The Euro Plus Pact: Competitiveness and Cross-Border Capital Flows in the EU Countries[*]

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Abstract: The *Euro Plus Pact* was adopted by most EU countries in March 2011. The Pact stipulates a range of quantitative targets meant to strengthen competitiveness and convergence with the ultimate aim to avoid the accumulation of unsustainable financial imbalances. This paper uses Granger causality tests and VAR models to assess the direction of causality between changes in the relative unit labour cost and the current account balance. The sample consists of the 27 EU countries for the period 1995–2011. The main finding is that the current account balance affects changes in relative unit labour costs, while there is no discernable effect in the opposite direction. This suggests that divergence in the unit labour cost between the core countries in Northern Europe and the countries in Southern and Central and Eastern Europe prior to the global financial crisis was partly the result of capital flows from the European core to the periphery. The results call into question the ability of the Euro Plus Pact to avert the build-up of financial imbalance in future.

JEL codes: E61, F36, F41

Keywords: European integration, policy coordination, unit labour costs, current account imbalances, economic crisis

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[*] The authors would like to thank participants in presentations at Mendel University in Brno and Eesti Pank for useful comments. All errors remain the responsibility of the authors. The views expressed are those of the authors and not necessarily those of the institutions to which they are affiliated.

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1. Introduction

The global financial crisis had pronounced effects on all European economies already from 2008, leading to substantial output losses in most EU countries. The crisis subsequently turned into a debt crisis as lending dried up and growth prospects deteriorated. Governments in the geographical periphery had to seek assistance from inter alia the IMF and the European Commission. Given this background, European economic governance structures came under scrutiny and a host of reforms were adopted with the aim to reduce the probability of future crisis in individual countries. Among the reforms adopted are *Europe 2020*, a new growth strategy, the *Euro Plus Pact*, in part to ensure financial stability, and the *Fiscal Compact*, setting new fiscal targets.[1] This paper discusses the Euro Plus Pact and seeks to assess its likely effectiveness.

The preparation of the Euro Plus Pact can be traced back to the autumn of 2010 when the diverging economic performance of countries in the euro area became apparent (*The Economist* 2011, Groll & van Roye 2011). Consultations between the German and French governments led to the *Competitiveness Pact*, which was presented in February 2011. After alteration and the adoption of a new name, the Euro Plus Pact was adopted at a European Council meeting in March 2011 (European Council 2011).[2] All euro area countries and most other EU countries (except the Czech Republic, Hungary, Sweden and the United Kingdom) signed up.

The goal of the Euro Plus Pact is to foster competitiveness and convergence among the participating countries with the aim of avoiding the build-up of financial and economic imbalances. The Pact stipulates a number of policy measures which should be undertaken to reach these goals, including review of wage setting arrangements, indexation schemes, public sector wages and structural reforms to enhance productivity. There are also measures to foster employment, enhance the sustainability of public finances and better financial stability. The measures of the Pact must be undertaken by individual countries, but the *open method of coordination* entails the "naming and shaming" of countries falling behind. The European Commission has been put in charge of monitoring and must to that end collect and publish various indicator variables, including the developments of unit labour costs, which capture the progress of individual countries.

The main impetus of the Euro Plus Pact is evident from its initial name, the Competitiveness Pact, but also from its current subtitle: "Stronger economic policy coordination for competitiveness and convergence" (European Council 2011, p. 13). Non-convergence in the form of deteriorating competiveness is seen as a source of economic and financial instability in individual countries. This view is directly stated in the conclusions from the European Council meeting at which the Euro Plus Pact was adopted (European Council 2011, p. 5):

> The Euro Plus Pact […] will further strengthen the economic pillar of EMU and achieve a new quality of policy coordination, with the objective of improving competitiveness and thereby leading to a higher degree of convergence […].

This underlying economic philosophy has been laid out very succinctly by Gros (2011, p. 1):

[1] The webpage http://www.ecb.int/mopo/eaec/ecopolicy/html/index.en.html provides an overview of the many reforms and provides links to source material.

[2] The word *plus* in the Euro Plus Pact should apparently refer to two issues. First, it imposed new governance structures in addition to those in place at the time of its inception. Second, whereas it is compulsory for the euro area countries, other EU countries can join the pact.

> The (relative) unit labour costs of GIP(S) countries Greece, Ireland, Portugal and Spain have increased: this is the fundamental cause of their problems as export performance must have been bad, pushing them into current account deficits.

The same point has been made by other commentators and analysts.[3] Although the policy-making process meant that the Euro Plus Pact ended up encompassing a large number of policy areas and a large number of indicator variables, the core of the Pact is the stipulation that each participating country must retain external price competitiveness in order to avoid the build-up of unsustainable financial imbalances, chiefly large current account deficits.[4]

The Euro Plus Pact has been subject to several policy-oriented analyses, especially in the months prior to and right after its adoption in April 2011.[5] The policy discussion has brought up many important points related to its underlying economic philosophy as well as its practical implementation. Groll & van Roye (2011) argue that it is the *level* of unit labour costs, not changes in these costs, which provides the most appropriate measure of achieved convergence. Gros & Alcidi (2011) make a similar point and point out that indices of the relative unit labour cost convey very different messages depending on the base year and the length of the sample. They also argue that important issues have been left out of the Euro Plus Pact because measures to address the issues are politically inconvenient for the core countries in the euro area.[6]

Gros (2011) claims that the Euro Plus Pact is based on flawed economics as competitiveness indicators are weak predictors of future export performance; Estonia, for example, is found to have had rapidly increasing relative unit labour costs but also strong export growth. Wyplosz (2011) argues that it is inappropriate to focus on unit labour costs relative to euro area countries; more informative competitiveness measures would compare with the unit labour cost of all trading partners. Marzinotto (2011) is also critical to the underlying rationale of the Euro Plus Pact, but points out that a solution to the economic problems in the peripheral countries must include measures to strengthen their external price competitiveness. At the political level the Euro Plus Pact has been criticised, inter alia by the Czech President Vaclav Klaus for further limiting the sovereignty of participating countries (Phillips 2011).

Other contributions to the debate on economic governance in the euro area or the EU consider the importance of capital flows within the region but without explicitly discussing the Euro Plus PactHolinski et al. (2012) find that the flows of capital from North European to South European countries in the period 1992–2007 cannot be explained by fundamentals such as differentials in productivity growth and therefore have led to the accumulation of imbalances.

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[3] Marzinotto (2011, p. 93) writes: "Implicit to the design of the recent economic governance reform is the idea that southern European countries have accumulated large current account deficits because poor price competitiveness impeded them to export abroad".

[4] The Euro Plus Pact eventually attained a broad approach compared to the earlier draft proposals, but the additional commitments augment the core idea: crisis countries are crisis countries because of weak wage cost competitiveness. Other components of the Pact like, for example, 'flexicurity' or the 'sustainability of pensions, health care and social benefits' or 'tax policy coordination' are also meant to improve competitiveness. In general, the official diagnosis of imbalances includes domestic policy factors such as wage, employment, social and fiscal policies. All these policies are assumed to contribute to wage cost competitiveness of a member country measured in terms of unit labour costs.

[5] The policy-oriented discussion may, however, be seen as having been overshadowed by the discussions of revisions to the Stability Growth Pact seeking to strengthen the fiscal policy stance in individual EU countries.

[6] Gros & Alcidi (2011, p. 89) conclude: "The newly created Euro-Plus Pact has reinforced […] the fallacy that because peripheral countries have lost competitiveness over the last year[s], this is the only problem that needs to be solved."

The authors argue that systematic monitoring of external imbalances and improved policy coordination is advisable. De Grauwe (2011) argues that monetary unions are especially susceptible to fiscal crises as governments do not have access to inflationary financing and are therefore exposed to sudden changes in capital flows. Increased integration is also in this case the favoured means to stabilise the euro area. . One of us (Gabrisch 2011) argues that additional coordination of economic policy is needed as market-induced capital flows bring about financial and economic imbalances including wage cost divergences given that the region does not constitute an optimal currency area. This argument and the related literature proposes an understanding of the role and causes of competitiveness different to the Euro Plus Pact and the European debate.

Our paper tries to answer the question, "Which comes first, weak competitiveness or capital inflows?" Obviously, the policy conclusions would differ with respect to different cause-effect relationships. The direction of causality is identified through the time dimension. To that end, we use Granger causality tests and vector autoregressive models including two variables, *viz.* changes in the relative unit labour cost and changes in the current account balance (or just the current account balance in some specifications).

The estimations are undertaken using a panel dataset comprising approximately 15 years of data for all 27 EU countries. The use of panel data enables reliable estimations in spite of the short time dimension. The panel data estimations assume homogeneity of the slope coefficients across the countries in the sample, and the estimated slope coefficients or marginal effects may thus be seen as *average* values for all the countries in the sample. The Euro Plus Pact has been adopted by most EU countries and it is therefore reasonable to base assessments of the Pact on estimates of the average effects for all 27 EU countries or different subsets of the 27 countries.

This paper is the first to discuss the contents and appropriateness of the Euro Plus Pact based on an econometric analysis of the main causal assumption underlying the Pact. As such the paper contributes to the important discussion of the economic governance required in the euro area and the European Union at large. The issue of the paper is, however, also of importance in its own right. The linkages between capital flows and the real exchange rate or other measures of competitiveness are widely debated and a large literature exists which seeks to provide quantitative estimates of these linkages, in particular in emerging market economies (see the literature survey in Section 2). The paper contributes by providing estimates for the entire European Union and different country subsets. The use of VAR models is relatively novel within this literature.

The rest of the paper is organised as follows: Section 2 discusses the existing literature on the links between competitiveness and capital flows. Section 3 presents the dataset, time series properties and various crossplots. Section 4 shows the results of simple Granger causality tests. Section 4 presents different VAR models and their impulse responses. Finally, Section 6 summarises the paper and draws some policy conclusions.

2. Capital flows and competitiveness

This section reviews and discusses literature on the linkages between capital flows and international competitiveness. The focus is on empirical and policy-oriented studies, but theory contributions will also be reviewed. We discuss first the direction from

competitiveness to capital flows, then from capital flows to competitiveness. The conclusion is that it is impossible to ascertain the direction of causality *ex ante*; only empirical studies of a specific sample can provide such information.

2.1 From competitiveness to capital flows

This strand of the literature explains a loss in competitiveness with domestic determinants related either to slow productivity growth and/or excessive wage growth in deficit countries and the opposite in surplus countries. In isolation, the productivity argument is restricted. First, productivity advantages of one country due to technological progress have the property to be dispersed across countries in integrated economies (Wyplosz 2011). Second, when the progress of productivity in a country stems from outsourcing, off-shoring and FDI activities, such productivity gains may be accompanied by higher wages (Marin 2006, for German firms).

One part of this strand of the literature has great sympathy for political explanations, blaming wage and fiscal policies. For the post-Keynesian side the conclusion is clear: "…wage policy has a critical role in the rebalancing of European economies" (Stockhammer 2011, p. 91). The political-economy argument posits that national wage setting neglects the inflation target of the ECB or euro-wide average inflation; wage setters in some countries try to achieve higher employment and exports through real wage declines– a reproach in part to German wage setting, while in other countries increases in nominal wages exceed productivity progress plus inflation.

Another argument blames fiscal policy, and is related to the Twin-Deficits literature, where fiscal deficits are causal to an external deficit, since they lead to an expansion of public and private wages; hence fiscal discipline is tantamount to wage discipline. From this perspective, the strengthening of the Excessive Deficit Procedure becomes another core part of EU governance reform (Schuhknecht et al. 2011).

Most of the empirical literature that deals with emerging imbalances in the EMU is based on the inter-temporal approach to the current account. Therefore, inflation differentials should be tested for fundamental factors in the domestic economy (purchasing power parity, productivity convergence á la Balassa-Samuelson), while non-fundamental factors would lead only to deviations from the inter-temporal equilibrium to be corrected by market forces after some time. The typical methodological approach is co-integration and vector error correction modelling. A couple of studies in the mid-2000s asked whether inflation differentials in EMU would reflect convergence and catching-up of productivity, wages and per capita income in the inter-temporal framework. The studies found that current account imbalances were overwhelmingly, but not exclusively, driven by fundamentals (Fischer 2007; Dullien and Fritsche 2008.

Fischer (2007) has argued that part of the deviation from long-run equilibrium has to be explained by weak labour market institutions. Barnes et al. (2010) used panel data to estimate a model explaining the current account balance by domestic fundamentals and "financial deepening" variables for 21 OECD countries. Their study confirmed the strong relevance of some fundamentals, among others openness, demography, and GDP per capita. They found credit to the private sector and stock market capitalization to be insignificant, and argue that the results are biased by the high share of relations between advanced countries. Housing investment, however, turned out to have a strong negative impact on the current account.

They also found that euro area membership boosted deficits in the peripheral members beyond what can be explained by fundamentals. The open question is how to understand the mechanisms between capital inflows, "financial deepening" and the REER.

2.2 From capital flows to competitiveness

The reverse causation has a long history in literature, and goes back at least to the early 1940s, when Keynes proposed a common currency (the "Bancor") plus a clearing union in order to deal with excessive debit balances (Keynes in Horsefield 1969, p. 20). The issue of destabilising capital flows gained attention during the debt and financial crises of the 1980s and 1990s (see Calvo et al. 1993 and 1996; Fernandez-Arias 1996, Kim 2000), the recent global financial crisis in less advanced countries (UNCTAD 2009) and in European transition countries (Lipschitz et al., 2002).

Most empirical studies find evidence that capital inflows induced by external variables (transitory and permanent shocks) indeed destabilize the receiving economy. While the topic is still up-to-date in the non-EU focused literature (Ca'Zorzi et al. 2009; Joumotte and Sodsriwiboon 2010, Bakardzieva et al. 2010; Sen 2010;, Pérez-Caldenty & Vernengo 2012), it seems not to play an important role in the ongoing E(M)U policy and governance reform debate, with a few exceptions mentioned below.

The pool of theoretical perspectives is rich. One is based on Balassa-Samuelson effects. Behlke et al. (2009) argue that foreign capital investment in the sector of tradable goods deepens the productivity differential with the sector of non-tradable goods. When wages increase in the non-tradable sector above productivity due to the foreign capital induced productivity progress in the tradable sector, commodity inflation will speed up, and the real exchange rate will appreciate. With respect to empirical testing, Behlke et al. (2009) run a panel model for new EU member states for the period from 1993 to 2008. However, the tests fail to produce clear evidence for or against a foreign capital induced Balassa-Samuelson effect. This raises doubts whether relative price adjustments following net capital inflows may explain domestic inflation.

Another perspective is related to the Dutch disease effect of capital inflows in studies on developing countries (Sy and Tabarraei 2009; Bakardzieva et al. 2010). The traditional interpretation (Corden and Neary 1982) explains the appreciation of the exchange rate by a higher relative price of a domestic natural resource or capital inflows since the higher revenues in foreign exchange increase the demand for non-tradable goods at the expense of tradable goods. Unlike to the Balassa-Samuelson framework, the real appreciation is not the effect of productivity differentials between the two sectors, but the form of spending for the production of tradable or non-tradable goods. Bakardzieva et al. (2010) found net capital inflows to have a positive impact on the REER for the entire panel of developing countries including East European countries, which is indicative to the Dutch disease. However, foreign direct investment (FDI) turned out to be insignificant to the REER for Eastern Europe (but not the African region), assumingly due to spending capital inflows on productive investment. With respect to the different results for FDI obtained for Africa or Eastern Europe, results might suffer from an aggregation problem: on a structural and regional basis, net capital inflows as well as FDI and other (net) foreign exchange flows might show a higher volatility than on a higher level of aggregation. Therefore, results for the entire panel and net capital inflows seem to be more robust than FDI flows at the regional level.

Sy and Tabarraei (2009) make an interesting reference to the Keynes-Ohlin controversy about the *transfer paradox*, in which Keynes argued that the compensations Germany paid after the First World War in gold marks would deteriorate the long-run competitiveness of the winner countries through a negative terms-of-trade effect. This famous debate underwent a revival with the German unification in 1990, when huge amounts of transfers flew from West to East Germany. The transfer of income used for imports from the donors lowers demand for domestically produced goods and makes their production unprofitable. Vice versa, the loss of income in the donor country suppresses demand for goods imported from the recipient country. It is immediately visible that the transfer paradox is basically different to the neoclassical version of the Dutch disease, where relative price movements lead to the reallocation of labour from manufacturing to the resource sector with given employment. The transfer paradox theory explains how the inflow of income (transfers, aid, capital) damages domestic production via a decline in effective demand. The East German example might have demonstrated that employment is not unaffected by transfers.

Another theoretical perspective on the impact of capital flows on the real exchange rate is related to the *financial fragility* literature and the appearance of boom-bust cycles. The boom-bust cycle part of the theory comes into play by Minsky's (1982) hypothesis of euphoric expectations among borrowers as well as lenders. The transformation of separated national economies into the euro area in 1999 constituted an external and permanent structural shock that may have created euphoric expectations in the region, when the exchange risk for investors disappeared so that they can exploit the large differences in wage cost levels.

There is another argument behind euphoric expectations in the emerging Euro area, related to the risk-sharing effect for international investors in Mundell (1973) and MacKinnon (2002). Risk sharing is an incentive for financial investments into countries even when these countries might be hit by an asymmetric shock. Then, the massive inflow of finance might become the trigger of an asset price boom. Since the price of a given stock of real capital is the demand price for investment goods (Minsky 1982, pp. 131–136), the asset price boom would be transferred into higher income in the capital goods sector. When output and income in this sector increase, the consumer good sector has to increase its own production. When labour and capital supply is short, prices of consumer goods would increase, or consumers would turn their additional demand to foreign goods. If workers demanded higher nominal wages to compensate for inflation, unit labour costs would increase at the given productivity.[7] With continued capital inflows, the country's competitiveness would deteriorate.[8] Gabrisch (2011) pointed at the problem of high-wage and low-wage countries becoming a member of a currency area - typically for the European monetary union: risk sharing would raise profit expectations of investors from a high-wage country with respect to a low-wage country.

3. Data and statistics

[7] The neo-classical view that capital accumulation in the investment good sector would increase the marginal product of labour, and would offset wage increases (Lipschitz et al. 2002, p. 6), is obviously wrong, since financial investment are not necessarily transformed into real capital, but have certainly a price effect. Holinski et al. (2012, p. 14) observe that the extensive flow of capital from North to South (in Europe) 'has not yet resulted in in measurable gains of productivity….'.

[8] The model differs from the Balassa-Samuelson approach insofar as a distinction between tradable and non-tradable good sectors is not necessary. Both investment and consumer goods can be tradable goods.

The dataset is a panel of annual data from 1995 until 2011 for the 27 EU countries. The panel is unbalanced due to missing observations of the unit labour cost at the beginning of the sample for some countries. The variables used in the empirical analysis derive directly from the discussion of the Euro Plus Pact in Section 1. The Pact aims to restrain the growth of the unit labour cost in order to prevent the accumulation of financial imbalances, chiefly current account deficits. All data were downloaded from the Eurostat webpage on 11 May 2012.[9]

The variable GRULC denotes the percentage growth of the unit labour cost in the individual EU country relative to the percentage growth of the unit labour cost in the EA12, i.e. the euro area comprising the first 12 participating countries. The unit labour cost is in both cases expressed in terms of common currency units (ECU/EUR). The variable is computed from an index of the nominal unit labour cost, which is defined as the ratio between the nominal compensation per employee and the productivity per employee, all expressed in local currency (Eurostat classifier *nama_aux_ulc*).[10] An increase of the relative unit labour cost, GRULC > 0, signifies a worsening of price competitiveness relative to the EA12, while a lowering of the relative unit labour cost, GRULC < 0, signifies an improvement of competitiveness relative to the EA12.[11]

The variable CA is the current account balance in percent of GDP (Eurostat classifier *bop_q_gdp*). A current account surplus, i.e. CA > 0, is tantamount to a net capital outflow and entails the accumulation of net foreign assets. A current account deficit, i.e. CA < 0, amounts to a net capital inflow and implies a deterioration of the net foreign asset position. In many specifications, the change in the current account, DCA = CA – CA(-1), is used.
For use in robustness analyses, two additional variables are included. One variable is GREER_ULC, which is the percentage change in the real effective exchange rate against 36 trading partners deflated using the unit labour cost in the total economy (Eurostat classifier: *ert_eff_ic_a*). The other variable is GREER_CPI which is the percentage change in the real effective exchange rate against 36 trading partner deflated using consumer price indices (Eurostat classifier: *ert_eff_ic_a*).

The time series properties of the data series are important for the choice of empirical methodology. Table 1 shows the results of panel data unit root tests, with common and with country-specific roots, for the data series GRULC, CA and DCA. The result is that GRULC is panel stationary, CA is a borderline case, while DCA, the first difference of CA, is panel stationary. The borderline result for CA and the clear stationarity of DCA suggest that it is judicious to use both panel series in the econometric analyses.

[9] The dataset is available from the corresponding author upon request.
[10] For the 17 euro countries the nominal unit labour cost are expressed as "euro fixed" values for the years prior to the introduction of the euro, i.e. the national currency values are converted to EUR/ECU using the irrevocably fixed exchange rate at the time of the introduction of the euro. The use of fixed conversion factors precludes comparison across countries and the euro fixed values are therefore converted into EUR/ECU values using the market rates of the national currencies against EUR/ECU (Eurostat classifier *ert_bil_conv_a*). For the 10 countries outside the euro area, the nominal unit labour cost is converted to ECU/EUR using the nominal exchange rates (Eurostat classifier *ert_bil_eur_a*).
[11] GRULC is not available for 1996–2000 for Greece and Malta and 1996–1999 for Romania due to missing source data.

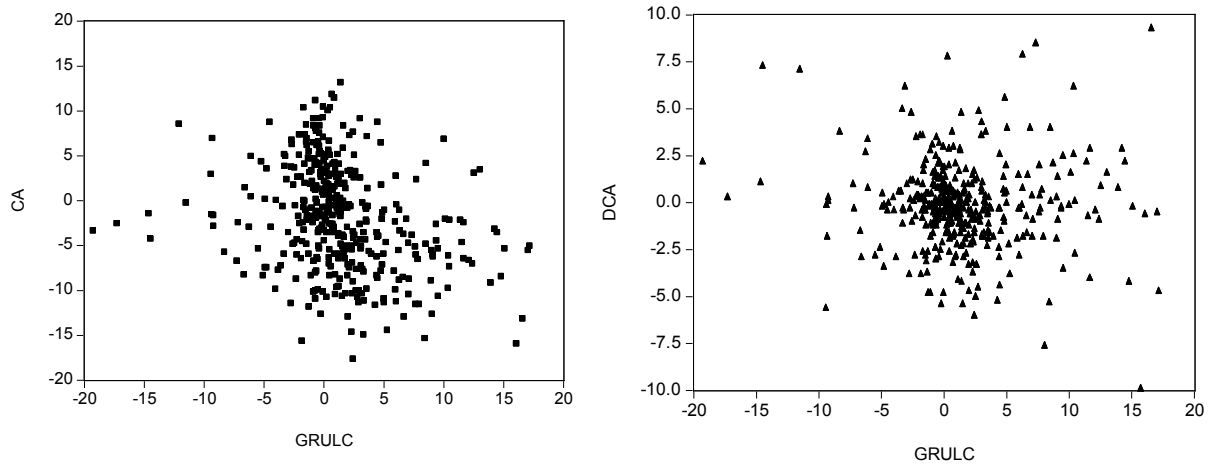
Table 1: Tests of unit roots of panel data series, 1995–2011

	Levin, Lin & Chu[a]	Im, Pesaran and Shin[b]	ADF-Fisher[b]	PP-Fisher[b]
GRULC	-10.318 [0.000]	-8.573 [0.000]	178.519 [0.000]	240.968 [0.000]
CA	-2.070 [0.019]	-1.407 [0.080]	70.658 [0.064]	67.010 [0.110]
DCA	-7.678 [0.000]	-8.457 [0.000]	172.421 [0.000]	316.066 [0.000]

[a] The test assumes a common unit root across the countries.
[b] The test allows for different unit roots across the countries.
Notes: The null hypothesis is in all cases that the variable has a unit root. The tests allow for country-specific intercepts in the test regressions. The values in square brackets are *p*-values.

Figure 1 shows crossplots of the growth in the relative unit labour cost GRULC and the current account balance CA or the change in the current account balance DCA for all 27 EU countries for the period 1995–2011. (The scales have been chosen so that a few extreme observations have been left out.) Both crossplots exhibit weak negative correlations, but no clear patterns are apparent. Moreover, the possible directions of causality cannot be ascertained without additional identifying assumptions.

Figure 1: The current account balance CA in percent of GDP and the change in the relative unit labour cost GRULC in percent; 27 EU countries, 1995–2011



4. Granger causality tests

The discussion in Section 2 suggests that the possible effect of competitiveness on the current account is likely to occur with a time lag (*j*-curve effect) and, conversely, the possible effect of the current account on competitiveness may also appear with a time lag, especially in cases of fixed exchange rates. It is therefore reasonable to identify the direction of causality using the time dimension, i.e. causality is associated with lagged values of a variable having explanatory power over the other variable.

This section presents the results of Granger causality tests. The aim is to test for time-based causality between the two variables of interest, i.e. between GRULC, the percentage growth in the relative unit labour cost, and DCA, the change in the current account balance in

percentage points of GDP. Tests are undertaken for a large number of specifications and for different country groups in order to examine the robustness of the results. A robustness test in which GRULC and the current account balance CA are used can be found in Appendix A.

The Granger causality test is undertaken in a model in which the dependent variable is explained both by lags of itself and lags of an independent explanatory variable (and possibly control variables). The Granger causality test is a standard Wald test with the null hypothesis that the coefficient or coefficients of the lagged independent explanatory variable is zero. The test statistic follows an *F*-distribution and asymptotically a χ^2- distribution. If the null hypothesis is rejected, the lagged variable is said to Granger cause the other variable.

To avoid that outliers unduly affect results, a few extreme observations have been trimmed from the dataset. Observations in which GRULC is below -20 or above 20 and observations in which CA is below -20 or above 20 have been omitted. These observations typically relate to episodes of extreme inflation, stabilisation of extreme inflation or cases of extreme financial instability. In total, 10 observations have been omitted due to trimming. The results are generally not very sensitive to the specific choice of cut-off points; results essentially identical to those presented below emerge when the low cut-off point is taken to be –15 and the high cut-off point is taken to be 15.

Table 2 shows the results of panel data estimations used to test whether lags of DCA have explanatory power towards GRULC when one or more lags of GRULC are included, i.e. to test whether GRUCL Granger causes DCA. Column (2.1) shows a simple estimation with country fixed effects and one lag of both variables. The null hypothesis of no explanatory power of GRULC cannot be rejected. The same applies in Column (2.2) in which the fixed effects are omitted and the model is estimated using ordinary least squares.

Table 2: Panel data Granger causality tests. Dependent variable DCA

	(2.1)	**(2.2)**	**(2.3)**	**(2.4)**	**(2.5)**	**(2.6)**
DCA(-1)	0.130 (0.069)	0.143 (0.101)	0.144 (0.054)	0.115 (0.092)	-0.061 (0.141)	0.188 (0.117)
DCA(-2)	..	..	..	-0.221 (0.046)	0.061 (0.057)	-0.241 (0.057)
GRULC(-1)	0.059 (0.046)	0.064 (0.038)	0.132 (0.063)	0.051 (0.038)	-0.058 (0.094)	0.055 (0.046)
GRULC(-2)	..	..	..	0.044 (0.035)	0.017 (0.061)	0.061 (0.043)
Granger causality[a]	1.60 [0.217]	2.84 [0.093]	4.36 [0.037]	1.15 [0.333]	0.20 [0.826]	1.42 [0.264]
Sample	1997-2011	1997-2011	1998-2011	1998-2011	1998-2011	1998-2011
Observations	381	381	381	356	163	128
Estimation	FE	OLS	System GMM	FE	FE	FE

[a] The null hypothesis of the Granger causality test is that the lagged value(s) of the independent explanatory variable do(es) not Granger cause the dependent variable. The test statistic is *F*-distributed except in the case of the System GMM estimation in which it is χ^2-distributed; the values in square brackets are *p*-values.

Notes: Standard errors are clustered along the cross section and are shown in round brackets. A constant term is included in all estimations but not reported.

The presence of a lagged dependent variable gives rise to potentially biased estimates when fixed effect estimation is used (*Nickel bias*). The model is therefore estimated using the

System GMM methodology developed by Arellano & Bover (1995) and Blundell & Bond (1998). Both the lagged dependent variable and the lagged independent explanatory variable are instrumented using expanding lags in both cases. The estimated coefficients are qualitatively similar to those obtained using fixed effects ordinary least squares. The hypothesis of no Granger causality can be rejected at the 5% level (although not at the 1% level), but the sign of the coefficient of GRULC(-1) is positive, not negative as expected.

Column (2.4) shows the results when two lags of both variables are introduced as explanatory variables. In this case Granger causality entails the rejection of the joint hypothesis that the coefficients of GRULC(-1) and GRULC(-2) are zero. The hypothesis cannot be rejected (*p*-value = 0.333), suggesting that the inclusion of two lags of changes in the unit labour cost does not change the results obtained previously. Column (2.5) shows the results when the sample is restricted to the EA12 countries, i.e. the first 12 countries that joined the euro area, and Column (2.6) shows the results when the sample is restricted to the 10 CEE countries. The result is in both cases that the null hypothesis cannot be rejected.

Table 3 shows the results when the change in the relative unit labour cost, GRULC, is explained by autoregressive terms and lagged changes in the current account balance, DCA. Column (3.1) shows the results when one lag is included and the panel is estimated using fixed effects. The lagged current account balance has substantial explanatory power; an increase in the change of the current account balance ("capital outflow") of one percentage point of GDP is associated with 0.397 percent lower growth in the unit labour cost the following year, i.e. a considerable improvement of external competitiveness. By the same token, a capital inflow leads to deteriorating competitiveness the following year. Similar results follow from the OLS estimation in Column (3.2) and the System GMM estimation in Column (3.3).

Table 3: Panel data Granger causality tests. Dependent variable GRULC

	(3.1)	**(3.2)**	**(3.3)**	**(3.4)**	**(3.5)**	**(3.6)**
DCA(-1)	-0.397 (0.109)	-0.378 (0.089)	-0.462 (0.161)	-0.300 (0.113)	-0.217 (0.097)	-0.321 (0.156)
DCA(-2)	..	..	..	-0.282 (0.079)	-0.305 (0.086)	-0.360 (0.098)
GRULC(-1)	0.072 (0.054)	0.117 (0.060)	0.122 (0.061)	0.671 (0.050)	0.230 (0.101)	0.046 (0.059)
GRULC(-2)	..	..	..	-0.148 (0.048)	-0.113 (0.054)	-0.168 (0.062)
Granger causality[a]	13.34 [0.001]	17.88 [0.000]	8.25 [0.004]	8.40 [0.002]	6.34 [0.015]	8.61 [0.008]
Sample	1997-2011	1997-2011	1998-2011	1998-2011	1998-2011	1998-2011
Observations	381	381	381	356	163	128
Estimation	FE	OLS	System GMM	FE	FE	FE

[a] The null hypothesis of the Granger causality test is that the lagged value(s) of the independent explanatory variable do(es) not Granger cause the dependent variable. The test statistic is F-distributed except in the case of the System GMM estimation in which it is χ^2-distributed; the values in square brackets are p-values.

Notes: Standard errors are clustered along the cross section and are shown in round brackets. A constant term is included in all estimations but not reported.

Column (3.4) shows the results when two lags are included. The coefficients of the two lags of the current account variable are both negative. They are highly significant in both

economic and statistical terms. The null hypothesis of no explanatory power of the two lags of the current account is rejected, i.e. changes in the current account Granger cause changes in the relative unit labour costs. Column (3.5) shows the results when the sample comprises the EA12 countries and Column (3.6) the results for the sample of CEE countries. In these samples, too, the estimated coefficients of the lagged changes in the current account balance are negative and, thus, changes in current account balance are found to Granger cause changes in the relative unit labour cost.

The conclusions from the Granger causality tests in Tables 2 and 3 are clear. Lags of GRULC do not help explain DCA in estimations in which lags of DCA are included. In other words, changes in the relative unit labour cost do not Granger cause changes in the current account balance. This holds across different samples of countries and across a number of estimation methodologies. Contrary to these results, lags of DCA appear in most cases to have substantial explanatory power over changes GRULC in models where lags of GRULC are included. In other words, changes in the current account balance Granger cause changes in the relative unit labour cost. This implies that for instance an increasing inflow of capital (a deteriorating current account balance) leads to deteriorating competitiveness.

The estimations presented in Tables 2 and 3 were undertaken using the change in the relative unit labour cost, GRULC, and the change in the current account balance, DCA. As argued earlier, it may also be of interest to examine possible Granger causality between GRULC and the level of the current account balance, CA. Tables A1 and A2 in Appendix A show the results when the estimations in Tables 2 and 3 are undertaken using the level of the current account balance; CA, instead of its change, DCA.

In qualitative terms most of the results remain unchanged. Table A1 shows the results of estimations in which changes in the current account balance are explained by autoregressive terms and lagged changes in the relative unit labour cost. Lagged changes in the relative unit labour cost do not Granger cause the current account balance, irrespective of the sample or estimation method.

Table A2 presents the results of estimations where the dependent variable is the change in the relative unit labour cost. In most specifications the level of the lagged current account balance is found to Granger cause changes in the relative unit labour cost at least at the 10% level of statistical significance. The exception is the case where the sample consists only of the EA12 countries and two lags are used. The coefficients of the two lags of the current account variable attain different signs and the sum is close to zero. The complicated structure of both negative and positive coefficients may be associated with the CA variable being a borderline case between stationarity and exhibiting a unit root. For the CEE countries the null hypothesis of no link from the lagged current account levels to changes in the relative unit labour cost is strongly rejected.

We undertook another robustness test as we replaced the change in the relative unit labour cost with two different measures of the change in the real effective exchange rate, deflated using, respectively, the unit labour cost and the consumer price index (GREER_ULC, GREER_CPI). To conserve space the results are not shown. In both cases the main results were as in the case of GRULC being used, i.e. competitiveness does not Granger cause the changes in the current account, but changes in the current account seem to Granger cause the competitiveness measure. This finding is not surprising as the three variables GRULC, GREER_ULC and GREER_CPI are closely correlated. The upshot is that the exact choice of

competitiveness measure is of secondary importance when we seek to identify the time-based dependence between competitiveness and capital flows.

5. VAR models

This section extends the analysis in Section 4 by modelling changes in relative price competitiveness and the current account balance in a vector autoregressive (VAR) model. This allows a deeper investigation of the interactions between the two variables over time. In particular, the reaction of the two variables to shocks can be computed using different assumptions as regards the temporal relation between the variables. We will focus on changes in the relative unit labour cost, GRULC, and changes in the current account balance, DCA. Both variables are panel stationary.

Even allowing for simultaneous dependence between the two variables GRULC and DCA, the system can be reduced so as contain only lags of the two variables as explanatory variables. We undertake estimations using two lags and consider three different country samples, *viz.* all 27 EU countries, the EA12 countries and the 10 CEE countries. The results of the system estimations, presented in Table 4, correspond to the results in Columns (2.4)-(3.4), (2.5)-(3.5) and (2.6)-(3.6).[12]

Table 4: Estimation of panel VAR models, GRULC and DCA

	(4.1)		**(4.2)**		**(4.3)**	
	DCA	**GRULC**	**DCA**	**GRULC**	**DCA**	**GRULC**
DCA(-1)	0.115 (0.092)	-0.300 (0.113)	-0.061 (0.141)	-0.217 (0.097)	0.188 (0.117)	-0.321 (0.156)
DCA(-2)	-0.221 (0.046)	-0.282 (0.079)	0.061 (0.057)	-0.305 (0.086)	-0.241 (0.057)	-0.360 (0.098)
GRULC(-1)	0.051 (0.038)	0.671 (0.050)	-0.058 (0.094)	0.230 (0.101)	0.055 (0.046)	0.046 (0.059)
GRULC(-2)	0.044 (0.035)	-0.148 (0.048)	0.017 (0.061)	-0.113 (0.054)	0.061 (0.043)	-0.168 (0.062)
R^2	0.129	0.219	0.042	0.281	0.167	0.221
Sample	1998-2011		1998-2011		1998-2011	
Observations	381		163		128	

Notes: Standard errors are shown in round brackets. Fixed effects are included in all estimations but not reported.

Across all three country samples, the lags of GRULC exert little explanatory power on DCA, while lags of DCA exert substantial explanatory power on GRULC, both in statistical and economic terms. The coefficients of determination also vary across the equations in the systems as they are higher for GRULC estimations than the DCA estimations. In the case of the EA12 countries the lagged dependent and the independent explanatory variables have essentially no explanatory power as regards DCA (R^2 = 0.042). This is a further indication that changes in the relative unit labour cost have little effect on the current account balance.

[12] The estimations of the panel VAR systems are undertaken in Eviews, and the econometrics software does not allow clustering of the standard errors; the ordinary standard errors are generally somewhat smaller than the clustered standard errors.

This paper seeks to ascertain the most probable direction of causality between the two main variables of interest, GRULC and DCA. Section 2 suggested that there might be a time lag between the cause and effect, but there is not one direction of causality which *ex ante* is more likely or compelling. In other words, the exact timing and interaction of cause and effect are essentially empirical questions. We will therefore consider three different identification schemes, which entail different temporal causality between the two variables of interest.

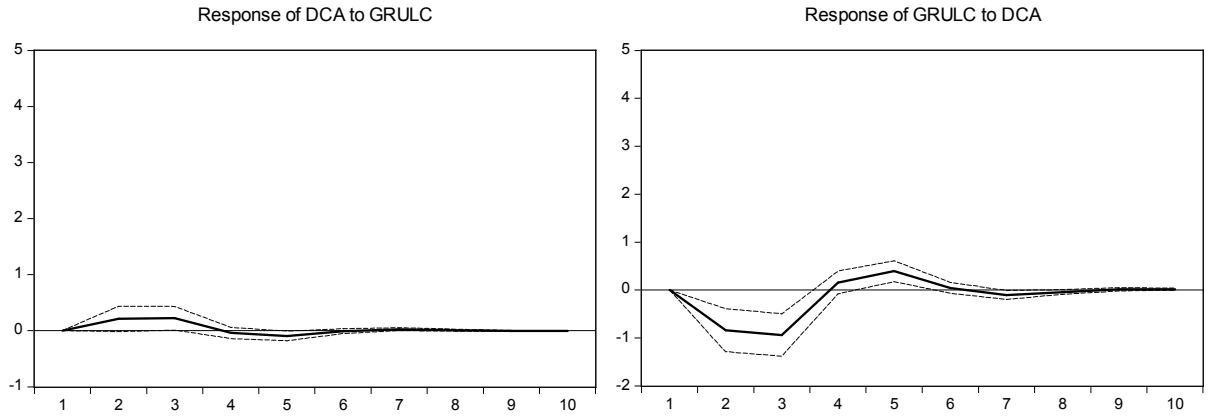
a) There are no contemporaneous effects between the two variables, only lagged effects. This is a case of over-identification as all off-diagonal elements in the variance-covariance matrix are zero (non-orthogonalisation).

b) GRULC can affect DCA contemporaneously, while DCA can only affect GRULC with a lag. This is a case of exact recursive identification based on Cholesky decomposition of the variance-covariance matrix.

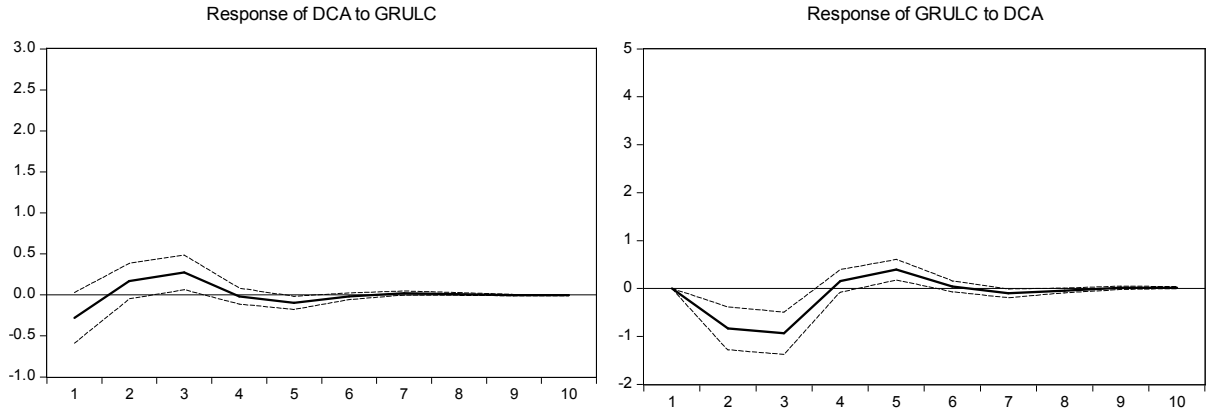
c) DCA can affect GRULC contemporaneously, while GRULC can only affect DCA with a lag. This is another case of Cholesky decomposition but with the opposite direction of temporal effects than in b).

Figure 2 shows impulse responses for model (4.1) comprising all 27 EU countries. The upper panel depicts impulse responses for identification scheme a) in which there are no contemporaneous effects. The left plot shows the impulse response of CA to a one standard deviation, 4.1 percentage points, increase of GRULC in period 1. It follows that the effect is very subdued, and possibly with the "wrong" sign for it signals an improvement of the CA when relative unit labour costs increase. The right plot shows the impulse response of GRULC to a one standard deviation, 2.8 percentage points, increase of CA in period 1. The result is a reduction of GRULC for two periods of approximately one percentage point. In order words, a capital outflow leads to substantial improvement in international competitiveness.

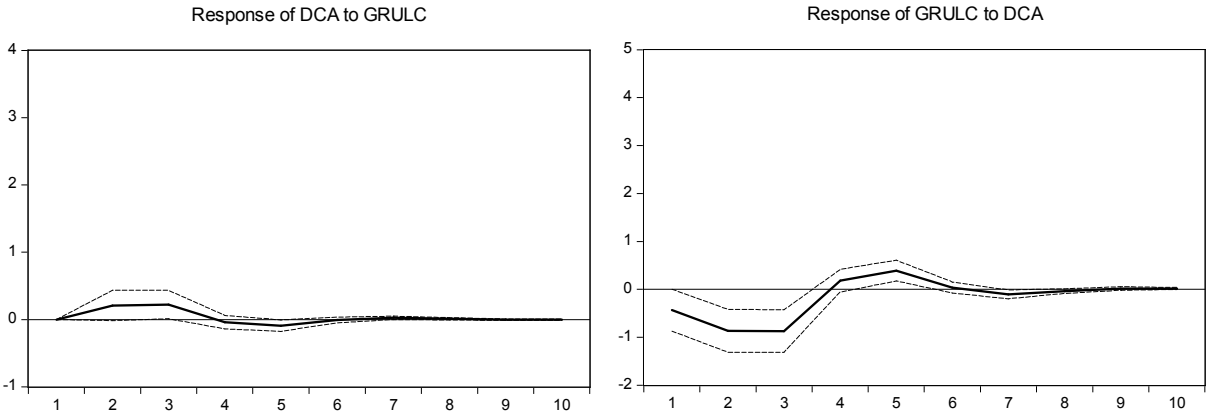
Figure 2: Response of DCA and GRULC to innovations in GRULC and DCA, 27 EU countries



(a) Non-factorised innovations



(b) Cholesky decomposition, only contemporary effects from GRULC to DCA



(c) Cholesky decomposition, only contemporary effects from DCA to GRULC

Notes: The solid line depicts the impulse response and the dashed lines the ± two standard deviations. The standard deviation of GRULC is 4.1 percentage points and the standard deviation of DCA is 2.8 percent.

The centre panel presents the impulse responses for identification scheme b) in which GRULC can affect CA immediately, while the reverse is ruled out. The left panel suggests

that a possible negative effect of a one-deviation-increase in GRULC on DCA is imprecisely determined and anyway dies out already in the impact period. Finally, the bottom panel shows the impulse responses for identification scheme c) which assumes that DCA can affect GRULC immediately, while effects in the opposite direction take place with a lag. The result is that GRULC has essentially no effect on DCA while there are effects in the other direction for up to three years.

The conclusion from the analysis is that irrespective of the identification scheme, the results from Section 4 also apply in the VAR model. Changes in the relative unit labour cost do not affect changes in the current account balance in any statistically or economically significant manner. Instead, changes in the current account balance seem to affect changes in the relative unit labour cost. Increasing current account deficits, signifying increasing capital inflows, are followed by deteriorating competitiveness in the form of the unit labour cost increasing faster than in the core euro area countries.

The results obtained are robust not only to the choice of identification scheme, but also to the sample of countries, the time sample and the measure of capital flows. We will briefly discuss some of the robustness analyses we have undertaken.

Country samples. The impulse responses for the sample of EA12 countries and for the sample of CEE countries take the same shape as those for the full sample presented in Figure 2. This point is illustrated in Figure B1 in Appendix B in which the impulse responses for the CEE countries, cf. Column (4.3) in Table 4, are shown. For this sample, the standard deviation of GRULC is 6.0 percentage points and the standard deviation of DCA is 3.9 percentage points. It is noticeable that the effect of a one standard deviation DCA shock on GRULC is somewhat larger for the sample of CEE countries than for the full sample.

Time samples. We have re-estimated the VAR models in Table 4 using a time sample ending before the outbreak of the global financial crisis, i.e. the sample is 1998–2007. The lower number of observations reduces the precision with which the coefficients are estimated, but otherwise the changes are small. The impulse responses confirm the previously observed pattern of causality (not shown).[13]

Measures of capital flows. We estimated a VAR model with GRULC and the current account level CA (instead of DCA). The impulse responses using identification schemes a)–c) are reproduced in Figure C1 in Appendix C. The results are essentially as before; changes in the relative unit labour cost have no or counter-intuitive effect on the current account balance, whereas innovations in the current account balance affect changes in the relative unit labour cost. The use of real effective exchange rate indices as measures of competitiveness also leads to impulse responses entailing the same qualitative results.

6. Final comments

The Euro Plus Pact, adopted in March 2011, aims to establish monitoring by the European Commission of a number of variables presumed to predicate financial imbalances which can lead to economic disruptions or crises in individual countries. The chief concern of the Pact is the development of external price competitiveness as measured by changes in the relative unit

[13] Further reduction of the sample to include only the EA12 countries is a partial exception as the effect on GRULC of changes in DCA is slower and less pronounced than in the case in which the full sample is used.

labour cost in common currency terms. We ask how appropriate this policy approach is to address the causes for financial imbalances.

This paper uses Granger causality tests and VAR models to analyse the dynamics between changes in the relative unit labour cost and the current account balance. The conclusions of the empirical analyses are robust to a number of sample and specification changes and can be summarised in two points. First, there is little or no effect from changes in the relative unit labour cost to changes in the current account balance. Second, there is a relatively strong and statistically significant link from changes in the current account balance to changes in the growth of the relative unit labour cost within a horizon of 1–3 years.

The conclusions would be consistent with a situation in which capital flows in large part depend on events outside the individual country, i.e. capital flows exhibit a substantial exogenous component. Insofar our analysis confirms earlier findings like Calvo et al. (1996, Kim (2000, or (Lipschitz et al. 2002). A country may experience a positive "confidence shock" and consequently become a major recipient of capital inflows. Capital inflow leads to a nominal appreciation if the country has a floating exchange rate and/or fuels a domestic boom that drives up domestic wages and prices. The net result, irrespective of exchange rate regime, is a real exchange rate appreciation or deteriorating international price competitiveness. The opposite may be a negative confidence shock that leads to a capital outflow, which over time improves competitiveness through lower wages and prices and/or a depreciating nominal exchange rate.
The finding that capital flows are likely to entail changes in competitiveness, while the reverse effect is subdued or non-existent, suggests that the Euro Plus Pact targets the messenger of economic imbalances rather than (one of) the underlying causes. Countries subject to large capital inflows experience upward pressure on relative unit labour costs, while countries with large capital outflows will experience downward pressure on relative unit labour costs. The Euro Plus Pact may thus have limited impact on the accumulation of imbalances that contribute to financial crises.

The results of this paper should not be taken to imply that price competitiveness does not matter for economic performance in the longer term. The argument is instead that price competitiveness is an endogenous variable, which is determined by a whole range of factors in the individual economy and the surrounding economic environment. One such factor is international capital flows, in the paper proxied by the current account balance, and this factor seems to have substantial predictive power. This would suggest that it is important to monitor the current account balance and possibly take remedying measures in cases where the current account balance developments are perceived to be unsustainable (Holinski et al. 2012, De Grauwe 2011).

The analysis in this paper provides rather clear results that are largely robust to different samples and specifications. Still, the analysis may be substantiated or extended in a number of ways. First, additional variables could be included in the VAR model in order to model the adjustment process in more detail. A richer specification of the VAR may also be a way to investigate the underlying economic mechanisms behind the observed pattern of causality. Second, quarterly data might make it easier to establish the direction of causality and estimate the adjustment patterns to different innovations. Third, it might be possible to ascertain the causality between external competitiveness and capital flows using other means of identification such as instrumentation and event studies. Fourth, it could be useful to divide capital flows into different components, including foreign direct investment, portfolio

investment and loans etc., as this would provide information on whether different components affect competitiveness in different ways (Bakardzhieva et al. 2010). Finally, it may be possible to undertake analyses of linkages between competitiveness and capital flows in individual countries in cases where long data series are available.

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Wyplosz, Charles (2011): "Why Angela Merkel's competitiveness pact is a bad idea, and what else she should do", Eurointelligence, 30 March, http://www.eurointelligence.com/. **ppendix A: Additional Granger causality tests**

Table A1: Panel data Granger causality tests. Dependent variable CA

	(A1.1)	(A1.2)	(A1.3)	(A1.4)	(A1.5)	(A1.6)
CA(-1)	0.614 (0.054)	0.880 (0.033)	0.709 (0.046)	0.808 (0.061)	0.772 (0.150)	0.780 (0.094)
CA(-2)	..	..	..	-0.321 (0.062)	-0.050 (0.149)	-0.432 (0.035)
GRULC(-1)	-0.000 (0.031)	0.024 (0.031)	0.023 (0.037)	0.018 (0.025)	-0.071 (0.081)	-0.008 (0.030)
GRULC(-2)	..	..	..	0.033 (0.030)	0.001 (0.054)	0.039 (0.037)
Granger causality[a]	0.00 [0.993]	0.57 [0.449]	0.40 [0.527]	0.69 [0.508]	0.39 [0.686]	0.07 [0.804]
Sample	1997-2011	1997-2011	1998-2011	1998-2011	1998-2011	1998-2011
Observations	381	381	381	356	163	128
Estimation	FE	OLS	System GMM	FE	FE	FE

[a] The null hypothesis of the Granger causality test is that the lagged value(s) of the independent explanatory variable do(es) not Granger cause the dependent variable. The test statistic is *F*-distributed except in the case of the System GMM estimation in which it is χ^2-distributed; the values in square brackets are *p*-values.

Notes: Standard errors are clustered along the cross section and are shown in round brackets. A constant term is included in all estimations but not reported.

Table A2: Panel data Granger causality tests. Dependent variable GRULC

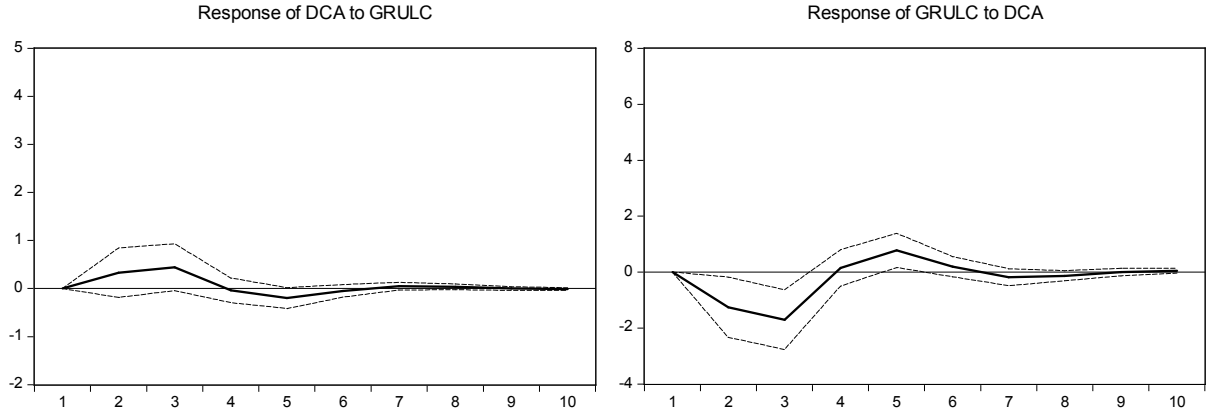
	(A2.1)	(A2.2)	(A2.3)	(A2.4)	(A2.5)	(A2.6)
CA(-1)	-0.236 (0.084)	-0.154 (0.041)	-0.208 (0.124)	-0.471 (0.112)	-0.175 (0.118)	-0.671 (0.121)
CA(-2)	..	..	..	0.202 (0.101)	0.198 (0.137)	0.136 (0.113)
GRULC(-1)	0.067 (0.055)	0.094 (0.029)	0.131 (0.068)	0.691 (0.048)	0.267 (0.098)	0.014 (0.055)
GRULC(-2)	..	..	..	-0.142 (0.046)	-0.087 (0.061)	-0.171 (0.062)
Granger causality[a]	7.94 [0.009]	14.46 [0.000]	2.82 [0.093]	9.41 [0.001]	1.15 [0.353]	17.37 [0.001]
Sample	1997-2011	1997-2011	1998-2011	1998-2011	1998-2011	1998-2011
Observations	381	381	381	356	163	128
Estimation	FE	OLS	System GMM	FE	FE	FE

[a] The null hypothesis of the Granger causality test is that the lagged value(s) of the independent explanatory variable do(es) not Granger cause the dependent variable. The test statistic is *F*-distributed except in the case of the System GMM estimation in which it is χ^2-distributed; the values in square brackets are *p*-values.

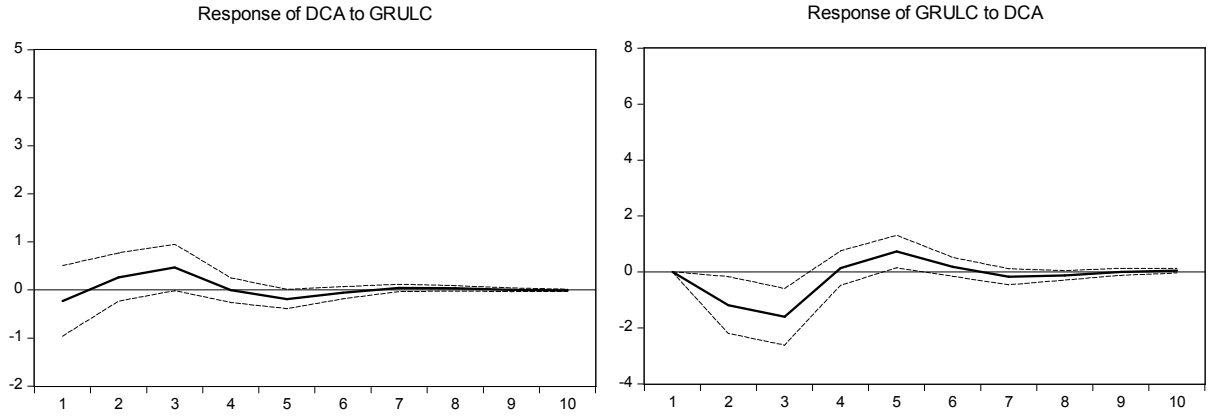
Notes: Standard errors are clustered along the cross section and are shown in round brackets. A constant term is included in all estimations but not reported.

Appendix B: Impulse responses for VAR model with CEE countries

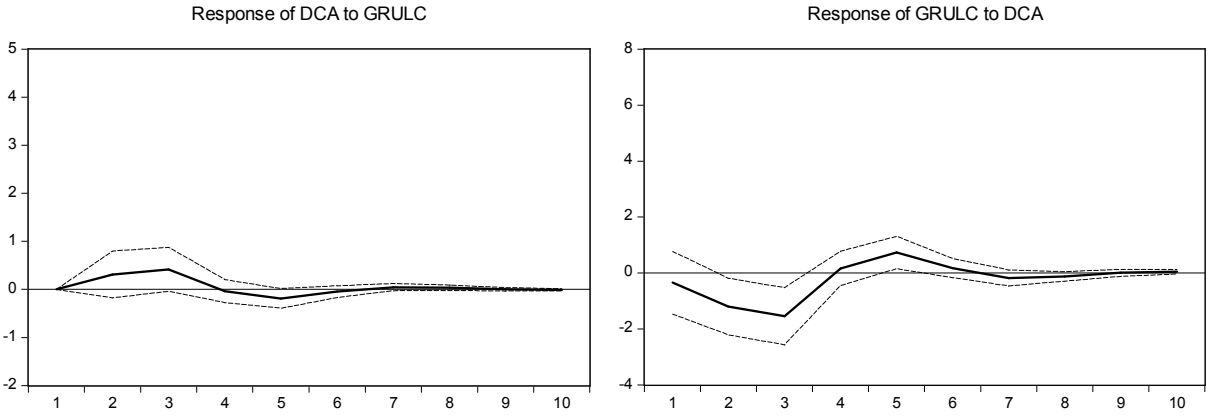
Figure B1: Response of DCA and GRULC to innovations in GRULC and DCA, CEE countries



(a) Non-factorised innovations



(b) Cholesky decomposition, only contemporary effects from GRULC to DCA

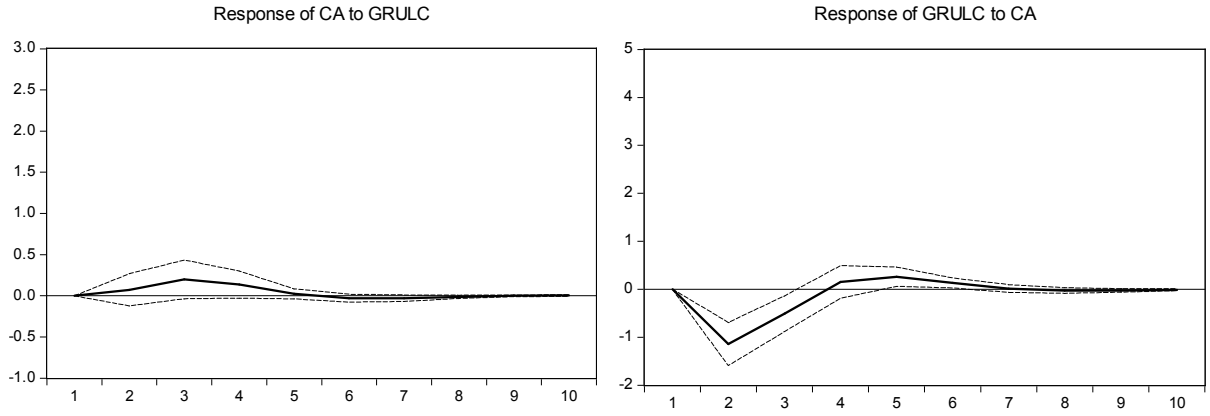


(c) Cholesky decomposition, only contemporary effects from DCA to GRULC

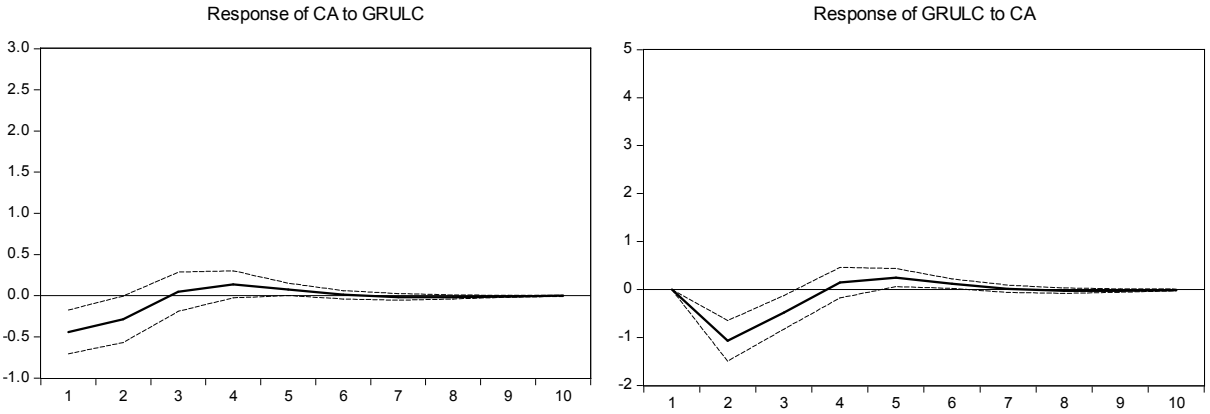
Notes: The solid line depicts the impulse response and the dashed lines the ± two standard deviations. The standard deviation of GRULC is 6.0 percentage points and the standard deviation of DCA is 3.9 percentage points.

Appendix C: Impulse responses for VAR model with CEE countries

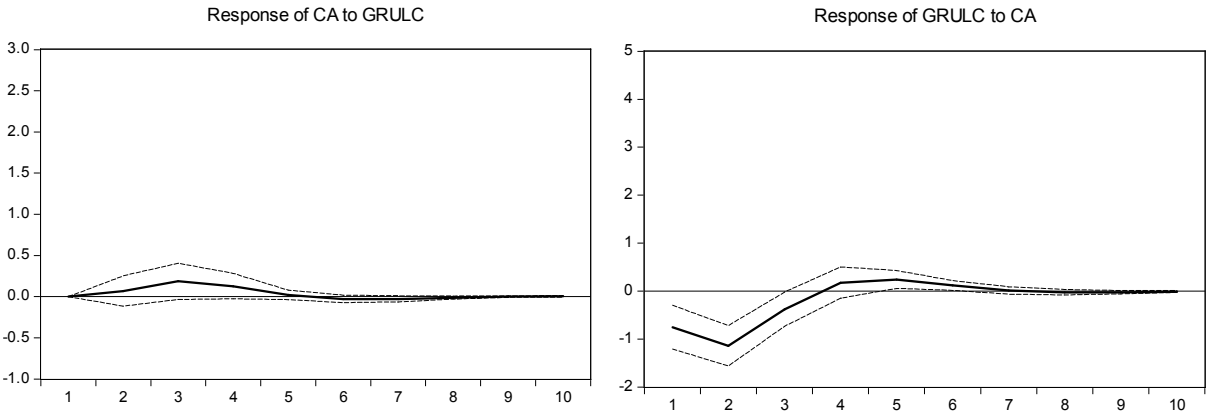
Figure C1: Response of CA and GRULC to innovations in GRULC and CA, all countries



(a) Non-factorised innovations



(b) Cholesky decomposition, only contemporary effects from GRULC to DCA



(c) Cholesky decomposition, only contemporary effects from CA to GRULC

Notes: The solid line depicts the impulse response and the dashed lines the ± two standard deviations. The standard deviation of GRULC is 6.0 percentage points and the standard deviation of DCA is 3.9 percentage points.