PSL Quarterly Review, vol. 70 n. 280 (June, 2017), 155-184

Explaining trade imbalances in the euro area: Liquidity preference and the role of finance

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1. Why finance might determine the real economy

There is consensus within the European economic and political establishment that trade imbalances in the euro area (EA) and the resulting division between debtor and creditor countries are the result of changes in their real economy, particularly of their competitiveness positions. The objective of this study is to challenge the theory underlying this consensus. To this end, this study proposes an alternative explanation for trade imbalances and changes in cost competitiveness among EA countries based on the expansion of financial intermediation and capital flows and tests this explanation empirically.

The theoretical part of this study is guided by the liquidity preference theory, which is used to explain the linkages between finance, trade imbalances and cost competitiveness. There is an immense body of literature on the features of the capitalist financial system, its structures and its fragility, and Post-Keynesian research on the phenomenon of "financialisation" assume that the theory of liquidity preference holds (see, for example, Karwowski et al., 2016). However, when financial variables appear in theoretical and empirical research on trade imbalances in the EA, they are somehow unrelated to real economy variables. The fact that unit labour costs are explained exclusively by political factors in Post-Keynesian and neoclassic papers remains unsatisfactory. Among Post-Keynesian authors, the

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dominant belief is that changes in unit labour costs are merely the result of Germany's wage moderation policy. Additionally, neoclassic economists prefer to explain the relatively high unit labour cost of Southern EA countries with the political failure of expanding the common currency to economically weak countries and the consequent damage to the sound relation between the prices of capital (the interest rate) and labour (wages) and their marginal products in each country (Sinn, 2010; Baldwin et al., 2015). Differently from a political economy approach, this study focuses on how markets interact and on how to find systematic empirical evidence.

The contribution of the study to the already abundant literature on EA trade imbalances is twofold: (*i*) it intends to demonstrate a causal relationship between finance and the real economy; and (*ii*) it tests this claim empirically, mainly through causality tests and regression analyses of capital gains and of an expectation-augmented investment model. I claim that the effective demand of an EA member, its trade balance and cost competitiveness may be endogenous to movements in EA capital markets. The term 'may' does not exclude causations running from real to financial variables in the sense of Biasco's (1988) framework of causal sequences in a complex world. However, this paper focuses exclusively on the real economy effects caused, or at least influenced, by financial changes or considerations.

The liquidity preference theory allows to assert that this causal relationship runs from capital market sentiments to aggregate demand and labour cost positions, through the market interest rate of financial and physical assets. This study is inspired by some 'older' literature, particularly by the *General Theory* by Keynes (1936). Without liquidity theory, Keynes would never have shown interest in an extreme version of the autonomous capital market development that he named the 'casino' after the experience with the stock market crashes in 1929 (Keynes, 1936, bk. 12, ch. IV). However, he did not investigate the financial sector's role in greater detail, as Hyman Minsky (1982) did, or Susan Strange (1986) in her famous book on 'casino capitalism'. Among the latest literature on this subject, Botta et al. (2016), Karwowski et al. (2016) and Tori and Onaran (2017)

describe and model how financial market developments affect growth, income distribution and the choice between corporate and financial investment, but this literature does not seem to play any role in the on-going debate on trade or current account imbalances in the EA.

The rest of the essay is divided into four parts. Section 2 substantiates the claim that the literature only offers explanations for EA trade imbalances that are 'one-sidedly' focused on politically determined unit labour costs and income distribution. Section 3 offers the cornerstones of an alternative: a liquidity preference view of business investment, aggregate demand, trade imbalances and competitiveness. Section 4 presents the results of econometric analyses on the EA, with 12 countries and two sub-panels: 5 economically weaker 'peripheral' countries with distinct crisis symptoms (henceforth the "periphery") and 7 stronger countries (the "core"). Granger causality tests with OLS and GMM methods confirm that unit labour costs follow external capital flows. OLS regressions with fixed effects confirm that independent external capital flows drive domestic financial conditions and, through them, business investment. Section 5 summarises and presents brief and tentative policy conclusions.

2. Critical comments on the recent literature on intra-EA trade imbalances

At the risk of oversimplifying their differences, most economists prefer to explain imbalances in Europe with national wage policy in the member countries. Stockhammer (2011, p. 91) summarises, "[…] wage policy has a critical role in the rebalancing of European economies." Many Post-Keynesian economists (among others, Bibow, 2017; Flassbeck, 2007, 2015; Lapavitsas et al., 2010; Perez-Caldenty and Vernengo, 2012; Stockhammer, 2011) debate about politically initiated wage moderation in Germany, which induced real depreciation in Germany. These authors conclude that German wages should increase by a large amount over a long time, in order to re-

balance the EU. Other, more neoclassically inspired economists argue for a mirror-imaged view of wage policies: it is Southern European countries that were unwilling to reform their social and wage formation systems after the introduction of the euro (e.g. Fischer, 2007; Marzinotto, 2011; or Sinn, 2010). Sinn (2015) concludes that Greece should better leave the monetary union: the harsh devaluation of the nominal exchange rate following the reintroduction of the own currency would bring the necessary wage reductions and improve competitiveness.

The reader can observe two distinct features that are common to this literature. The first is that the data provided in tables or graphs indeed suggest a correlation between unit labour costs and current account imbalances or net capital flows. However, as we know, correlation is not causation, and this literature does not provide any advanced empirical method to test causality. In previous works Karsten Staehr and I applied Granger causality tests and VAR analyses to a panel of 27 EU countries to identify causality at least in a statistical sense (Gabrish and Staehr, 2014, 2015). In all test versions we found that an appreciation of the real exchange rate statistically follows a net inflow of capital, and not vice versa. However, our results leave the question of 'true' causality – hence of an economic explanation – unanswered.

Second, the focus on unit labour costs allows the financial sector to completely disappear from the analysis and the policy conclusions. It is true that the one-sided focus on unit labour costs does not exclude that some authors also mention financial market processes. Stockhammer (2011) and Stockhammer and Wildauer (2015) see a credit-led growth model behind external imbalances, and Bofinger (2015) and Wren-Lewis (2015) understand the euro crisis as a financial crisis. Others explain imbalances through 'financialisation' (Detzer and Hein, 2014) or the extensive description of the liberalisation of financial services in the EA (Pérez-Caldenty and Vernengo, 2012). However, more detailed explanations and, particularly, a theoretical substantiation of a possible link between finance and external imbalances is lacking. Politically motivated

changes in income distribution seem to play a crucial role in Pérez-Caldenty and Vernengo (2012) and Detzer and Hein (2014), even though the former recognise a decline in the degree of capacity utilisation as a consequence of the wage moderation introduced in the core countries of the EA, which has led to a depreciation of the real exchange rate. Capacity utilisation increased in the periphery, creating incentives for capital inflows and an appreciation of the real exchange rate.

Several authors seem to offer an explanation for the unit labour cost hypothesis by using microeconomic price theory that postulates a causal relationship between costs (wages) and prices. In the case of Germany, the core argument is that workers were not paid according to their productivity: wage moderation induced a real depreciation, and this, according to the 'most simple market theory', might have led economic agents in other EA countries to buy more German commodities, the prices of which had become relatively cheaper (Flassbeck, 2015). One may observe a change in the relative prices after an exogenous wage decline on the one side, and a change in the net commodity trade on the other side, which corresponds to this case. However, in my view, one may not conclude a priori from wage contracts on trade surpluses, even if one has a preference for real economy explanations, as do most of the authors cited above. In fact, a general wage reduction at the aggregate level could have various responses at the firm level. Regardless of what occurs there, each traded good is different with respect to the combination of cost, profit and market factors. An aggregation of different micro situations into a reliable macroeconomic statement needs to be proven.

Additionally, a change in the saving habits of consumers may induce changes in aggregate demand and external trade. Taking this as a background, it is not surprising that several studies with standard or advanced empirical methods find the competitiveness hypothesis to be weakly justified (Schröder, 2015; Storm and Naastepad, 2015). Some studies explicitly test trade imbalances for the impact of both financial and real economy variables, and they all find, with various

econometric techniques,[1] that either differences in debt-financed domestic aggregate demand (Comunale and Hessels, 2014; Díaz Sanchez and Varoudakis, 2013) or the tested financial variables (Cesaroni and De Santis, 2015; Stockhammer and Wildauer, 2015) exert a significant, impact often more important than changes in unit labour costs or other price indicators. Podkaminer (2017) finds that changes in wage levels – the numerator in the unit labour cost formula and a determinant of household income and demand – are statistically significant, and exhibit the expected negative sign, in regressions of trade imbalances. His findings and those of the German SAVE project on savings habits and their changes (Boersch-Supan and Essig, 2005) underline the need to distinguish between competitiveness and demand factors when analysing trade imbalances.

Independently of the empirical method adopted, the authors who test the impact of financial market variables in addition to that of real economy variables assume the financial sector's role is necessarily independent from wage and price developments; otherwise, one cannot put both into a single regression without additional tests. There are, however, two shortcomings in this practice: first, it seemingly does not answer the questions of why and how both sets of variables should be included into one single regression. The presence of real economy variables, such as wage and profit shares, seems to be theoretically well justified (see Stockhammer and Wildauer, 2015). However, this makes the lack of guidance on why the interest rate, the volume of credit or wealth and debt variables play a role all the more flamboyant. Regression results may leave only statistically substantiated doubts on the role of unit labour cost or financial variables. Second, the literature seems to understate the role of corporate investment in growth dynamics and fragility. Stockhammer and Wildauer (2015) narrow down changes in the liquidity preference to household wealth and debt. Therefore, residential investment and property price bubbles play a leading role in explaining their debt-led growth hypothesis and its empirical test. It does not seem very

[1] Error correction, VAR, dynamic panels, and ARDL.

plausible to narrow the liquidity preference to asset transactions such as the acquisition of homes. The interest rate – derived from capital market sentiments through liquidity preference – plays a crucial role in Keynes's business investment theory. Additionally, upon examination, the investment statistics of certain EA debtor countries reveal sharp increases not only in housing but also in corporate investment, which is the largest aggregate of the two.[2] Thus, why these investments soared in some Southern EA countries and Ireland before the financial crisis of 2008 remains an open question.

For these reasons, an analytical framework that plausibly substantiates the detected statistical causality between finance and real-side variables is necessary. Bhaduri (2011) and Bhaduri et al. (2015) propose such a model. Their idea is that an increase in the market value of assets generates potential capital gains for those who hold these assets. The modern financial sector disposes of the instruments to transform notional gains into the purchasing power of their holders. Private households may exploit notional capital gains to borrow from banks and expand their consumption. With respect to corporate investment demand, the authors claim this has a crowding-out effect: capital gains provide a reason for redirecting one's own and borrowed financial resources from capital goods to financial assets. Then, the authors identify two finance-led growth regimes: a consumption-led growth regime appears when the positive consumption effect exceeds the negative investment effect. A negative financial investment-led growth regime exists when the investment effect exceeds the consumption effect. Here, the weak point in the argumentation immediately comes to light: interest rate effects are disregarded, and therefore, so is the relationship between changes in liquidity preference and business investment.[3] In my view, capital

[2] For example, the amount of gross fixed capital investment in Spain soared by 105% between 1996 and 2008, and that of smaller aggregate 'dwellings' increased by 128% (calculated with Eurostat data).

[3] In some of the latest Post-Keynesian literature, the interest rate is assumed to have a negative impact on business investment; see Botta et al. (2016) and Tori and Onaran (2017).

gains and their effects on interest rate are two sides of the same coin, both being changes in asset prices; Keynesian models should not disregard the impact of interest rates on business investment, because one cannot definitely expect a growth regime with negative investment.

A positive financial investment-led regime is possible when a decline in financing costs triggers an investment boom, as was the case in the Southern EA countries and Ireland before the financial crisis in 2008. The next section considers the case in more detail.

3. Liquidity preference, business investment and production costs

Here I will need to bring up three cornerstones of the *General Theory* (Keynes, 1936, ch. 11 and 12), which help explain the real economy effects of financial events, in general and in cross-border relations within a monetary union like the EA:

1. The *liquidity preference theory* explains changes in the interest rate by looking at changes in the agents' state of confidence (of course, this determines the medium and long-term market interest rate and not the policy rate set by the central bank).
2. The *investment theory* explains the role of asset price changes for the demand for capital goods via changes in the interest rate.
3. A *dual price theory* explains how the replacement costs in capital good production (the 'supply price') adjust to changes in the demand price for capital goods.

3.1. Liquidity preference

The first cornerstone – liquidity preference theory – relates to the use of money for the transfer of purchasing power from the present to the future. This function includes the fundamental uncertainty with

respect to the expected return of each investment in the future. The preference of agents for holding unprofitable money reflects their desire to always remain solvent, and an increase in this preference signals there might be an approaching threat of insolvency. The alternative to unprofitable money is the investment in interest-bearing securities, which presumes a certain trust of the investor in the ability of the debtor to repay.

Under liquidity preference, financial market developments may not necessarily be driven by real-side events. Instead, sentiments on financial markets are passed onto the real economy through the long-term nominal interest rate. However, financial markets establish the market value or price of a security, not its interest rate. A rise in the general preference for liquidity, hence money, induces the market value of all less liquid assets to contract and their effective and fixed interest rate to increase.[4] Rational agents will invest less into physical capacities, buy or issue fewer shares and other financial assets. The financial sector will be less inclined to acquire debt titles so their market value will contract. In these circumstances, any investor who considers the purchase of a less liquid asset expects a higher interest rate as a risk premium. The higher the state of confidence, the higher is the market value of an asset and the less its yield is important as an indicator of cost of bond or equity financing.

This inverse relation is crucial for understanding the interaction between demand for investment in the real economy and the financial markets. A higher yield (= higher liquidity preference) corresponds to less readiness of the corporate sector to take debts to finance net investment, and of the financial sector to buy debt titles and to re-finance through the issuance of an entity's own debt titles. The demand for investment in the capital stock weakens, along with the price non-financial corporations would pay for capital goods. The process passes with reversed signs, when uncertainty and liquidity preference decrease. It is important to note that in deeply integrated

[4] This applies to a situation of unchanged central bank money supply.

equity, bond and credit markets, changes in the market value of traded financial assets are highly correlated, and thus also their yields and lending rates (see for example Frank and Hesse, 2009, for a rich empirical literature).

3.2. Business investment

Investment theory, the second main element in Keynes's general price theory, describes how the expected net cash flows from business investment link the financial sector to the corporate sector and translate as the demand price for physical capital. A positive net cash flow secures the desired solvency at all times and simultaneously determines both the non-financial business sector's demand and the financial sector's supply of interest-bearing debt titles. We may express the expected net cash flow as the present value *V* of cumulated monetary flows of an existing capital stock (with perpetual life for the sake of simplicity):

$$P_K \overline{K} = V = \frac{E(\pi)}{i} \tag{1}$$

where P_K is the present demand price for physical capital goods, or what the corporate sector is ready to pay for one unit of the given capital stock $\overline{K}$. $E(\pi)$ is the expected positive income from the utilization of $\overline{K}$ (with E the expectation operator), and i is the long-term yield on the capital market. Equation (1) disregards different capital goods as well as their remaining lifetime. In this respect, $E(\pi)/i$ stands for the present value calculated over the entire term and different for the differentiated capital goods. With constant expectations on returns and a given interest rate, massive sale of the given capital stock will lead to a fall in the demand price P_K. In addition, the demand price falls with i because a decrease in the interest rate raises the present value of the capital stock. Finally, P_k will increase when $E(\pi)$ increases.

Under liquidity preference, all statements regarding the yields of financial assets may be expressed as statements regarding the market

value of debt titles. Solving for the demand price for physical capital, (1) changes into

$$P_K = \frac{E(\pi)}{\bar{K}} P_A \tag{2}$$

where P_A is the inverse of the yields on asset markets, determined by the state of confidence μ. We do not necessarily know the precise circumstances of μ; it is exogenously given.

Taking the total differential and assuming constant profit expectations,[5] we get:

$$\frac{dP_K}{dP_A} = \frac{E(\pi)}{\bar{K}} - \frac{E(\pi)P_K}{\bar{K}^2}\frac{d\bar{K}}{dP_A} \tag{3}$$

Equation (3) describes the response of the demand price for physical capital to a change in the state of confidence indicated by a change in the market price for assets. It should be noted that an increase in such price ($dP_A > 0$) creates notional capital gains for the holders of the assets, and also that the owners of the physical capital stock note a potential increase in the market value of their capital: the first element on the right side of equation (3) is positive, because every former investment into the capital stock could have been undertaken only with a positive expectation of returns on investment. The second element is undetermined. However, if an increase in asset prices raises the present value of the existing capital stock, companies might offer less items of this stock for sale. In this case, the term is positive. The demand for investment into new physical capital increases when a higher price for capital raises the present value of the existing capital stock.

At this point of the analysis, we find the reason why the increasing demand for debt-financed new capital goods boosts effective demand and pushes the trade balance to deteriorate.

[5] This assumption will be refuted in the empirical section.

3.3. Supply prices of investment goods

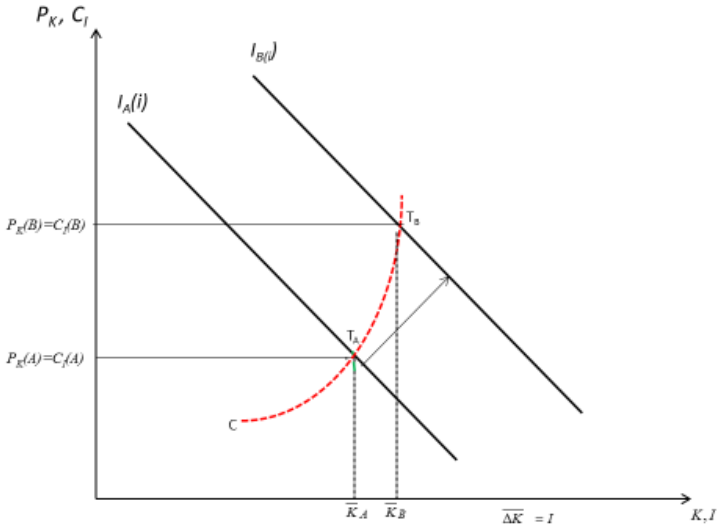
The third and final cornerstone of Keynes's theory is what one may call *dual price theory.* The idea that the supply price for new capital goods is not independent from the demand price, when the capacity for their production is limited in the short-run, is typical for Keynesian models. When the demand price increases the supply price should follow, reflecting the extra cost of producing an additional unit of that capital good (= investment). This linkage between demand and supply prices is applied in Keynes (1936) as well as in Minsky (1982). The connection between the supply or cost price C and the demand price and the asset price can be written as:

$$C_I = C_I(X) = C_I(P_K), \qquad \text{with } P_K = P_K(P_A) \tag{4}$$

where X is a vector of various cost and profit categories. An increasing demand for capital goods is satisfied primarily by producing new goods and not by selling out all the given capital stock. Potential investors will invest in productive capacity as long as the demand price for that good exceeds the cost of production of the next additional unit, because this price-cost difference assures a notional wealth income gain for the owners of old as well as new capital stocks. A higher present value of the existent capital stock is a promise of a higher income from that stock. Banks and shadow banks realize this, and are ready to lend or buy corporate bonds and to refinance both through their own borrowing. The process of investing comes to an end when the demand price equals the cost of the last unit in the production of capital goods. The higher effective demand for capital goods entails higher marginal and unit costs in their production.

Figure 1 illustrates the model with two different finance-led states, A and B, of the economy. The horizontal axis measures the physical capital stock, K, and investment, I, and the vertical axis measures the demand price per unit of physical capital, P_K, and the marginal cost per unit of new capital, C_K. $\overline{K}$ is the capital stock in any

Figure 1 – *Demand and supply prices for capital goods in two finance-led states of the economy*



equilibrium point between the two. Because the demand price results from the inverse function of the yields on financial markets, a higher price is tantamount to a lower interest rate. The two demand curves for capital goods, respectively $I_A(i)$ and $I_B(i)$, depict the two states of the economy defined by two different interest rates *i*. Both curves have a negative slope because the price of physical capital will contract if the existing capital stock is sold out. The willingness of companies to offer capital goods from the stock declines when the demand price increases, because a higher demand price means a higher value of the existing capital stock. Corporations see a higher value as an effective protection against attempts of a hostile takeover.

A rightward shift of a demand curve follows as the corporations' response to a decline in the interest rate, thus a higher demand price and a higher market value of traded debt titles for a given capital stock. Such a shift may be expected when the economy, led by a financial boom, enters a transition period from one state to another. The arrow illustrates the transition from a lower to a higher state of the economy. We further find a cost curve $\overline{C_I C_I}$, which, for the sake of simplicity, is applied to all corporations in the economy (equal technologies assumed) and which reflects the increasing cost of the production of one additional unit of capital goods. This assumption may be justified by an increasingly inelastic supply of capital and labor. When costs are dominated by labor, unit labor costs and total unit cost C_I will also increase.

Furthermore, we find two points, T_A and T_B, which represent the equilibrium between the marginal output costs and the demand price for capital goods in the two states of the economy, governed by the yield. T_A may be the equilibrium price-cost relation in a situation where finance is depressed with low capital gains and high interest rates. T_B could be understood as a state of the economy characterized by a peak in the financial boom, high capital gains and low interest rates. There are also many transitory states of equilibrium, and if supply follows demand for physical capital, there is always a push towards equilibrium.

3.4 Cross-border capital flows, trade imbalances and competitiveness in the EA

So far, the model has described the impact of sentiments on a country's financial markets, on its markets for physical capital and investment. It is related to Minsky's notion of a financial cycle (Minsky, 1982), at least to the upswing stage with euphoric expectations. One may utilise this framework to discuss the case of cross-border capital flows. Assume a country that is experiencing a financial boom; in these conditions, all financial investors with free access to the capital markets of the country are likely to expect capital gains from higher

prices for financial assets. Hence, the domestic boom in finance will attract foreign capital.

Let us simply fill out the two different financial and real-side states of the economy in figure 1 with the data from two regions or countries whose economies are in different states within a monetary union. A perfect case is the EA. Let us assume an economically weaker peripheral country, say Spain (S), and a stronger core country, say Germany (G). Prior to the monetary union and with exchange rates, a lower asset demand price in S compared to G is the precondition for a higher interest rate in S. Financial investors in both countries understand the difference as a sign of a higher risk and abstain from an excessive engagement in less liquid financial assets of country S, despite a higher nominal yield i and a lower price of capital. In addition, the marginal cost of production is lower in S than in G.

With the monetary union in force, *residents* in S will form euphoric expectations over the future market prices of financial assets. The abolition of traditional risks in country S sounds like a signal for promising capital gains not only for S resident investors but also for G investors. They will wish to invest more in debt papers and may mobilise domestic financial resources through profits, issuance of bonds, and borrowing from banks. An example may be the case of a German global player who releases a bond to finance the takeover of the majority of the shares of a Spanish corporation. An additional increase in asset prices (stock market prices) in S would follow. When cases such as this one, including bond and other paper markets, become widespread, they are followed by a general decrease in the banks' lending rate. The expected capital gains from S might – at least for a certain period – more than compensate for a possible reduction of income from lower interest rates. For the owners of the existing capital stock in S, the capital gain results from the difference between the new P_K in the future equilibrium, T_B, and the old P_K in the initial equilibrium, T_A. The flow of financial capital from G to S ('capital export') not only triggers a rising demand for capital goods through the asset-price-interest mechanism in country S, but also finances it ex ante.

4. Empirical analysis of the euro area case

The empirical analysis starts with a test of equation (4), which states that costs are ruled by financial factors through aggregate demand. A Granger causality test is applied to find out which comes first, a change in competitiveness or in net capital flows. A Granger causality test regresses the dependent variable on lagged dependent and independent variables. The test results decide whether capital flows may have an impact on domestic financial market variables, and through them, on business investment.

As is customary in the literature, the capital flow variable is taken to be the current account balance in a multilateral country setting.[6] The variable for current account balance – as a percentage of GDP – is denoted *CA*. $CA > 0$ corresponds to a net capital outflow and indicates the accumulation of net foreign assets. Competitiveness is measured by the real effective exchange rate, denoted here *GRULC* (Growth rate of the Relative Unit Labour Costs).[7] An increase in the relative unit labour cost, $GRULC > 0$, signifies a worsening competitiveness, while a decrease in the relative unit labour cost, $GRULC < 0$, signifies an improvement in competitiveness.

The significance of the Wald *F* test determines the direction of causality. The interpretation of signs in test regressions is based on the following principle: regardless of which of the two competing causality assumptions holds, one of the lagged independent variables should always result with a negative sign. If there is a positive sign, the test regression is 'incorrect' in the sense that it indicates that an increase in the real exchange rate *GRULC* (an appreciation) causes the current account to improve (higher net capital outflow or lower

[6] Borio and Disyatat (2015) argue that not net – but gross – capital flows are what matters. However, this statement is restricted to bilateral flows, where net outflows from a country A to a country B correspond to the current account of A with B. I use the aggregate current account of a country A with all other countries as an indicator of net capital flows.

[7] 'Relative' means the indicator for the individual EA country relative to the average percentage growth of the unit labor cost in the EA.

capital inflow), and vice versa. This result would not be consistent with either causality hypotheses.

The financial market variables considered consist of the stock market index, *STEX*, the yields on bond markets, *SBY*, and the nominal lending rate for bank credit, *LR*. The 10-year sovereign bond yield (*SBY*) of a country is used as a proxy for the financing of bond markets by business investment.

If the model predictions in section 3 hold, the expected sign of foreign capital flows should be negative and statistically significant in regressions that include the stock market index because a (higher) net capital inflow ($\Delta CA < 0$) is expected to raise the stock market index. The sign of foreign capital flows is expected to be positive in regressions with bond yields because a (higher) net capital inflow causes the value of bonds to increase and bond yields to fall. An insignificant coefficient means that there is no systematic relation between the two variables, and business investments are probably driven by domestic financial conditions only.

Because bank lending rates, the yields on bond markets and the potential capital gains on equity markets should be correlated, the expected sign of lending rates is negative in regressions of stock market values and positive in those of bond yields (a decline in the yield is made evident by a decline in bank lending rates). The expected coefficients of (changes in) stock market values should be positive in regressions on business investment I (or $\Delta logI$). A negative sign indicates a crowding-out effect (Bhaduri et al., 2015). Signs in regressions with bond yields and lending rates are expected to be negative: a decline in bond yields or interest rates enhances business investment.

The dataset used for the regression is a panel of seasonally adjusted quarterly data from 1995Q1 to 2014Q4. The EA panel consists of the 12 initial members that adopted the common currency in 1999. Two sub-panels are formed: "core" countries include Austria, Belgium, Germany, Finland, France, Luxembourg, and the Netherlands; and "periphery" includes Greece, Ireland, Italy, Portugal, and Spain, the latter having shown evident crisis symptoms due to

their yearlong current account deficits and unsustainable debtor positions. Data for the variables *CA*, *I*, *SBY* and *GRULC*, or for their calculation, were downloaded from Eurostat National Accounts database. *I*, and *Y* (GDP) are volumes expressed in mln euro. Data for *LR* (in percentages) were downloaded from the European Central Bank's website, and depict nominal interest rates on outstanding credits over 1 year. *GRULC* is calculated from Eurostat's real effective exchange rate with 19 EA members and 28 trading partners indexes. *STEX* data are from Yahoo and Quandl.[8] The panels are unbalanced, as observations at the beginning or end of the sample are missing for some countries. Data for lending rates is available only since 2003Q1. *STEX* data for Luxembourg is not available. These shortcomings could affect the estimation results.

The time series properties of the data series are important for the choice of the empirical methodology. Panel data unit root tests, with common and with country-specific roots, show that *CA*, *SBY*, *STEX* and *Y* are I(0) for the entire EA panel, but this changes for the two sub-panels (see Appendix). All variables are stationary in their first differences or rates of change. The results suggest that it is well-advised to use all variables mostly in their first differences. The regression models are panel estimations with fixed effects (FE). GMM models are applied when the Levene test of variance equality fails to reject the null hypothesis of no groupwise heteroskedasticity. Finally, Durbin-Watson (DE) tests for the FE models and Arellano-Bond tests for the GMM estimations are employed to check for serial correlation in the estimation residuals.

Table 1 presents the results of Granger causality tests for the two sub-panels. Columns 1 to 4 show whether lags of the independent variable Δ*CA* have explanatory power over the dependent variable *GRULC* for the two panels using fixed effects (FE) regressions. The Wald test rejects the null hypothesis of no explanatory power of Δ*CA* in three of the four cases and in both

[8] https://de.finance.yahoo.com/ accessed January 8th, 2017, for France, Netherlands, Austria, Ireland, Greece, Belgium, Spain and Finland. https://www.quandl. com/data/ accessed January 9th 2017, for Italy and Portugal.

Table 1 – *Results of Granger causality tests with GRULC and ΔCA as dependent variables*

	ΔCA* Granger-causes *GRULC							
	Periphery		**Core**		**Periphery**		**Core**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1 lag	-3.72***	-5.68***	-0.16	-0.27	4.118	-6.57	0.55	-0.35
2 lags		-2.167		-0.65**		-8.24*		-0.75
Wald *F*	-2.40***	5.48***	0.34	2.52*	3.26*	1.81	0.56	3.39**
AB: AR(1)						3.01***	-2.79***	-0.04
AB: AR(2)						4.51***	0.53	1.04
Levene	1.12	1.46	0.28	0.81	1.31	1.57	0.13	1.51
DW	1.55	1.69	1.64	1.79				
Obs.	371	367	477	484	361	356	477	470
Method	FE	FE	FE	FE	D-GMM	D-GMM	D-GMM	D-GMM
	GRULC* Granger-causes *ΔCA							
	Periphery		**Core**		**Periphery**		**Core**	
	9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
1 lag	0.00	0.00	-0.002	-0.51***	0.00	0.00*	0.00	-0.00
2 lags		-0.00		-0.27***		0.00		-0.00
Wald *F*	0.01	0.72	-1.28	1.35	1.31	1.84	0.66	0.05
AB: AR(1)					-1.46	-4.74***	-8.78***	-6.58***
AB: AR(2)					-1.38	-0.58	0.49	-0.54
Levene	0.90	0.89	5.04**	3.12**	1.884	0.95	0.22	3.54***
DW	2.04	1.92	2.05	1.96				
Obs.	366	361	484	477	356	351	470	463
Method	FE	FE	FE	FE	D-GMM	D-GMM	D-GMM	D-GMM

Legend: * : 10%, ** : 5%, *** : 1% significance levels.

Notes: for the test of Granger causality, Wald *F* denotes the *F* statistic with the the coefficients of the independent variable set to 0. AB stands for Arellano-Bond *m* statistic for the AR(1) and AR(2) terms. All regressions were estimated with a constant, not reported here. FE: fixed effects, D-GMM: System Generalized Method of Moments with differences, which allow for AB tests. Column 5 produces most efficient results with orthogonal deviations, which do not allow for AB tests.

panels. Additionally, the coefficients have the predicted negative sign. There is at least one statistically significant coefficient in each specification. The Wald test confirms that ΔCA Granger-causes the relative growth rate of unit labour costs with one exception (column 3). The Levene statistics reveals no group-wise heteroskedasticity, and serial correlation of the residuals is rather low according to the Durbin-Watson (DW) statistics. A completely different picture appears when the opposite hypothesis is tested (columns 9 to 12). The null of no Granger causality cannot be rejected in any of these cases; the Levene statistics shows group-wise heteroskedasticity in two cases, and serial correlation is rather elevated compared to the previous estimations.

A panel Granger causality test with the dependent variable's first differences might lead to inefficient estimations in least squares regressions with fixed effects, due to a possible correlation between the lagged dependent variables and the residuals (the so-called Nickell bias). Normally, such bias is rather small. GMM methodology (following Arellano and Bond, 1991) is used to assess the relevance of a possible bias and the robustness of FE estimates (columns 5-8, and 13-16). The similarity between the results of the FE and GMM estimations confirms the expectation that the danger of biased results is small. The appropriateness of the GMM model used here is confirmed by the Arellano-Bond test that does not reject the null of no serial correlation in six of the seven cases with one-step difference GMM; the second order AR statistic is not statistically significant, which is what one would expect when the model error terms are serially uncorrelated in levels. I conclude that FE estimations are efficient.

Looking at all the results, one may assume that the history of higher relative unit labour costs and less competitiveness in the crisis countries can be better explained when an increase in net capital inflows (or a decline in net capital exports) is considered. With this result at hand, estimations of how external finance affects domestic

finance become meaningful. To this end, I employ panel regressions with fixed effects according to:

$$D_t^j = \alpha_0 + \beta Z_t^j + \alpha_j + \alpha_t + \varepsilon_t^j \quad (5)$$

where D is a matrix of dependent variables and Z a matrix of selected independent regressors; j denotes the cross-section, and t indicates the time dimension of the two panels. The specific composition of D and Z depends on the estimation specification. The constant, α_0, is common for all countries in a panel j, α_j and α_t are the unobserved period- or cross-section effects, and ε is the error term. The presence of cross-section and/or period effects has been tested. When *STEX* and *SBY* are included as independent variables, they check for cross-relationships between equity and bond markets. All regressions with *STEX* exclude Luxembourg due to lack of stock market data.

Panel unit root tests (see Appendix table) revealed that *CA*, *STEX*, *SBY* and *Y* have stationary levels for the entire EA panel, which allows to test for the long-run impact of *CA* on domestic financial markets in a first set of regressions. Columns 1 and 2 present the results. In the estimation model with *SBY* as the dependent variable (col. 1), *logY* and *logSTEX* serve as control variables. The estimation result supports the hypothesis that a net capital outflow depresses the secondary bond market and drives up bond yields. *CA* is positive and statistically significant. A higher aggregate demand boosts bond markets, and is associated with lower bond yields; the expected sign is negative and statistically significant. The negative and significant coefficient of *STEX* supports the idea of a liquidity preference connection between stock and bond markets. However, a regression with *STEX* as the dependent variable (in column 2) shows that a capital outflow induces the stock market prices to increase – which contradicts the relationship we had assumed. The two other explanatory variables – aggregate demand and bond yields – behave in the expected way: a high demand explains a high status of stock markets and low bond yields. The results of long-run estimations are seemingly not very efficient because of a high positive serial correlation in both specifications.

Table 2 – *Results of the regressions*

	EA		Periphery			Core			Periphery	Core
	1	2	3	4	5	6	7	8	9	10
	SBY	log*STEX*	Δ*SBY*	Δlog*STEX*	Δ*LR*	Δ*SBY*	Δlog*STEX*	Δ*LR*	Δlog*I*	Δlog*I*
CA	9.10***	1.71***								
Log *Y*	-6.06***	2.44***								
Log *STEX*	-2.53***									
SBY		-0.0.5***								
Δ*CA*			2.96***	-0.83**	0.04	0.54***	-0.02	2.99**		
Δlog*Y*			-2.26**	1.76	-0.70**	0.39	-0.01	26.14**		
Δlog$E(\pi)$									0.26	0.69***
Δlog*STEX*			-1.48***			-0.37***			0.05***	0.03***
Δ*SBY*				-0.04***	0.02**		-0.12***	0.38**		0.00
Δ*LR*			0.42**			-0.002			-0.04**	
Δlog*I*(-1)									-0.39***	-0.17**
Adj. R^2	0.64	0.98	0.66	0.12	0.89	0.98	0.82		0.76	0.09
DW stat.	0.11	0.17	1.14	1.35	1.71	1.59	1.71		1.89	1.91
Levene	1.41	0.85	0.32	1.94	1.65	1.29	1.15	1.19	2.35*	9.87***
Obs.	796	539	223	370	223	267	415	297	222	444
Method	FE	FE	FE	FE	FE	FE	FE	S-GMM	FE	FE

Legend: * : 10%, ** : 5%, *** : 1% significance levels.
Notes: regressions with STEX exclude Luxembourg. GMM denotes estimations with orthogonal deviation and White Period (AB-n step).

A high serial correlation is often related to datasets with many observations but few independent variables; for this reason, more efficient results may be expected in the regressions with the two sub-panels. The results of the unit root tests suggest the necessity of regressing only variables in their first differences or rates of change. Note that *ΔSTEX* and *ΔSBY* now signal capital gains on stock and bond markets. The results are shown in columns 3 to 7. The estimations show reasonable DW values; so far, we are applying FE estimation models. An exception is col. 8, in which case a GMM model is used to eliminate groupwise heteroskedasticity.

For the periphery countries, there is a clear indication of the expected impact of net capital flows on bond (column 3) and equity markets (column 4). The coefficients bear the expected signs and are statistically significant. A net capital output pushes bond yields up and causes the stock markets and capital gains to shrink. There is no systematic relationship between external capital flows and the bank's lending rate (column 5). The other variables' coefficients are statistically significant when the signs turn out as expected. When the bank lending rate is involved (column 3), a positive linkage with sovereign bond yields appears as expected.

Similarly, in the core countries, a net capital outflow causes yields on bond markets to increase (column 6), but a possible direct impact on capital gains in stock markets is unsystematic (col. 7). However, the impacts that capital gains have on bond markets exert a direct and significant influence on capital gains in stock markets, therefore one may expect an indirect effect of a net capital inflow running via the bond markets. We should also note that a change in aggregate demand has no significant influence on capital gains in regressions with FE. With changes in the bank lending rate *LR* as the dependent variable, all regressions with FE reveal groupwise heteroskedasticity. Hence, another model – the GMM estimator – has been applied. The results in column 8 show that a net capital outflow raises the bank lending rate more markedly in core countries than in the peripheral ones (column 5): changes in sovereign bonds are positively related to changes in bank lending rates, and the coefficient is statistically significant.

However, an increase in domestic demand raises the bank lending rate with an implausibly high coefficient. Overall, most estimations revealed the expected impact of net capital inflows on domestic financial markets.

The final step is to test the impact of a change in asset prices on business investment in an expectation-augmented model. Financial markets seemingly filter the effects of foreign capital flows on the financial markets, and only part of this impact maintains its strength for domestic investment. The regressions include either the bank lending rate or bond yields; otherwise, there would a problem of multicolinearity in the estimations in columns 5 and 8. The variable $E(\pi)$ enters the Z-matrix in equation (5) as a proxy for expected returns on investment. The variable includes fitted values from autoregressive estimations with *Y*. In formulating an adaptive-expected return on investment, I applied the Akaike Information Criterion to determine the optimal number of lags; they are all in the range of 1 to 4.[9] In addition, a lagged dependent variable is included in the matrix Z because business investment is not usually finished within one quarter or even within one year. The investment expenditure in a certain quarter is also related to these parts of investment projects, which began (or ended) in the former (or latter) quarter at least.

The regressions in columns 9 and 10 reveal possibly important commonalities and differences between core and periphery countries. First, expected returns play a significant role in investment only in the capital-exporting core-country panel but not in the capital-importing peripheral panel. Second, there is no indication that capital gains induce a crowding-out of productive investment in favour of financial investment. The sign of log$\Delta STEX$ is positive and statistically significant. This result is particularly interesting for the financialisation debate (see section 2). Third, bond markets do not

[9] For the interested reader, here are the AIC values for the individual countries (lags in brackets): Austria: 15.7 (-1); Belgium: 14.6 (-3), Germany: (20.1 (-1), Sppain: 17.7 (-1), Finland: 15.3 (-2), France: 184 (-2), Greece: 15.7 (-4), Ireland: 16.4 (-1), Italy: 18.7 (-2), Luxemburg: 12.5 (-1),, Netherlands: 16.3 (-3), and Portugal: 14.7 (-4).

play a significant role in transmitting an impulse from net capital exports to domestic investment in the core countries, but banks' lending markets play a significant role in the peripheral countries. In fact, this result has the expected negative sign, contradicting the results obtained by Tori and Onaran (2017) who, using a different econometric specification for a set of 14 EU countries, find that that 'financial payments', including interest payments, principally have a negative impact on physical investment. In both country sets, the lagged investment variable has a negative sign, apparently since, in the period we considered, investment activities were on the decline, not least due to rising doubts over the economic future of the EA. The estimation results show only weak serial correlation. However, the explanatory power of the core panel regression is low, not least due to the presence of groupwise heteroskedasticity.

5. Final comments

This study provides new insights on the on-going debate in economics and policy, by applying the liquidity preference theory to the highly debated issue of current account imbalances and debtor-creditor positions in the EA.

Liquidity preference governs the financial conditions for decisions on business investment and, through them, the cost conditions in the related industries. A country's trade balance and competitive position are endogenous to domestic and foreign financial flows.

The empirical analysis with peripheral and core EA countries reveals evidence supporting three hypotheses: first, that there is statistical causality, and it flows from net capital flows to unit labour costs, and not vice versa. Second, that net capital flows have an impact on equity and secondary bond markets and bank lending rates. Third, capital gains can have a positive impact on business investment in an expectation-augmented model and do not tempt corporations to replace investment in physical capital with financial investment.

However, further econometric research is necessary to refine the results obtained above.

These findings have relevant policy implications. The debate in Europe currently centres on the issue of labour market reforms to reduce unit labour costs in debtor countries or to increase them in creditor countries. Such a one-sided strategy might fail. This study has shown that the control and reduction of certain segments of the financial sector, including controls for cross-border capital flows, might help stabilise the EA.

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APPENDIX

The table shows the results of panel data unit root tests, with common and with country-specific roots, for the data series *CA*, *GRULC*, *LR*, *STEX*, *SBY*, *INV*, *Yfit* and their first differences. The result is that *GRULC* is panel stationary for all subsets, *CA* is not, while Δ*CA*, the first difference of *CA*, is again panel stationary. The nominal bank lending rate for corporations, *LR*, is not panel stationary for the EA-12 and Core countries, but it is for the periphery, and its first difference is panel stationary for all three subsets. Mixed results appear also for *STEX*. The absolute levels of the investment volume *I* are not stationary, but their first differences are. The expectation variable *Yfit* is panel stationary in its levels as well as first differences according to almost all test specifications.

Table A1 – *Unit root test results (t-statistics; seasonally adjusted data)*

		Levin, Lin & Chu	Im, Pesaran and Shin	ADF	PP	Obs.
CA	Euro area-12	-0.354	-1.142	42.193**	59.882***	850-862
	Core-7	-1.205	-2.163**	37.562***	52.085***	484-491
	Periphery-5	0.879	0.796	4.630	7.787	366-371
Δ*CA*	Euro area-12	-10.871***	-21.877**	329.619***	347.323***	838-850
	Core-7	-13.497***	-18.891***	208.192***	194.713***	477-484
	Periphery-5	-1.296*	-11.529***	121.427***	152.610***	361-366
GRULC	Euro area-12	-2.410***	-12.393***	196.038***	341.966***	1008-1020
	Core-7	-0.496	-9.213***	110.745***	200.767***	588-595
	Periphery-5	-2.996***	-8.297***	85.293***	141.199***	420-425
Δ*GRULC*	Euro area-12	-19.341***	-31.763***	340.024***	221.048***	996-1008
	Core-7	-11.765***	-24.034***	206.297***	128.945***	581-588
	Periphery-5	-15.913***	-20.770***	133.727***	92.103***	415-420
LR	Euro area-12	-0.581	-0.386	28.187	11.737	572-583
	Core-7	0.531	1.693	5.709	3.165	364-371
	Periphery-5	-1.875**	-2.598**+	22.478**	8.571	260-265

(*continued*)

(*continues*)

Δ*LR*	Euro area-12	-3.953***	7.391***	101.222***	107.893***	561-572
	Core-7	-3.330***	-5.762***	60.492***	74.199***	357-364
	Periphery-5	-2.292**	-4.633	40.730***	33.694***	255-260
STEX	Euro area-11	-1.966**	-3.399**	45.161***	34.673**	897-909
	Core-6	-1.217	-2.299	23.221	18.787	496-503
	Periphery-5	-1.635*	-2.524***	21.940**	15.885	401-406
Δ*STEX*	Euro area-11	-7.471***	-11.272***	169.908***	262.901***	885-897
	Core-6	-5.500***	-8.621***	97.134***	158.097***	489-496
	Periphery-5	-5.136***	-7.275***	72.775***	104.804***	396-401
SBY	Euro area-12	-1.916***	-1.216	41.178**	42.126**	1008-1020
	Core-7	0.379	1.977	3.680	12.502	588-595
	Periphery-5	-3.989***	-4.224***	37.499***	29.624***	420-425
Δ*SBY*	Euro area-12	-8.773***	-14.352***	240.061***	312.718***	996-1008
	Core-7	-8.775***	-12.716***	168.354***	211.858***	581-588
	Periphery-5	-3.720***	-7.189***	71.707***	100.860***	415-420
I	Euro area-12	-0.783	1.638	13.097	13.652	988-1000
	Core-7	-1.228	0.682	10.211	10.284	584-591
	Periphery-5	0.224	1.730	2.886	3.368	404-4009
Δ*I*	Euro area-12	-4.423***	-16.715***	273.936***	264.037***	976-988
	Core-7	-3.342***	-13.342***	163.100***	167.075***	577-584
	Periphery-5	-2.931***	-10.108***	110.836***	96.952***	399-404
Yfit	Euro area-12	-6.785***	-2.577***	42.786**	37003**	875-882
	Core-7	4.402***	-0.968	15.383	12.945	508-522
	Periphery-5	-4.276***	-2.288**	20.494**	24.058***	350-360
Δ*Yfit*	Euro area-12	-19.010***	-20.854***	332.862***	362.313***	868-870
	Core-7	-2.141**	-7.886***	91.225***	214.554***	501-515
	Periphery-5	-0.993	-4.959***	43.909***	147.759***	345-355

* : 10%, ** : 5%, *** : 1% significance levels.

Notes: column "Levin, Lin & Chu" reports tests that common unit root = autoregressive coefficients identical over cross-sections; columns "Im, Pesaran and Shin", "ADF" and "PP" report results of tests that autoregressive coefficients vary over cross sections. CA: current account balance in % of GDP; GRULC: relative growth rate of unit labor costs;; LR bank lending rate; STEX: stock exchange index; SBY: sovereign bond yield in %; I: business investment (volume; mn euro); Yfit (=$E(\pi)$**):** fitted values from autoregressive regressions.