Common determinants of corporate surplus and investments in the OECD economies: a balance sheet recession?

Matteo Alpino and Giulio Nicoletti*

December 28, 2013
PRELIMINARY AND INCOMPLETE:
please do not quote without permission

Abstract

In the aftermath of the 2007-2009 crisis, non-financial corporations in advanced economies increased their saving attitude, with investments remaining weak. Was this common pattern new and due to a 'balance sheet recession'? We trace past comovements of corporate surpluses and gross capital formation in OECD economies using integrated economic and financial accounts. Three common factors explain a large part of variations across countries with limited evidence of breaks or new types of shocks in the recent crisis. Using instrumental variable methods as in Stock and Watson (2012) we argue the structural shocks are news shocks, financial sector risk appetite (with analogies with the Brokers and Dealers leverage) and uncertainty (with analogies with the Bloom index).

1 Introduction

In the aftermath of the 2007-2009 financial crisis and ensuing recession, non-financial corporations in almost all of the advanced economies largely increased their saving attitude. In some countries pre-existing positive net lending positions enlarged, in others the previous deficit positions switched into surpluses: investment dynamics remained overall weak for a protracted period of time. While such

*Both ECB, all views are personal, we thank Adrien Amzallag, Patrick Bolton, David Lodge, Bernd Schnatz, Michael Ehrmann, Stelios Makrydakis and seminar participants to the 2013 CEF for helpful discussions and support on this project.

strong comovement took commentators by surprise the pattern was reminiscent of what happened to the Japanese corporate sector in the aftermath of the real estate bubble of the 1990s and the 1997 Asian crisis. A major publishing success, the book by Koo (2003) described this type of recession as 'balance sheet recession', with economic agents being forced to reduce their debt positions and therefore increase savings. Eggertson and Krugman (2012) formalize this very idea under the name of 'Fisher-Minsky-Koo' recession.

In Eggertson and Krugman (2012) the credit limit allowed to economic agents face a sudden and exogenous reduction ('Minksy moment'): while the exogenous nature of such a shock might not be taken literally, the model still suggests that balance sheet recessions might best be empirically described as some type of structural change or a new type of shock affecting the economy. However, recent empirical research has so far found limited evidence of such pattern: for example, the empirical study of Stock and Watson (2012) on the US economy rejects the idea that the type of shocks that led to the Great Recession were of different nature than the one prevailing in the Great Moderation period.

This paper tackles the question of rising corporate surplus with associated weakness in corporate's investments from an empirical perspective. In particular, the questions we aim to answer are the following:

1. Is the recent common rise of corporate surplus in advanced economies really a new phenomenon? Can we find strong common determinants for corporate surpluses and investments in aggregate cross-country data also in normal times?

2. Can we find evidence of a change, i.e. a structural break or a new shock, in the determinants of the aggregate behaviour of the corporate sector in the advanced economies during to the recent recession?

3. Can we identify structural determinants of corporate surplus, net investments and loans? What role for technological, bank loan supply shocks and uncertainty shocks?

By looking at empirical joint determinants of corporate surplus and investments the paper contributes to two streams of literature: on the one hand we try to gather evidence of a possible balance sheet recession, as in the thread of Stock and Watson (2012). On the other hand, we contribute to a still small but growing literature on determinants of real investments which are not purely of neoclassical type. For example, the contribution of both Eisfeldt and Muir (2013) and Bolton, Chen, and Huang (2011) highlight the implications of firms facing frictions in raising equity and they provide arguments in favor of the importance of cash holdings to explain asset returns and investments. However, these type of models only describe the

asset side of firms' balance sheet: non-financial sector can only choose how to split their assets in form of cash and real investments but no specific role is assigned to the liability side of the balance sheet, i.e. debt. In such simplified an environment it would not be possible to address the theme of 'balance sheet recession'. As we cannot rely on well-established dynamical models on investment decisions of the non-financial corporate sector we aim at providing empirical evidence that can guide further theoretical developments in this field.

Concerning our empirical methodology, we mainly use factor model techniques to describe common determinants of firms decisions in advanced economies: this seems a natural choice as the phenomenon we want to describe is common to many economies and we want to provide empirical evidence which can be as robust as possible to both model misspecification and data measurement errors. For what concerns data, we use the set of integrated economic and financial accounts, a recollection of Flow of Funds for several economies. In particular, we use two main datasets: the annual OECD harmonized accounts and the quarterly ones provided only for the EU by Eurostat.[1] While this type of data has gained a lot of attention among market practitioners and policy makers, it is still relatively under-used in the academic literature, we hope our contribution can foster its use further.

A plan of the paper can be given as follows, section 2 describes the logic behind two main datasets we use; section 3 provides results on factor model estimates using both the full sample and the sample before the 2007-2009 recession, in subsection 3.2 we use the Klems dataset to show that our identified factors also have explanatory power over real investments over the stock of capital from the Klems dataset, which provides a measure which is the closest to what should be consistent with theoretical models of investments. Finally, in section 4 we try to provide a structural interpretation of previous reduced form results. Conclusions follow.

2 Data description

For our analysis we use the the integrated economic and financial accounts: from them we put together data on net investments; corporate surplus and loans to non-financial corporations in OECD economies. We use two datasets: the harmonized dataset provided by the OECD and the harmonized set of accounts from Eurostat. While the underlying methodologies used to construct the datasets are similar, there are some important differences in the two sets of data: frequency, time span and country coverage. The OECD data are provided at an annual frequency and for most of the countries in our sample they currently start in 1996 and they end in

[1] For a more complete introduction the reader can see OECD (2006), page 223.

2010; their country coverage is larger. Eurostat data are quarterly, starting from 1999:Q1 and ending in 2012Q3[2], but they cover only EU economies.

Table 1 summarizes our choice of countries for the different datasets.

Code	Included countries	
	OECD dataset	Eurostat dataset
US (United States)	+	-
UK (United Kingdom)	+	+
Austria (AT)	+	+
BE (Belgium)	+	+
FR (France)	+	+
DE (Germany)	+	+
IT (Italy)	+	+
NE (Netherlands)	+	+
NO (Norway)	-	+
SWE (Sweden)	+	+
CA (Canada)	+	-
FI (Finland)	+	+
PT (Portugal)	+	-
CZ (Czech Republic)	+	-
SZ (Slovenia)	+	-
HU (Hungary)	+	-
PO (Poland)	+	-
DK (Denmark)	–	–
SWI (Switzerland)	–	–
JP (Japan)	–	–
GR (Greece)	–	–
IRL (Ireland)	–	–
SP (Spain)	–	+
AUS (Australia)	–	–
ME (Mexico)	–	–
KO (Korea)	–	–

Table 1: Selected and available countries

To summarize, we include 17 countries from the OECD dataset and we exclude Denmark, Switzerland, Japan, Greece, Ireland, Spain, Australia, Mexico and Korea; slightly less countries from the Eurostat dataset. Exclusion choices are made

[2]Eurostat data are not seasonally adjusted, we run an automatic X-12-ARIMA to seasonally adjust them.

on the basis of data availability: for some countries series are far too short and/or they are unavailable (especially loans data).

A general description of our accounts and the variables we select can be provided as follows. The dataset includes both economic and financial accounts. Economic accounts describe the generation of income for the different economic agents (government, non-financial corporations, households ...) and how this is split between savings and investments. In our study we focus on the so called capital account, which has the following simplified structure:[3]

$$GFC_t - CFC_t + Netlending_t = Savings_t, \tag{1}$$

On the left hand side of 1 we have uses and on the right hand side resources. Gross fixed capital formation (GFC) is firms' investments, net of inventories[4] while consumption of fixed capital (CFC) is depreciation of existing capital, the difference of the two gives net investments ($Netinv$). Investments can in turn be financed either by internal savings ($Savings$) which measure undistributed profits and/or by borrowing vis-a-vis some other sector, the banking sector or markets: an increase in borrowing positions of the corporate sector corresponds to $Netlending < 0$. In terms of relation 1, corporate surplus is registered by $Netlending$, while flows of undistributed profits are denoted by $Savings$.

For our analysis we take time series of $Netinv_t = GFC_t - CFC_t$ and $Netlending_t$;[5] variables have been normalized either by GDP (OECD accounts) or value added (for Eurostat accounts): $\frac{Netinv}{GDP}, \frac{Netlending}{GDP}$.

Using the Financial accounts we then examine how $Netlending$ relates to loans in the balance sheet of non-financial corporations: this is an important step as, for example, the balance sheet recession in Japan was characterized by non-financial sector unloading loans from the banking system. Financial accounts are constructed in such a way that they keep separate track of the effects of transactions and the change in the valuation of items in the balance sheet. Whenever possible, we use the transaction side to exclude valuation effects. Financial accounts provide us with the following decomposition of flows (this account is also presented in simplified form by omitting items that are of minor importance for non-financial corporations):

$$Netlending_t = +\Delta(Cash_t + SSEC_t) - \Delta Loans_t + \Delta Sec_t, \tag{2}$$

[3]Such a simplified structure omits some relatively minor items, however they are unlikely to contribute to systematic movements across countries. In factor model language they would be absorbed in the idiosyncratic measurement error.

[4]We assess the robustness of our results by using also Gross Fixed Capital formation, which excludes inventories.

[5]A robustness check is conducted keeping Consumption of fixed capital separated from Gross fixed capital formation.

Cash and short term ($Cash + SSEC$ securities stored by firms can be used as resources (as discussed in Bolton, Chen, and Huang (2011)).

3 Empirical Results: was the 2007-2009 different?

We use the annual OECD dataset together with a factor model methodology to gather information on the underlying shocks affecting net investments, corporate surplus and loans to non-financial firms in our sample. In a factor model representation, our series are described as:

$$y_t^i = \lambda_i F_t + \zeta_t^i, \tag{3}$$
$$F_t = \Phi F_{t-1} + \epsilon_t, \tag{4}$$

where y_t^i is either net investment, corporate surplus or loans, all normalized by nominal gdp or value added, for each i of the 17 economies in the sample 1996-2010 for the case of the OECD dataset, λ_i is a $1 \times T$ vector of loadings, F_t are a matrix of factors ($T \times r$) and ϵ_t^i are idiosyncratic errors. As usual in the literature, F_t are represented in vector autoregressive form, selecting the lag length p of the VAR with a Schwartz criterion (we use $p = 1$ with annual data and $p = 4$ with quarterly data). In the case of the OECD dataset we fill some missing data, both at the beginning of the sample in 1996 and for few economies at the end 2010, by using the EM algorithm as in Smets and Wouters (2003).

To relate representation 3–4 to our discussion on a possible deleveraging shock, we examine the following two possibilities: if the deleverage shock hit all or most of the economies in our sample and it was a new type of large shock, then this should be reflected in the common factors. A theoretical explanation for this to happen is policy rates hitting the zero lower bound on interest rates; as argued by Justiniano, Primiceri, and Tambalotti (2013) for the case of households, deleveraging might have sizeable effects only when interest rates are at the zero lower bound. In this case, we should see that common factors reconstructed using pre-crisis loadings should sizeably differ from the ones computed on the full sample. A different possibility, which our model 3–4 does not take into account, is that the deleverage shock only hits a selected group of economies, in this case one would expect the linear relation 3 to change in a non linear one, where $X(i)$ is a vector of characteristics that drive deleveraging, for example, the amount of corporate debt and/or the health of the banking sector, as according to different possible theories underlying the phenomenon:

$$y_t^i = \lambda_i F_t + \mu_i * X(i) F_t + \zeta_t^i. \tag{5}$$

In this latter case, however, it should be possible to show some systematic relation between some determinants X and the way loadings λ_i change in the different samples using equation 3. As this section will show, the empirical evidence lies somewhere in the middle of the two thesis highlighted above: data support limited evidence for a break in the factors, but at the same time countries that changed their loadings the most do not to start from an unhealthy banking sectors or with a high corporate debt. If any structural change was at play, evidence of a deleveraging shock is scant, at best.

A part from the caveats highlighted in the previous section, the choice of factor analysis is well rooted in our research question: first, we are looking for Global factors, as the 2007-2009 recession we study affected mostly or all advanced economies: figure 3 corroborates evidence in this direction. Second, the factor model structure is relatively robust to structural breaks, i.e. underlying factors can be consistently estimated even when factor loadings are not constant over time but they change relatively slowly, see for example Stock and Watson (2002). Third, as we discussed in the introduction theoretical models that could provide more structure to our empirical analysis are very limited or even non-existing.

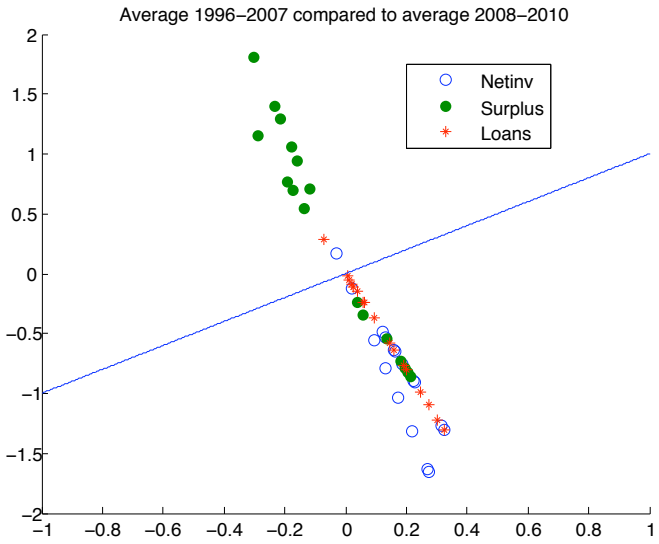

Figure 1: Recent patterns in corporate surplus and investments: standardized data using full sample information

Using informal methods, i.e. the amount of additional variance explained by additional factors, we select 3 factors, which roughly explain 70% of the comovements across countries, for our full sample, only slightly less for a sample up to 2006. In order to detect possible structural breaks from 2007 onwards we estimate loadings $\Lambda^{96-06} = [\lambda_1^{96-06}; \ldots \lambda_i^{96-06}; \lambda_N^{96-06}]$ up to 2006 and use them loadings to reconstruct the factors even after 2006, given the post-2006 data, in the following way:

$$F_t = (\Lambda')^{1996-2006} X_t, t = 1996 \ldots 2010,$$

where the missing data in 2010 (17 out of 51 series) have been substituted with their fitted values, results are robust to excluding these economies and recomputing the factors. This methodology is similar to what has been used in Stock and Watson (2012) to assess whether the Recession of 2007-2009 was different from the previous ones. The factors reconstructed from the 1996-2006 sample seem to replicate well the full sample ones relatively well, with the partial exception of the second factor:

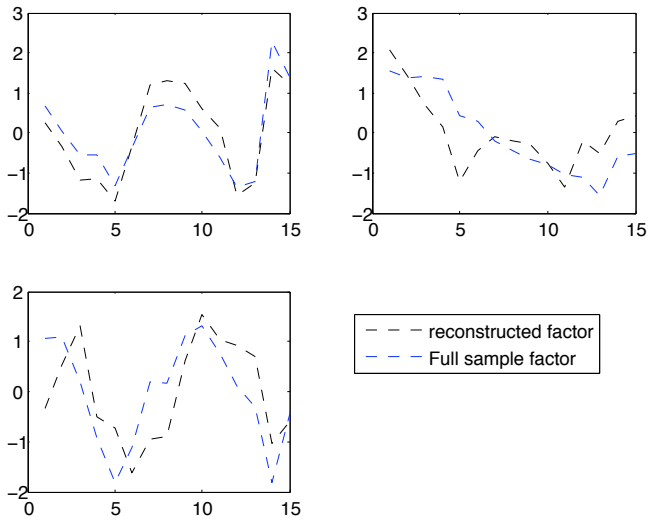

Figure 2: Full sample factors and reconstructed ones

while factors are not identified, the factor loadings on the first factor still seem to convey some intuition, they are almost all positive on net investment and loans and negative on the corporate surplus (this holds true across samples).

Since the first factor explains a non-negligible proportion of com-movements (roughly 35%) policy makers are somewhat right to worry when corporate sur-

plus raises, as, through the first factor, this is generally associated to a reduction in both loans and net investments. Looking at differences across the two samples, there is a general tendency of on net investment and loans' loadings to increase, raising the sensitivity of their respective countries to the first statistical factor. Exception to this tendency are only Poland for net investments and Germany and the Netherlands for what concerns loans' loadings. For what concerns corporate surplus, the evidence is more mixed, with half of the countries (US,BE,FR,IT,FI,PT,CZ,SZ,HU) increasing their exposure (i.e. their loading becoming more negative) to the factor and the other countries reducing it.

Concerning the countries that display the largest changes in their loadings, there does not seem to be an evident relationship between the change in loadings and the level of their corporate debt, which could hint at a deleveraging shock being at play, with countries having higher corporate debt being more affected by it, while the others might be left untouched. For example Italy experienced a comparatively large change in loadings in all three set of variables and this is a country with traditionally a low corporate debt and no clear need of deleveraging in either the corporate nor the household sector. As figure 3 already showed the fact that loadings appear to change over time does not seem to convey sensible implications for a break in the first factor, which is practically identically reconstructed across samples.

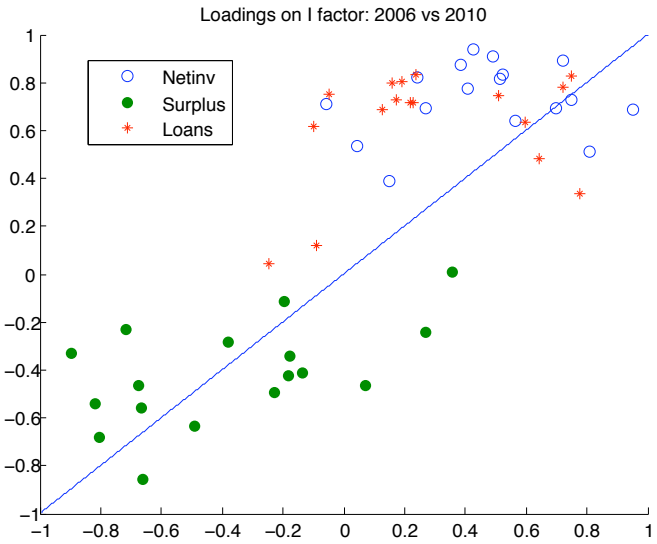

Figure 3: Loadings on the first factor: Full sample versus up-to-2006

Looking at the remaining two statistical factors in 4, evidence on a break in loadings is more compelling for the second factor, where we observe a systematic increase of loadings on net investment and a reduction of those on corporate surplus. This evidence, together with the reconstruction of the second factor, suggests that a structural change happened.

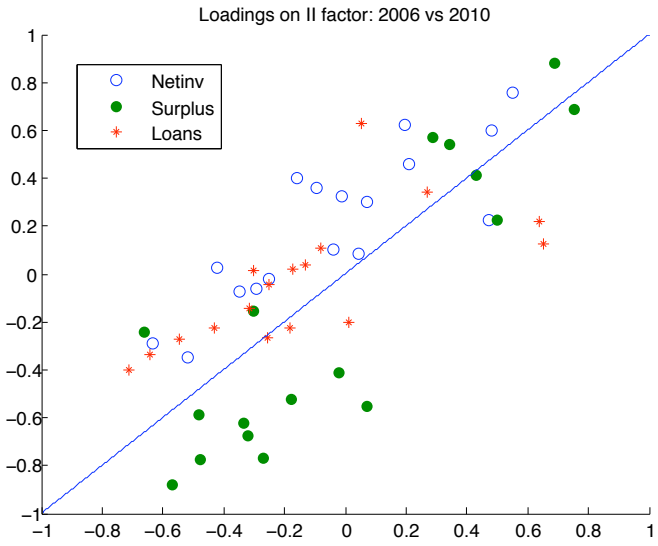

Figure 4: Loadings on the second factor: Full sample versus up-to-2006

To gauge further intuition on what changed we examine the pattern of change in loadings on the second factor more closely, ordering the economies by changes in the loadings on net investments. First of all, before the recession, the net investments in most of the european economies (excluding Portugal) had a negative correlation with the factor, the Atlantic bloc of Canada and US plus the non-euro scandinavian bloc (Sweden, Norway) were positively exposed to this (non-identified) factor. By the end of 2010 most of the signs turned into positive increasing the amount of synchronicity across economies. For what concerns the corporate surplus, the factor loadings are reduced after the Recession, so that, using full sample estimates, a reduction in the second factor also tend to produce a decrease in net investments and an increase in surplus. Notably, for what concerns both investments and the surplus, the relation for the United States has barely changed.

Much less evidence of a break is found on loadings on the third factor as shown in figure 5, this, together with the fact that the factor seems to barely change in

	FR	CZ	UK	NO	NE	BE	PO	SWE
Loadings on Net investment								
1996-2006	-0.2	-0.1	-0.4	0.2	-0.6	-0.0	-0.3	0.2
1996-2010	0.4	0.4	0.0	0.6	-0.3	0.3	-0.1	0.5
Loadings on corporate surplus								
1996-2006	0.8	-0.3	-0.2	-0.0	0.7	0.1	0.3	-0.3
1996-2010	0.7	-0.8	-0.5	-0.4	0.9	-0.6	0.6	-0.6
Loadings on loans								
1996-2006	-0.4	-0.3	0.6	-0.2	-0.5	0.3	-0.6	-0.1
1996-2010	-0.2	-0.1	0.2	0.0	-0.3	0.3	-0.3	0.1
	IT	PT	FI	CA	DE	AT	US	SZ
Loadings on Net investment								
1996-2006	-0.3	0.1	-0.3	0.6	-0.5	-0.0	0.5	0.0
1996-2010	-0.0	0.3	-0.1	0.8	-0.3	0.1	0.6	0.1
Loadings on Corporate Surplus								
1996-2006	-0.5	-0.3	0.5	-0.6	0.3	0.4	-0.5	-0.3
1996-2010	-0.8	-0.7	0.2	-0.9	0.5	0.4	-0.6	-0.2
Loadings on Loans								
1996-2006	-0.2	0.7	-0.3	0.1	-0.3	-0.1	-0.2	0.0
1996-2010	-0.2	0.1	0.0	0.6	-0.3	0.0	-0.0	-0.2

Table 2: Loadings on the II factor for the 16 in which loadings on net investment increased

our reconstruction, lead us to exclude the possibility of a break also here.

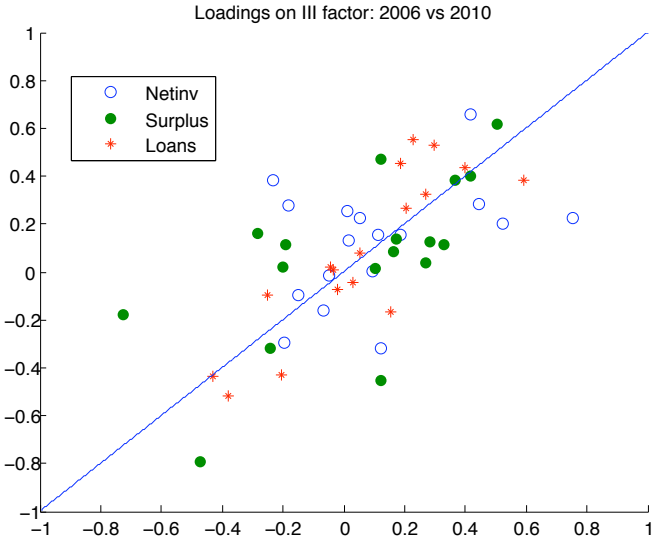

Figure 5: Loadings on the third factor: Full sample versus up-to-2006

Finally, identity 1 describes the relation between savings against net investments and the net lending positions of financial firms. Given the linearity of the factor model, we can decompose the identity 1 to describe how savings (non-distributed profits) of non-financial corporations are influenced by our factors and whether the sensitivity of the different economies to our factors changed over time. By adding the factor representation we decompose then the accounting relation 1 by factors as follows (i refers to countries, time t is omitted to simplify exposition):

$$\begin{aligned} Netinv_i &= \lambda_i^{inv} F + \epsilon_i^{inv}, \\ Netlending_i &= \lambda_i^{lend} F + \epsilon_i^{lend}, \\ Savings_i &= (\lambda_i^{inv} + \lambda_i^{lend}) F + h_i; \end{aligned} \tag{6}$$

This decomposition of identity 1 by factor provides the following picture:

So far we have used annual data to pin down our factors, similar results can be obtained using quarterly data, available from Eurostat. [to be ADDED]

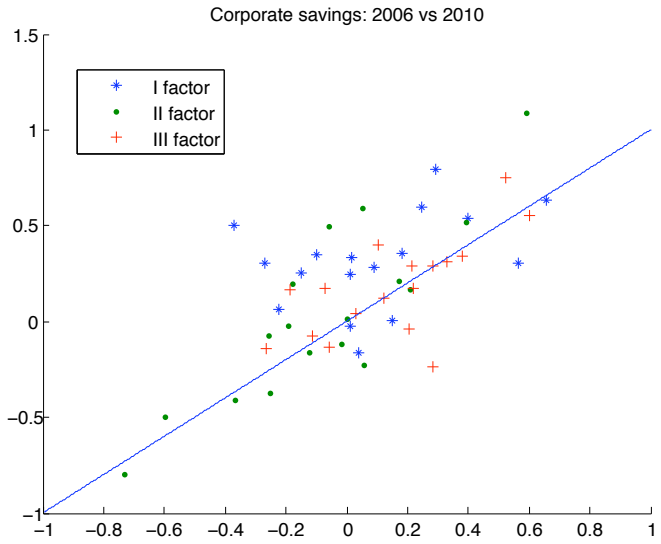

Figure 6: Implicit Loadings on corporate savings: Full sample versus up-to-2006

3.1 A formal assessment of structural breaks

We assess the presence of structural breaks in the loadings using the Andrews test of instabilities at the end of the sample, as described in Andrews (2003). Given limited data availability this can only be attempted using the quarterly Eurostat dataset

[TO BE COMPLETED]

3.2 Relation of factors with the real economy

In this section we provide evidence that the statistical factors we extracted do not only have explanatory power with respect to the nominal investments over gdp (value added) variables we selected, but they can also explain the bulk of real variables such as the ratio of real investments over the capital stock. To undertake this robustness check we extract information from the KLEMS dataset and we basically

[TO BE COMPLETED]

4 A structural interpretation of the factors

For what concerns our econometric methodology, our approach follows from Stock and Watson (2012) and Mertens and Ravn (2012) that use external instruments to identify single structural shocks: the methodology originates in the VAR literature on the identification of shocks through a narrative approach as in Romer and Romer (1989). In a nutshell, as in VAR analysis, reduced form innovations are given by a linear combination of structural shocks, so that:

$$\epsilon_t = H\eta_t,$$

where H is the identification matrix, which has to inferred from the instruments; in particular, each (or multiple) instruments only allow to identify one row, say H_1 of $H = [H_1; \ldots; H_r]$ of H in order to gather one of the r structural shock, say, ϵ_1 in $\epsilon = [\epsilon_1; \ldots; \epsilon_r]$.

Consider now for simplicity having a single instrument Z, which is assumed to satisfy three conditions which are standard in any instrumental variable approach:

$$E[\eta_j Z_t = 0], if j > 1, \tag{7}$$
$$E[\eta_j Z_t = \alpha \neq 0], if j = 1, \tag{8}$$
$$\Sigma_{\eta\eta} = D = diag(\sigma^2_{\eta_1} \ldots \sigma^2_{\eta_r}). \tag{9}$$

Condition 7 is the usual orthogonality condition of the chosen instrument with respect to the structural shocks different from the one we want to identify; condition 8 specifies that for the shock we want to identify, the chosen instrument should be relevant, so that their covariance must be $\alpha \neq 0$, last condition states the variance covariance matrix of structural shocks should be diagonal, i.e. structural shocks should not be correlated. How can an external instrument satisfying conditions 7– 9 help identifying the matrix H? Consider now the fitted values of the regression of the reduced form innovations ϵ_t onto the instrument Z, which we assume is correlated with the first structural shock:

$$E(Z_t\epsilon)\Sigma_\epsilon^{-1}\epsilon_t = E(Z_t\epsilon_t)(H'DH)^{-1}\epsilon_t \tag{10}$$
$$= \alpha H\eta(H'DH)^{-1}\epsilon_t = \frac{\alpha H_1}{\sigma_{\eta_1}}\epsilon_t + \ldots \frac{\alpha H_r}{\sigma_{\eta_r}}\epsilon_t \tag{11}$$
$$= \frac{\alpha H_1}{\sigma_\eta}\epsilon_t = \frac{\alpha}{\sigma_{\eta_1}}(\eta_1)_t \tag{12}$$

where the matrix $H = [H_1 \ldots H_r]$ is considered as columns of r structural shocks; we have that $\Sigma_\epsilon = H'DH$ and the last result follows from the orthogonality

of the instrument with respect to structural shocks that are different from the first one. In this respect, the identified structural shock is identified by the fitted values of the chosen instrument with respect to the residuals. The identification is obtained up to a normalization constant $\frac{\alpha}{\sigma_\eta}$.

Once the structural shock has been identified from equation 12, the relevant row of matrix H, this is H_1, can be singled out by regressing the structural shocks on the reduced form innovations. In this way it is also possible to draw impulse responses from the identified structural shock. The case of multiple instruments can also be handled by substituting the OLS regression in equation 12 by a reduced rank regression: Olea, Stock, and Watson (2013) show that when errors are homoskedastic reduced rank regression provides equivalent results to using a GMM type of estimator.

For what concerns the choice of our instruments, looking at the available theoretical literature we conjecture that three main structural shocks can be important determinants of the variables in our dataset: prospects of future growth (profitability shock); volatility and/or uncertainty, bank lending behaviour. Profitability shocks were already somewhat been discussed by both Eisfeldt and Muir (2013) and Bolton, Chen, and Huang (2011) in the form of technology shocks which move the trend of productivity. Volatility and uncertainty shocks are also a natural element to discuss investments, as for example in Bloome (2009), more in particular the set-up of **??** suggests that an increase in uncertainty can lead to an increase of cash retained by firms, leading to a rise in the corporate surplus. Finally, bank supply shocks are shown to matter in a large number of studies, for example

A resume of how we relate our structural shocks to instrument is as follows:

- PROFITABILITY: Following the identification of Barsky and Sims (2011), we consider profitability shock as news shocks: the shocks to productivity that mostly explain future productivity trends. In particular, we identify a time series of structural news shocks, following the four-variable VAR approach described in Barsky and Sims (2011) (see appendix for details) using US quarterly data until 2013Q1.

- UNCERTAINTY: For what concerns uncertainty we use both the policy uncertainty index and the VIX, as already done by Stock and Watson (2012)

- BANK LOAN SUPPLY: As instruments for bank lending behaviour, supply in particular, we use the TED spread and following recent literature we the growth of assets of the US brokers and dealers assets as proxy for appetite in the financial sector. ().

4.1 The profitability shock

The effects of a shock to profitability are rather expected for most of the economies in our sample, as figure 7 shows in four example. An reduction of expected profitability, diminishes investment the Corporate surplus goes up, while loans and net investments go down.

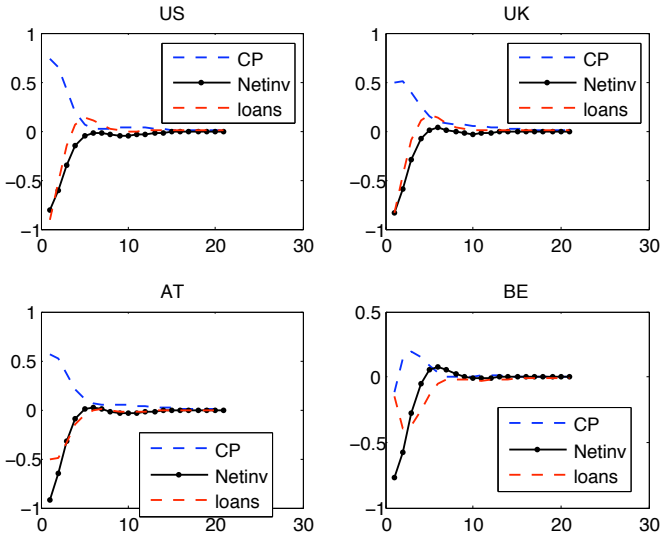

Figure 7: Impulse response of a News shock: selected economies

News shock are also the ones that has proved the most able to replicate most closely as evaluated by historical decomposition the actual paths of the variables in our dataset, especially so for the net investments and loan, while the explanatory ability of the news shock drops quite significantly for what concerns the corporate surplus, with the notable exception of the US and few other economies. This holds true both for the period up to 2006 and for the full sample up to 2010. By and large, the historical decomposition works best for countries which experienced less variable loadings across subperiods as discussed in section 3.

For what concerns the net investments, quite remarkable is also the fit of news shocks in countries in europe, for example France, Italy Germany and the Netherlands, not only in the recent recession but across the whole sample:

A similar fit as for the net investments holds also for the dynamics of loans, with the exception of Germany:

With the exception of the US and few other economies the decomposition for the corporate surplus shows news shocks are less able to track history

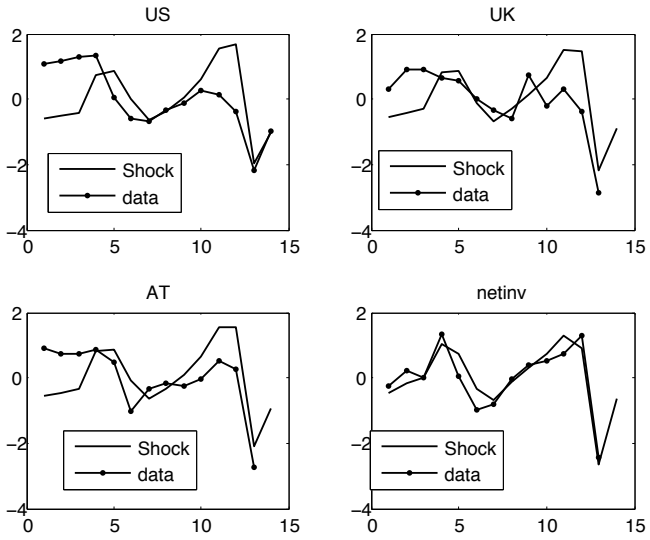

Figure 8: Historical decomposition of a news shock for net investments: selected economies

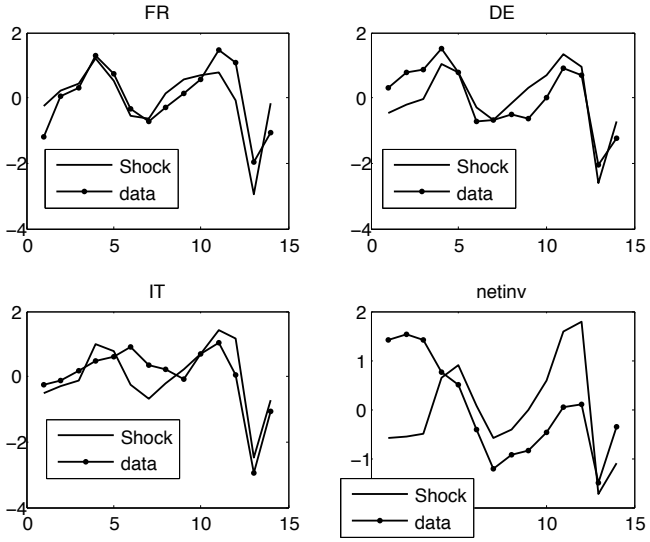

Figure 9: Historical decomposition of net investments with a news shock: selected economies

As for example can be assessed by comparing the fit of some selected some

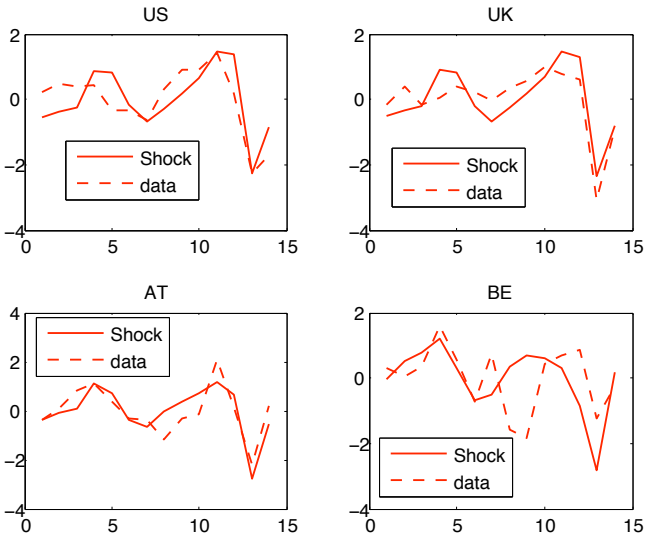

Figure 10: Historical decomposition of loan dynamics with a news shock: selected economies

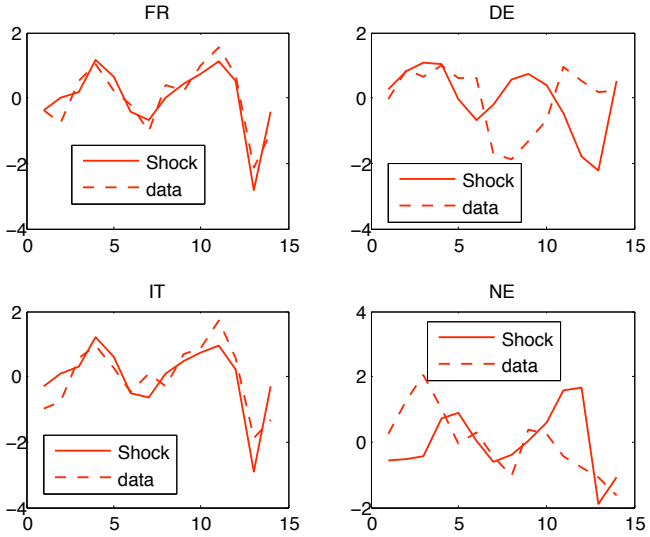

Figure 11: Historical decomposition of loan dynamics with a news shock: selected economies

European economies for corporate surplus w.r.t. to the previous net investments:

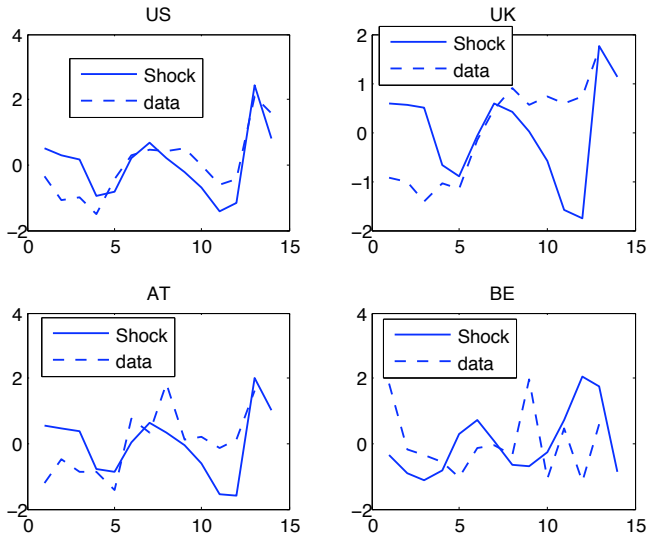

Figure 12: Historical decomposition of corporate surplus with a news shock: selected economies

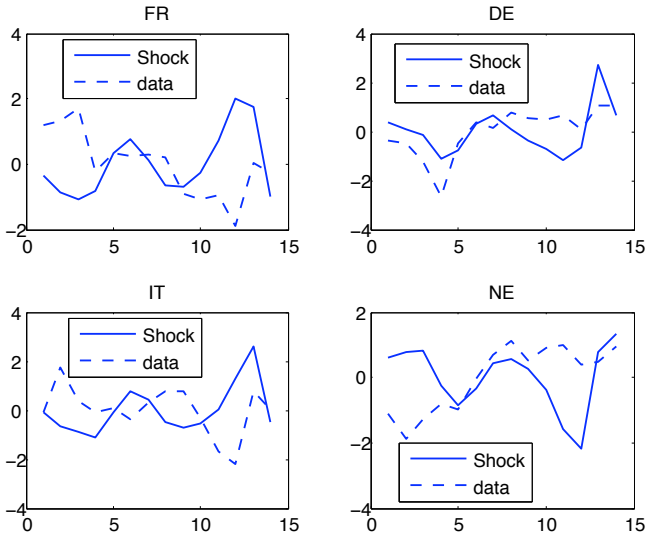

Figure 13: Historical decomposition of corporate surplus with a news shock: selected economies

4.2 A volatility shock

[TO BE COMPLETED]

4.3 A bank lending shock

[To be added]

5 Conclusions

By considering together the net lending positions, net investments and loans normalized by either GDP or value added we studied common comovements assuming that countries in the global economy are differently exposed to global common factors. Indeed, over the period 1996-2010 for 17 countries, three factors explain a portion of common variance which is about 70%. Evidence of structural breaks for the period 2008-2010 recession is not conclusive: the statistical factors driving our dataset change only partially when the last recession is included, in particular, the second statistical factor seems to be differently reconstructed after the 2010 data are introduced. At any rate however, we are not able to relate the change in loadings to variables that could relate to the presence of a 'Balance sheet recession': we leave further investigation on the topic, allowing for example for a richer empirical model in which loadings are allowed to vary as according to economic determinants, to future research.

Concerning the syncronization of the economic cycles in the global economy, we could assess that –conditional on the second factor– before the last recession, the group of EU countries in our sample tended to display an anti-cyclical movement with respect to the US, Canada and the Scandinavian Countries after the 2007-2009 period they seemed overall to act procyclically.

A tentative identification of the underlying structural factors has been undertaken using external instruments the method as in Stock and Watson (2012) and Mertens and Ravn (2012). We focused on news shocks, credit supply and uncertainty shocks. It seems that the news shock is the one mostly able to capture common movements, especially for net investments and loans, while being much less successful for the corporate surplus. The undertaken approach of using external instruments is appealing because it is not obvious from theory to provide an identification strategy; however the most important limitation of such approach is that identified shocks can be cross-correlated. Also improvements in the direction of identifying uncorrelated shocks within this framework is left to further research.

Bibliography

Andrews, W. K. D. (2003): "End of Sample Instability Tests," *Econometrica*, 71 (6), 1661–94.

Barsky, R. B., and E. Sims (2011): "News shocks and business cycles," *Journal of Monetary Economics*, 58(3), 273–289.

Bloome, N. (2009): "The Impact of Uncertainty Shocks," *Econometrica*, 3, 623–685.

Bolton, P., W. Chen, and Huang (2011): "A Unified Theory of Tobin's Q, Corporate Investment, Financing and Risk Management," *Journal of Finance*, 117,3, 371–410.

Eggertson, G. B., and P. Krugman (2012): "Debt Deleveraging and the Liquidity Trap: A Fisher-Minsky-Koo Approach," *Quarterly Journal of Economics*, p. 14691513.

Eisfeldt, A. L., and T. Muir (2013): "Aggregate Issuance and Savings Waves," *mimeo*.

Justiniano, A., G. E. Primiceri, and A. Tambalotti (2013): "Household Leveraging and deleveraging," *New York FED working paper*, 602, March.

Koo, R. (2003): *Balance Sheet Recession: Japans Struggle with Uncharted Economics and its Global Implications*.

Mertens, K., and M. Ravn (2012): "A Reconciliation of SVAR and Narrative Estimates of Tax Multipliers," *CEPR Discussion Papers*, 8973.

OECD (2006): *Understanding National Accounts*.

Olea, J. L. M., J. Stock, and M. Watson (2013): "Inference in Structural VARs with External Instruments," *Mimeo*, Harvard University.

Romer, C. D., and D. H. Romer (1989): "Does Monetary Policy Matter? A New Test in the Spirit of Friedman and Schwartz," *NBER Macroeconomics Annual*, 4, 121–70.

Smets, F., and R. Wouters (2003): "An Estimated Dynamic Stochastic General Equilibrium Model of the Euro Area," *Journal of the European Economic Association*, 1(5), 1123–1175.

Stock, J., and M. Watson (2002): "Macroeconomic forecasting using diffusion indices," *Journal of Business and Economics Statistics*, 20, 147–162.

——— (2012): "Disentangling the Channels of the 2007-2009 Recession," *Brookings Papers on Economic Activity*, May.