(2) Investment (2sls)	(3) Unemployment (2sls)
House Prices	-35.01***	35.85***	
	(10.65)	(11.12)	
Investment			-0.976***
			(0.157)
Observations	523	523	523

Table B	(1) Unemployment (OLS)	(2) Public Saving (OLS)	(3) Public Spending (OLS)	(4) Public Revenue (OLS)
Investment	-0.486***			
	(0.0439)			
Unemployment		-0.661***	0.626***	-0.103*
		(0.0584)	(0.0823)	(0.0552)
Observations	523	523	523	523
R^2	0.528	0.617	0.562	0.148

Notes: HAC robust standard errors are in parentheses (we use Bartlett kernel-based filter with bandpass parameter 2). Country fixed-effects included. *** p<0.01, ** p<0.05, * p<0.1. This table is extracted from Geerolf and Grjebine (2013).

Table A.4: Falsification tests I

	(1)	(2)	(3)	(4)	(5)	(6)
	Table A: Second-stage of the Instrumental Variable Strategy					
	CA	CA	CA	CA	CA	CA
First-stage Tax	Property	Income	Social Secu.	Payroll	Goods/Services	Other
House Prices	-23.15***	52.37	21.59	-176	-1.558	1.278
	(8.647)	(51.76)	(18.39)	(331.1)	(56.927)	(11.89)
Observations	769	769	769	769	769	769
	Table B: First-stage of the Instrumental Variable Strategy					
	House	House	House	House	House	House
Tax	Property	Income	Social Secu.	Payroll	Goods/Services	Other
	-0.0196***	0.00279	-0.00582*	-0.00241	7.41e-05	-0.0156**
	(0.00716)	(0.00207)	(0.00299)	(0.00488)	(0.00274)	(0.00758)
Observations	769	769	769	769	769	769

Notes: HAC robust (Heteroscedasticity and AutoCorrelation robust) standard errors are in parentheses (we use Bartlett kernel-based filter with bandpass parameter 2). *** p<0.01, ** p<0.05, * p<0.1. Country and Year-fixed effects are included.

Table A.5: Falsification tests II

	(1)	(2)	(3)	(4)
	House	House	House	House
	(2sls) 1st stage	(2sls) 1st stage	(2sls) 1st stage	(2sls) 1st stage
Tax	Property	Capital gains	Transactions	Inheritances
	-0.0184***	0.0484***	0.0696***	0.0167
	(0.00701)	(0.00913)	(0.00939)	(0.0254)
Observations	734	734	734	734

Notes: HAC robust (Heteroscedasticity and AutoCorrelation robust) standard errors are in parentheses (we use Bartlett kernel-based filter with bandpass parameter 2). *** p<0.01, ** p<0.05, * p<0.1. Country and Year-fixed effects are included.

Table A.6: Examining exclusion restriction

	(1)	(2)	(3)	(4)
	Property (/total tax)	Property (/GDP)	Property (/GDP)	Total tax (/GDP)
	(OLS)	(OLS)	(OLS)	(OLS)
GDP	-0.00285	-0.000419		
	(0.00187)	(0.000572)		
Property (/total tax)			0.286***	-0.555***
			(0.0167)	(0.170)
Observations	757	757	757	757
R^2	0.008	0.005	0.785	0.037

Notes: HAC robust (Heteroscedasticity and AutoCorrelation robust) standard errors are in parentheses (we use Bartlett kernel-based filter with bandpass parameter 2). *** p<0.01, ** p<0.05, * p<0.1. Country fixed effects are included. Series are HP filtered. "Property" denotes the property tax.

Table A.7: Controlling by different measures of GDP

	(1) House (IV: 1st st.)	(2) House (IV: 1st st.)	(3) House (IV: 1st st.)	(4) House (IV: 1st st.)	(5) CA (IV: 2nd st.)	(6) CA (IV: 2nd st.)	(7) CA (IV: 2nd st.)	(8) CA (IV: 2nd st.)
Property tax	-3.038***	-3.219***	-3.474***	-1.954**				
	(0.917)	(0.981)	(1.047)	(0.821)				
Relative income	1.547***				9.698			
	(0.201)				(12.07)			
GDP		0.00353***				0.00457		
		(0.000434)				(0.0241)		
GDP growth			0.0378**				0.701	
			(0.0180)				(0.457)	
GDP per cap.				4.34e-05***				0.000630
				(5.95e-06)				(0.000556)
House Prices					-20.82***	-19.66***	-20.95***	-26.45**
					(6.482)	(5.898)	(5.608)	(11.24)
Observations	665	593	592	593	593	593	592	593

Notes: HAC robust (Heteroscedasticity and AutoCorrelation robust) standard errors are in parentheses (we use Bartlett kernel-based filter with bandpass parameter 2). *** p<0.01, ** p<0.05, * p<0.1. Country fixed effects are included in the regressions. Series are HP-filtered (except GDP growth).

Table A.8: Other scaling variables

Table A	(1) House prices (1st st.)	(2) House prices (1st st.)	(3) House prices (1st st.)	(4) CA (IV: GDP)	(5) CA (IV: Invest.)	(6) CA (IV: Cons.)
Property tax (/GDP)	-0.0910***					
	(0.0264)					
Property tax (/Invest.)		-2.713***				
		(0.404)				
Property tax (/Cons.)			-6.224***			
			(1.702)			
House Prices				-18.87***	-24.75***	-25.78***
				(5.490)	(3.317)	(5.474)
Observations	766	766	766	766	766	766

Table B	(1) House (1st st.)	(2) House (1st st.)	(3) House (1st st.)	(4) House (1st st.)	(5) CA (IV:Tot.tax mean)	(6) CA (IV:Tot.tax sm. 100)	(7) CA (IV:Tot.tax sm. 10)	(8) CA (IV:Property mean)
Property(/Tot. tax mean)	-0.0817***							
	(0.0250)							
Property/(Tot. tax sm.a)		-0.113**						
		(0.0549)						
Property/(Tot. tax sm.b)			-0.245**					
			(0.0982)					
Property/(Property mean)				-0.00308***				
				(0.000694)				
House Prices					-27.63***	-38.63**	-21.00**	-15.08***
					(9.728)	(18.07)	(8.330)	(2.058)
Observations	719	719	719	719	719	719	719	719

Notes: HAC robust (Heteroscedasticity and AutoCorrelation robust) standard errors are in parentheses (we use Bartlett kernel-based filter with bandpass parameter 2). *** p<0.01, ** p<0.05, * p<0.1. Country-fixed effects are included. All series are HP-filtered. In Table A, the property tax variable is measured as a % of GDP, as a % of investment, as a % of consumption, etc. In Table B, "Tot. tax smo." indicates that total tax is smoothed with the trend component of a HP filter ("a","b" indicates a filter of 100 and 10 respectively). Total tax (mean) and Property (mean) are calculated as the moving average of Total tax and Property with a 10-year period.

Table A.9: Share prices and current accounts?

	(1) CA (OLS)	(2) CA (OLS)	(3) Share Prices (OLS)	(4) CA (OLS)
Market cap.	0.00752			
	(0.0102)			
Share prices		-0.0216*		
		(0.0118)		
House Prices			36.05***	
			(8.300)	
Res. Share				-0.0101
				(0.0113)
Observations	517	517	517	517

Notes: HAC robust (Heteroscedasticity and AutoCorrelation robust) standard errors are in parentheses (we use Bartlett kernel-based filter with bandpass parameter 2). *** p<0.01, ** p<0.05, * p<0.1. Country and Year-fixed effects are included. "Market cap." is market capitalization.

Table A.10: Other HP filters

	(1) CA	(2) CA	(3) CA	(4) CA	(5) CA
Smooth. parameter	1600	400	100	25	10
	Table A: OLS				
	(OLS)	(OLS)	(OLS)	(OLS)	(OLS)
House Prices	-9.336***	-10.62***	-11.26***	-11.59***	-11.19***
	(0.937)	(1.068)	(1.236)	(1.478)	(1.648)
Observations	833	833	833	833	833
	Table B: IV				
	(2sls)	(2sls)	(2sls)	(2sls)	(2sls)
House Prices	-20.19***	-17.10***	-14.97***	-13.48***	-13.04***
	(6.438)	(4.587)	(4.047)	(4.094)	(4.549)
Observations	769	769	769	769	769

Notes: HAC robust (Heteroscedasticity and AutoCorrelation robust) standard errors are in parentheses (we use Bartlett kernel-based filter with bandpass parameter 2). *** p<0.01, ** p<0.05, * p<0.1. Country fixed-effects included.

Table A.11: Country Groupings

	(1)	(2)	(3)	(4)	(5)
	CA	CA	CA	CA	CA
	(OLS)	(OLS)	(OLS)	(OLS)	(OLS)
House Prices	-7.734***	-5.426**	-10.29***	-5.283***	-11.35***
	(1.657)	(2.190)	(2.579)	(1.475)	(2.617)
Public Surplus	0.0599	0.0803	0.0892	0.0600	0.0615
	(0.0884)	(0.0817)	(0.106)	(0.0629)	(0.161)
Relative income	0.912	-1.087	2.536	-16.71**	4.480
	(10.18)	(7.028)	(13.77)	(7.597)	(16.66)
Relative income sq.	-35.78	-643.2***	232.2	-47.70	-190.0
	(228.6)	(194.8)	(258.4)	(257.6)	(273.8)
Relative dependency ratio (Young)	-0.585**	-0.695**	-0.450	-0.710***	-0.976
	(0.244)	(0.275)	(0.357)	(0.202)	(0.617)
Relative dependency ratio (Old)	0.792*	1.328***	0.268	0.681	1.149*
	(0.451)	(0.458)	(0.847)	(0.558)	(0.634)
Financial deepening	0.0107	0.0227***	0.00113	0.0179**	0.00754
	(0.00831)	(0.00601)	(0.0124)	(0.00744)	(0.0127)
Oil Dummy	0.267		0.0153	0.278	1.381
	(1.059)		(1.838)	(0.951)	(1.038)
Real interest rates	0.109	-0.199	0.396**	0.115	0.275
	(0.170)	(0.169)	(0.190)	(0.152)	(0.348)
Real exchange rates	-0.0381***	-0.0643*	-0.0462***	-0.0434**	-0.0622**
	(0.0138)	(0.0331)	(0.0152)	(0.0169)	(0.0289)
Observations	402	170	232	201	201
R^2	0.254	0.533	0.265	0.524	0.309
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Euro Countries		Yes	No		
High income Countries					Yes
Low income Countries				Yes	

Notes: HAC robust (Heteroscedasticity and AutoCorrelation robust) standard errors are in parentheses (we use Bartlett kernel-based filter with bandpass parameter 2). *** p<0.01, ** p<0.05, * p<0.1. Country and Year-fixed effects are included. Series are detrended with a HP-filter. In our sample, Euro countries are Austria, Belgium, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Slovakia, Slovenia, Spain. High (low) income Countries are countries where GDP per capita is higher (lower) than the median of the sample.

Table A.12: Consumer and firm credit constraints: more specifications

Table A	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	CA	CA	CA	CA	CA	CA	Private Saving	Private Saving	Consumption	Consumption	CA	CA
	(OLS)	(OLS)	(OLS)	(OLS)	(OLS)	(OLS)	(OLS)	(OLS)	(OLS)	(OLS)	(2sls)	(2sls)
House Prices	-12.03***	-13.93***	-11.55***	-18.21**	-12.07***	-11.18***	-6.066***	-6.358***	14.42***	18.73***	-17.20**	-101.9
	(1.239)	(1.999)	(1.528)	(7.571)	(1.560)	(1.684)	(1.273)	(1.289)	(2.132)	(2.544)	(8.702)	(314.3)
House*LTV				0.0666								
				(0.0860)								
Observations	833	416	417	604	500	333	367	273	384	409	416	353
R^2	0.258	0.261	0.340	0.280	0.365	0.281	0.277	0.436	0.469	0.492		
LTV		$< 80\%$	$> 80\%$				$< 80\%$	$> 80\%$	$< 80\%$	$> 80\%$	$< 80\%$	$> 80\%$
Extraction					No	Yes						

Notes: HAC robust (Heteroscedasticity and AutoCorrelation robust) standard errors are in parentheses (we use Bartlett kernel-based filter with bandpass parameter 2). *** p<0.01, ** p<0.05, * p<0.1. Country and year fixed-effects are included. "Consumption" is indexed 2005=100 and in real terms.

Table B	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	CA	CA	Invest.	Invest.	R Invest.	R Invest.	NR Invest.	NR Invest.	CA	Invest.	R Invest.	NR Invest.
	(OLS)	(OLS)	(OLS)	(OLS)	(OLS)	(OLS)	(OLS)	(OLS)	(2sls)	(2sls)	(2sls)	(2sls)
House Prices	-0.371	-1.593	7.983***	7.017***	5.579***	5.103***	2.370	1.935				
	(2.089)	(2.129)	(2.554)	(2.080)	(1.379)	(1.313)	(2.175)	(1.906)				
House/PCGDP	-938.7***	-931.6***	547.8**	581.6***	-7.756	50.76	556.6***	529.3***	-1,913***	3,513***	123.9	3,371***
	(209.3)	(191.1)	(218.0)	(190.4)	(87.33)	(86.90)	(187.4)	(174.9)	(710.3)	(879.9)	(308.1)	(928.0)
Observations	710	710	664	664	664	664	664	664	664	664	664	664
R^2	0.201	0.266	0.318	0.477	0.327	0.429	0.174	0.354				
Country FE	No	Yes	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes

Notes: HAC robust (Heteroscedasticity and AutoCorrelation robust) standard errors are in parentheses (we use Bartlett kernel-based filter with bandpass parameter 2). *** p<0.01, ** p<0.05, * p<0.1.

Table A.13: Decomposition of the current account with Year Fixed Effects

	(1) OLS	(2) OLS,Y	(3) OLS	(4) OLS,Y	(5) OLS	(6) OLS,Y	(7) IV	(8) IV,Y	(9) IV	(10) IV,Y	(11) IV	(12) IV,Y
Table A: Current Account = Savings - Investment												
	CA	CA	Saving	Saving	Invest.	Invest.	CA	CA	Saving	Saving	Invest.	Invest.
House Prices	-10.35***	-12.07***	2.618***	1.613	14.07***	13.80***	-17.66***	-24.70***	17.78***	16.32*	38.29***	42.17***
	(1.136)	(1.397)	(0.953)	(1.014)	(1.154)	(1.104)	(5.075)	(8.840)	(6.195)	(8.377)	(7.543)	(10.40)
Observations	721	721	721	721	721	721	721	721	721	721	721	721
R^2	0.156	0.230	0.020	0.239	0.305	0.475						
Table B: Savings = Private Savings + Public Savings												
	Saving	Saving	Pr. Sav.	Pr. Sav.	Pu. Sav.	Pu. Sav.	Saving	Saving	Pr. Sav.	Pr. Sav.	Pu. Sav.	Pu. Sav.
House Prices	2.203***	1.187	-5.321***	-6.675***	8.375***	8.839***	27.16***	33.21*	-17.01***	-13.07	46.38***	47.26**
	(0.855)	(0.928)	(0.925)	(0.877)	(1.332)	(1.072)	(9.791)	(18.90)	(6.383)	(12.57)	(14.38)	(24.05)
Observations	621	621	621	621	621	621	621	621	621	621	621	621
R^2	0.016	0.271	0.073	0.298	0.113	0.527						
Table C: Investment = Residential + Non-residential Investment												
	Invest.	Invest.	R Invest.	R Invest.	NR Invest.	NR Invest.	Invest.	Invest.	R Invest.	R Invest.	NR Invest.	NR Invest.
House Prices	11.49***	11.13***	4.605***	4.681***	6.829***	6.399***	33.68***	38.26**	1.475	-4.443	32.17***	42.17**
	(1.046)	(1.056)	(0.378)	(0.361)	(0.923)	(0.944)	(9.154)	(16.29)	(2.825)	(8.143)	(9.417)	(21.06)
Observations	591	591	591	591	591	591	591	591	591	591	591	591
R^2	0.273	0.468	0.365	0.467	0.134	0.387						

Notes: HAC robust (Heteroscedasticity and AutoCorrelation robust) standard errors are in parentheses (we use Bartlett kernel-based filter with bandpass parameter 2). *** p<0.01, ** p<0.05, * p<0.1. Country fixed effects included in the regressions. Year fixed-effects included for OLS, Y and IV, Y columns. All series are detrended using a HP-filter.

Table A.14: OLS Regressions with controls and year fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	CA	CA,Y	CA	CA,Y	CA	CA,Y	CA	CA,Y	CA	CA,Y
House Prices	-10.61***	-12.03***			-8.986***	-10.27***			-7.453***	-7.728***
	(1.068)	(1.239)			(1.396)	(1.815)			(1.225)	(1.657)
Public Surplus			-0.106*	-0.000113	-0.0295	0.0557	-0.0516	0.0273	0.00266	0.0591
			(0.0622)	(0.0862)	(0.0580)	(0.0837)	(0.0733)	(0.0901)	(0.0704)	(0.0885)
Relative income			-8.018	-12.73	1.861	0.855	-4.878	-8.489	2.271	0.940
			(8.111)	(9.324)	(7.849)	(9.074)	(8.810)	(9.924)	(8.915)	(10.18)
Relative income sq.			-70.92	4.282	-9.645	39.57	-227.0	-110.4	-114.7	-36.34
			(201.1)	(217.0)	(178.7)	(186.4)	(262.0)	(253.2)	(239.1)	(228.5)
Relative dependency ratio (Young)			-0.247	-0.274	-0.441*	-0.371	-0.430*	-0.494**	-0.696***	-0.583**
			(0.253)	(0.262)	(0.240)	(0.250)	(0.260)	(0.251)	(0.248)	(0.244)
Relative dependency ratio (Old)			0.365	0.569	0.0109	0.141	1.003**	1.390***	0.446	0.796*
			(0.444)	(0.465)	(0.434)	(0.446)	(0.471)	(0.455)	(0.468)	(0.451)
Financial deepening			0.00731	0.00642	0.00954	0.00845	0.00673	0.0104	0.00830	0.0107
			(0.00659)	(0.00999)	(0.00589)	(0.00909)	(0.00606)	(0.00843)	(0.00574)	(0.00830)
Oil Dummy			-0.359	-0.490	-0.510	-0.602	0.218	0.0349	-0.0789	-0.206
			(0.828)	(0.831)	(0.787)	(0.761)	(0.805)	(0.776)	(0.782)	(0.755)
Real interest rates							0.136	0.138	0.190	0.105
							(0.161)	(0.173)	(0.154)	(0.171)
Real exchange rates							-0.0572***	-0.0570***	-0.0329**	-0.0380***
							(0.0177)	(0.0153)	(0.0153)	(0.0138)
Observations	833	833	473	473	473	473	402	402	402	402
R^2	0.181	0.258	0.044	0.122	0.170	0.232	0.086	0.194	0.168	0.254

Notes: HAC robust (Heteroscedasticity and AutoCorrelation robust) standard errors are in parentheses (we use Bartlett kernel-based filter with bandpass parameter 2). *** p<0.01, ** p<0.05, * p<0.1. Country fixed effects included in the regressions. Year fixed-effects included in columns CA,Y.

Table A.15: Instrumental strategy with controls and year fixed effects, First Stage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	House	House	House	House	House	House	House	House	House	House
	(2sls)	(2sls)	(2sls)	(2sls)	(2sls)	(2sls)	(2sls)	(2sls)	(2sls)	(2sls)
Property tax	-3.697***	-1.956***	-3.389***	-1.800**	-3.362***	-1.732**	-3.195***	-1.658**	-2.955***	-1.560**
	(0.881)	(0.716)	(0.942)	(0.787)	(0.934)	(0.757)	(0.971)	(0.778)	(0.951)	(0.793)
Rel. dependency ratio (young)			-0.0318***	-0.0234***	-0.0299***	-0.0207***	-0.0282***	-0.0223***	-0.0299***	-0.0233***
			(0.00728)	(0.00630)	(0.00772)	(0.00686)	(0.00714)	(0.00659)	(0.00759)	(0.00675)
Rel. dependency ratio (old)			-0.0112	-0.0283**	-0.00890	-0.0239*	-0.0122	-0.0234	-0.0153	-0.0319**
			(0.0157)	(0.0141)	(0.0155)	(0.0138)	(0.0156)	(0.0148)	(0.0160)	(0.0144)
Oil Dummy			0.00248	0.0228	-0.0255	-0.00828	0.00249	0.0197	-0.0439	0.0111
			(0.0288)	(0.0202)	(0.0326)	(0.0269)	(0.0292)	(0.0193)	(0.0398)	(0.0716)
Relative income					0.181***	0.166***				
					(0.0639)	(0.0596)				
Relative income sq.					3.133	2.398				
					(7.794)	(6.714)				
Real exchange rates							0.00345***	0.00268***		
							(0.000700)	(0.000599)		
Financial Deepening									0.00182***	0.00115***
									(0.000405)	(0.000355)
Observations	769	769	591	599	591	599	567	575	545	553
Year FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Notes: HAC robust (Heteroscedasticity and AutoCorrelation robust) standard errors are in parentheses (we use Bartlett kernel-based filter with bandpass parameter 2). *** p<0.01, ** p<0.05, * p<0.1. Country fixed effects included in the regressions. All series are HP-filtered.

Table A.16: Instrumental strategy with controls and year fixed effects, Second Stage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA
	(2sls)	(2sls)	(2sls)	(2sls)	(2sls)	(2sls)	(2sls)	(2sls)	(2sls)	(2sls)
House Prices	-17.10***	-23.15***	-18.77***	-26.89***	-19.09***	-27.82***	-22.25***	-32.48***	-22.62***	-34.35***
	(4.587)	(8.647)	(5.438)	(10.24)	(5.417)	(10.50)	(6.070)	(12.20)	(6.572)	(13.09)
Relative dependency ratio (young)			-0.292	-0.359	-0.277	-0.321	-0.438*	-0.569	-0.529**	-0.606
			(0.241)	(0.317)	(0.233)	(0.305)	(0.247)	(0.359)	(0.254)	(0.384)
Relative dependency ratio (old)			-0.205	-0.413	-0.183	-0.360	-0.378	-0.681	-0.0759	-0.577
			(0.325)	(0.488)	(0.327)	(0.472)	(0.362)	(0.525)	(0.370)	(0.617)
Oil Dummy			0.355	0.989	0.168	0.493	0.364	1.066	-1.784	-0.399
			(0.912)	(0.871)	(0.998)	(1.000)	(0.956)	(0.910)	(1.713)	(2.453)
Relative income					2.237	3.315				
					(2.480)	(2.944)				
Relative income sq.					-153.3	-65.61				
					(203.1)	(220.7)				
Real exchange rates							0.0206	0.0316		
							(0.0265)	(0.0390)		
Financial Deepening									-0.0188	-0.0182
									(0.0175)	(0.0197)
Observations	769	769	591	599	591	599	567	575	545	553
Year FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Notes: HAC robust (Heteroscedasticity and AutoCorrelation robust) standard errors are in parentheses (we use Bartlett kernel-based filter with bandpass parameter 2). *** p<0.01, ** p<0.05, * p<0.1. Country fixed effects included in the regressions. All series are HP-filtered.

Table A.17: Instrumental strategy with controls, Investment, Second Stage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Inv.	Inv.	Inv.	Inv.	Inv.	Inv.	Inv.	Inv.	Inv.	Inv.
	(2sls)	(2sls)	(2sls)	(2sls)	(2sls)	(2sls)	(2sls)	(2sls)	(2sls)	(2sls)
House Prices	38.29***	42.17***	39.37***	46.95***	39.23***	47.69***	45.77***	58.12***	45.96***	58.88***
	(7.541)	(10.40)	(8.712)	(14.57)	(8.762)	(15.06)	(10.31)	(19.34)	(11.53)	(22.14)
Relative dependency ratio (young)			0.370	0.223	0.335	0.183	0.548	0.604	0.669	0.660
			(0.351)	(0.430)	(0.339)	(0.410)	(0.393)	(0.555)	(0.436)	(0.619)
Relative dependency ratio (old)			0.0603	1.001	0.0169	0.910	0.286	1.389*	0.268	1.563
			(0.503)	(0.673)	(0.495)	(0.647)	(0.590)	(0.833)	(0.636)	(1.013)
Oil Dummy			-0.239	-0.269	-0.170	-0.387	-0.264	-0.312	0.827	0.530
			(0.919)	(0.887)	(0.954)	(0.972)	(1.135)	(1.155)	(1.157)	(1.434)
Relative income					-3.116	-3.800				
					(2.559)	(3.525)				
Relative income sq.					-290.0	-172.9				
					(211.5)	(209.9)				
Real exchange rates							-0.121***	-0.105*		
							(0.0435)	(0.0553)		
Financial Deepening									-0.0521**	-0.0416
									(0.0255)	(0.0309)
Observations	721	721	590	590	590	590	566	566	544	544
Year FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Notes: HAC robust (Heteroscedasticity and AutoCorrelation robust) standard errors are in parentheses (we use Bartlett kernel-based filter with bandpass parameter 2). *** p<0.01, ** p<0.05, * p<0.1. Country fixed effects are included in the regressions. All series are HP-filtered.

Table A.18: Instrumental strategy with controls, Saving, Second Stage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Sav.	Sav.	Sav.	Sav.	Sav.	Sav.	Sav.	Sav.	Sav.	Sav.
	(2sls)	(2sls)	(2sls)	(2sls)	(2sls)	(2sls)	(2sls)	(2sls)	(2sls)	(2sls)
House Prices	17.78***	16.32*	17.98**	16.30	17.66**	15.76	21.49***	22.25*	23.73***	25.97*
	(6.194)	(8.377)	(7.087)	(10.62)	(7.030)	(10.98)	(7.677)	(12.62)	(8.691)	(14.44)
Relative dependency ratio (young)			0.0852	-0.147	0.0810	-0.131	0.120	-0.00290	0.224	0.133
			(0.285)	(0.303)	(0.273)	(0.288)	(0.284)	(0.347)	(0.320)	(0.387)
Relative dependency ratio (old)			-0.469	0.0628	-0.471	0.0745	-0.437	0.0899	-0.0810	0.683
			(0.337)	(0.453)	(0.326)	(0.423)	(0.358)	(0.499)	(0.416)	(0.616)
Oil Dummy			0.184	0.191	0.492	0.419	0.170	0.167	-0.433	-0.695
			(0.675)	(0.633)	(0.700)	(0.662)	(0.781)	(0.719)	(0.868)	(0.928)
Relative income					0.367	1.423				
					(2.184)	(2.623)				
Relative income sq.					-253.0	-101.9				
					(163.7)	(132.0)				
Real exchange rates							-0.118***	-0.0942***		
							(0.0322)	(0.0347)		
Financial Deepening									-0.0596***	-0.0475**
									(0.0207)	(0.0213)
Observations	721	721	590	590	590	590	566	566	544	544
Year FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Notes: HAC robust (Heteroscedasticity and AutoCorrelation robust) standard errors are in parentheses (we use Bartlett kernel-based filter with bandpass parameter 2). *** p<0.01, ** p<0.05, * p<0.1. Country fixed effects are included in the regressions. All series are HP-filtered.

Table A.19: Controlling with the Frequency of Cadastral Revisions

	(1)	(2)	(3)	(4)	(5)	(6)
	House	House	House	CA	CA	CA
	(IV: 1st st.)	(IV: 1st st.)	(IV: 1st st.)	(IV: 2nd st.)	(IV: 2nd st.)	(IV: 2nd st.)
Property tax	-3.697***	-3.434***	-3.896***			
	(0.881)	(1.193)	(1.281)			
House Prices				-17.10***	-17.37***	-16.92***
				(4.588)	(6.404)	(6.366)
Observations	769	393	376	769	393	376
Revision		Yes	No		Yes	No

Notes: HAC robust (Heteroscedasticity and AutoCorrelation robust) standard errors are in parentheses (we use Bartlett kernel-based filter with bandpass parameter 2). *** p<0.01, ** p<0.05, * p<0.1. Country fixed effects are included in the regressions. All series are HP-filtered. "Revision" points to countries where cadastral values are reassessed at least every five years (Australia, Canada, Denmark, Finland, Hungary, Japan, Netherlands, New Zealand, Portugal, South Africa, Sweden, Switzerland, United States). For a description of the frequency of revision of cadastral values, see Table B.22.

Table A.20: Decades

	(1)	(2)	(3)	(4)	(5)	(6)
	House	House	House	CA	CA	CA
	(IV: 1st st.)	(IV: 1st st.)	(IV: 1st st.)	(IV: 2nd st.)	(IV: 2nd st.)	(IV: 2nd st.)
Property tax	-2.473**	-3.705***	-10.68***			
	(0.987)	(1.281)	(2.568)			
House Prices				-20.47*	-20.58***	-13.60***
				(11.90)	(6.647)	(4.491)
Observations	284	229	256	284	229	256
Decades	<1990	1990s	>2000	<1990	1990s	>2000

Notes: HAC robust (Heteroscedasticity and AutoCorrelation robust) standard errors are in parentheses (we use Bartlett kernel-based filter with bandpass parameter 2). *** p<0.01, ** p<0.05, * p<0.1. Country fixed effects are included in the regressions. All series are HP-filtered.

Table A.21: Real Exchange Rates

	(1) CA (IV)	(2) Real Exchange Rates (OLS)	(3) Real Exchange Rates (VAR)	(4) House (VAR)
House Prices	-19.73***	18.83***		
	(5.017)	(3.532)		
Real exchange rates	0.0293			
	(0.0189)			
Real Exchange Rates (L1)			0.461***	-0.000404
			(0.0723)	(0.000341)
House Prices (L1)			11.33***	0.707***
			(3.155)	(0.0623)
Observations	691	691	664	664
R^2		0.052	0.287	0.447

Notes: HAC robust (Heteroscedasticity and AutoCorrelation robust) standard errors are in parentheses (we use Bartlett kernel-based filter with bandpass parameter 2). *** p<0.01, ** p<0.05, * p<0.1. Country fixed effects are included in the regressions. All series are HP-filtered.

B Appendix : Data

This Appendix details the frequency of revision of cadastral values in Table B.22, and the source for house price series in Table B.23. More detail on the data is provided in our online Appendix.

Table B.22: Recurrent Taxes on Property: Revision of Cadastral Values

Country	Level of administration of the Tax	Cadastral values	Sources
Australia	Local councils levy rates on the rental value of the property	Land valuations made every 3 to 4 years	Landgate (2012), Sidney (2012)
Austria	Federal rate multiplied by a municipal coefficient	From 1973 with no automatic update	ECB (2012)
Belgium	Regional and Local	From 1975, indexed to the CPI since 1991	ECB (2012)
Canada	Municipal governments	Market value in most provinces (with an annual reassessment)	Statistics Canada (2003)
China	Central, local	On historical cost. Market value for Shanghai and Chongqing since 2011	The Economist (2012)
Czech Republic	Local	Based upon floor-area	ECB (2012)
Denmark	Municipal tax and National tax	Updated every second year	ECB (2012)
Estonia	Municipality	From 2001	ECB (2012)
Finland	Municipality	From 2009	ECB (2012)
France	Local	From 1978	SÃ©nat (2012)
Germany	Federal rate multiplied by a municipal coefficient	From 1964	ECB (2012)
Greece	National tax of 2011	Based upon floor-area	ECB (2012)
Hungary	Local	Fair market value	ECB (2012)
Ireland	National	Regular update for non-residential housing. New Property Tax in 2012	ECB (2012)
Italy	Local Tax	From 1988. Correction factor was increased by 60% in 2012	ECB (2012)
Korea	Local and national	From 2005	Kim (2008)
Japan	Central government	Adjusted every three years	The Japan Times (2012)
Luxemburg	Local	From 1941	ECB (2012)
Netherlands	Local	Updated annually by municipalities	ECB (2012)
New Zealand	Local	Official land valuation every three years	LINZ (2012)
Norway	Municipalities	Assessed value of the property (about 25% of the market value)	Global Property Guide (2012)
Portugal	Municipalities (min/max rates determined at the national level)	Adjusted every 3rd year. But some values have not been updated since 2003	ECB (2012)
Slovak Republic	National and municipalities	From 2004	ECB (2012)
Slovenia	Municipalities	Based upon floor-area. Market value since 2012.	ECB (2012)
South Africa	Local	Market value	Global Property Guide (2012)
Spain	Tax levied by municipalities	Partly updated in Jan. 1994	ECB (2012)
Sweden	Municipal tax	Fully updated every 6th year, with a minor revision in between	ECB (2012)
Switzerland	Cantons	Market value	Federal Tax Administration (2011)
United Kingdom	Local taxation (Council tax)	From April 1991	ECB (2012)
United States	Local governement level (municipal or county level)	Nearly always at the fair market value. Values determined by local officials	Texas Basics, Tax Foundation Study

Table B.23: Data Appendix: House Price Series

Country	Time coverage	Sources	Series
Australia	1970-present	BIS -Australian Treasury	Residential property prices, existing dwellings (8 Cities), nsa
Austria	1986-present	BIS	Residential Property Prices, all dwellings (Vienna and big cities), nsa
Belgium	1970-present	BIS-Statistics Belgium	Residential property prices, existing houses, nsa.
Canada	1970-present	BIS	Residential Property Prices, all dwellings
China	1998-present	BIS	Land prices, residential and commercial, nsa
Czech Republic	2004-present	BIS	Residential property prices, existing flats , nsa
Denmark	1970-present	Danmarks Nationalbank	Residential property prices, new and existing single-family house, nsa
Estonia	2002-present	BIS	Residential property prices, all flats, nsa
Finland	1970-present	BIS-Statistics Finland	Residential property prices, existing houses, nsa
France	1970-present	J. Friggit (Conseil GÃ©nÃ©ral Ã l'Environnement et au DÃ©veloppement Durable)	Residential property prices, existing dwellings, nsa
Germany	1975-present	BIS- Deutsche Bundesbank	Residential property prices, existing flats (West-G.), nsa
Greece	1992-present	BIS	Residential property prices, all flats (Athens-Thessaloniki), nsa
Hungary	2000-present	BIS	Residential property prices, existing dwellings (Budapest), nsa
Iceland	1999-present	BIS	Residential property prices, all dwellongs, nsa
Indonesia	2001-present	BIS	Residential property prices, new houses (big cities), nsa
Ireland	1970-present	BIS-Department of Environment	Residential Property Prices, all dwellings, nsa
Israel	2000-present	BIS	Residential property prices, owner-occupied dwellings, nsa
Italy	1970-present	BIS- Il Consulente Immobiliare	Residential Property prices, All dwellings, nsa.
Japan	1970-present	Stat Bureau, Ministry of Internal Affairs and Communications, Japan	Japan Residential land price index
Korea	1985-present	BIS	Residential Property Prices, all dwellings, nsa
Mexico	2004-present	BIS	Residential Property Prices, all dwellings, nsa
Netherlands	1975-present	BIS-The Dutch Land Registry Office (Kadaster)	Residential Property Prices, existing dwellings, nsa
New Zealand	1970-present	BIS-Reserve Bank of New Zealand	Residential Property Prices, all dwellings, nsa
Norway	1970-present	Norges Bank	Residential Property Prices, all dwellings, nsa
Poland	2001-present	BIS	Residential property prices, existing flats (big cities), nsa
Portugal	1987-present	BIS	Residential Property Prices, all dwellings, nsa
Slovak Republic	2004-present	BIS	Residential Property Prices, existing dwellings, nsa
Slovenia	2002-present	BIS	Residential Property Prices, existing dwellings, nsa
South Africa	1970-present	BIS-ABSA	Residential Property Prices, all middle-segment houses, nsa
Spain	1970-present	BIS-Ministerio de la Vivienda	Residential Property Prices, all dwellings, nsa
Sweden	1970-present	BIS-Statistics Sweden	Residential Property Prices, all owner-occupied dwellings, nsa
Switzerland	1970-present	Swiss National Bank	Residential Property Prices, all 1-family houses, nsa
United Kingdom	1970-present	Nationwide	Residential Property Prices, all dwellings, nsa
United States	1970-present	FHFA-Shiller	Residential Property Prices, existing 1-family houses, nsa

Variables	Abbreviation	Sources	Variable description
House Prices	House	See Table B.23	Real house prices (base 1=2005)
Current account balance	CA	WDI	Current account balance (ratio of GDP)
Property Tax	Property Tax	OECD	Property tax (ratio of total taxation)
Income Taxes	Income Tax	OECD	Income tax (ratio of total taxation)
Taxes on capital gains	Capital gains	OECD	Taxes on capital gains (ratio of total taxation)
Taxes on inheritances	Inheritances	OECD	Taxes on inheritances (ratio of total taxation
Taxes on capital and financial transactions	Transactions	OECD	Taxes on capital and financial transactions (ratio of total taxation)
Social security contributions	Social Secu.	OECD	Social security contributions (ratio of total taxation)
Payroll taxes	Payroll	OECD	Payroll taxes (ratio of total taxation)
Taxes on goods and services	Goods/Services	OECD	Taxes on goods and services (ratio of total taxation)
Other taxes	Other	OECD	Other taxes (ratio of total taxation)
CPI	CPI	OECD	Consumer Prices, Index 2005=100
Net Foreign Asset Position	NFA	WDI	Stock of net foreign assets, ratio to GDP
Young dependency ratio	Relative dependency ratio (Young)	WDI	Youth Population under 15/Population between 15 and 65
Old dependency ratio	Relative dependency ratio (Old)	WDI	Population over 65/Population between 15 and 65
Gross fixed capital Formation	Investment	OECD	Gross fixed capital Formation, total, ratio of GDP
Residential Investment	Res. Inv.	OECD	Gross fixed capital formation (housing), ratio of GDP
Non residential Investment	NR Invest.	OECD	Gross fixed capital formation (non-housing), ratio of GDP
Saving	Gross domestic savings	WDI	Gross domestic savings (ratio of GDP)
Gross Saving	Gross Savings	WDI	Gross savings (ratio of GDP)
Government net lending	Government surplus	OECD	Government net lending (+ indicates surplus, - indicates deficit), ratio of GDP
Net Capital Outlays	Net Capital Outlays	OECD	Net capital outlays of the government, ratio of GDP
Public Saving	Public Saving	OECD	Government net lending+ Net capital outlays, ratio of GDP
Private Saving	Private Saving	OECD	Gross Savings minus Government net lending minus Net capital outlays , ratio of GDP
Total General government expenditure	Public Spending	OECD	Total General government expenditure, ratio of GDP
Total General government revenue	Public Revenue	OECD	Total General government revenue, ratio of GDP
Household final consumption	Consumption	WDI	Household final consumption expenditure, etc. (ratio of GDP)
Share Prices	Share Prices	OECD	Share prices, Index 2005 = 100
Relative Income	Relative Income	WDI	Relative income is the the GDP per capita divided by the GDP per capita for the US
GDP	GDP	WDI	GDP (current US $), Index 2005=100
GDP per capita	GDP per capita	WDI	GDP per capita, PPP (current international $)
Market capitalization	Financial deepening	WDI	Market capitalization of listed companies (ratio of GDP)
Domestic credit to private sector	PCGDP, Financial. Deep.	WDI	Domestic credit to private sector (ratio of GDP)
Oil rents	Oil rents	WDI	Oil rents (ratio of GDP)
Oil dummy	Oil dummy		Norway, Russia
Real long term interest rates	Real Interest Rates	OECD	Real long-term interest rate on government bonds, ratio of GDP
Real effective exchange rate	Real exchange rates	WDI	Real effective exchange rate index (2005 = 100)
Unemployment	Unemployment	WDI	Unemployment, total (% of total labor force)
Loan-To-Value ratios	LTV ratios	See text	maximum LTV ratios