TRADE IMBALANCES WITHIN THE EURO AREA AND WITH RESPECT TO THE REST OF THE WORLD

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Abstract

Many studies have explored the determinants of current account balances in Europe. However, only in a few studies have trade imbalances been decomposed into intra balances, trade balances vis-à-vis the euro area, and extra balances, trade balances vis-à-vis the rest of the world. In this paper, we apply this decomposition and augment the previous studies of this type by including a larger set of theoretically plausible explanatory variables derived from the current account literature. We observe that, contrary to Schmitz and von Hagen (2011), the introduction of common currency has not increased the elasticity of trade flows to per capita incomes within the euro area for the member countries. In addition, this framework reveals that there is significant heterogeneity among the usual determinants of trade balances whether those contribute to intra balances or extra balances.

Keywords: Current account, Trade balance vis-à-vis the euro area, Trade balance vis-à-vis the rest of the world, European monetary union, Culture, Institutions

JEL classification: F21, F32, F33, F36, Z10

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1. Introduction

Despite the fact that the euro area as a whole has been in balance with the rest of the world, many euro area member countries have had substantial current account imbalances (see FIGURE 1). These imbalances have exhibited a tendency to grow following the adoption of the common currency in 1999.
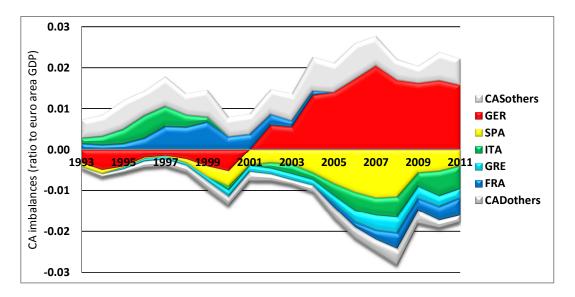

FIGURE 1 Current account imbalances in the euro area.[1]

However, graphs such as FIGURE 1 hide some important aspects of the development. First, in FIGURE 1 large countries dominate because imbalances are measured as ratios to euro area GDP. Second, we are unable to detect how these imbalances have been distributed between balances against the euro area and balances against the rest of the world (see FIGURES 2 and 3 or TABLE 1). In some cases, a country has had a positive intra balance but a negative extra balance, or vice versa. Examples of such countries during the 1999–2011 period are the Netherlands, Belgium-Luxembourg, Austria, Italy, France, Sweden and Denmark.

In our paper, we follow the distinction made in Schmitz and von Hagen (2011) and decompose trade balances into intra balances and extra balances. Intra balance measures the trade balance vis-à-vis the euro area, whereas extra balance measures

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[1] Current account surpluses of other countries are stacked to the CASothers component, and current account deficits of other countries are stacked to the CADothers component.

the trade balance vis-à-vis the rest of the world. Our analyzing framework provides interesting insights; in particular, we can detect whether the determinants are different for the two, which might help us understand why some countries have positive intra balances but negative extra balances or vice versa. Using data on the EU-15 countries from 1984 to 2011, we are able to see whether the relative importance of some variables changed for the euro area member countries after they adopted the euro.
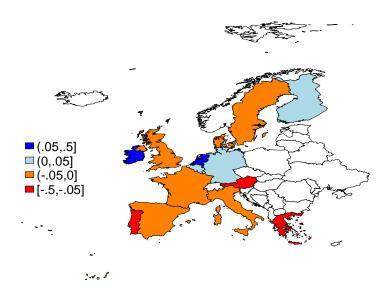

FIGURE 2 Intra balances for the EU-15 countries (ratio to GDP) during the period of 1999–2011.
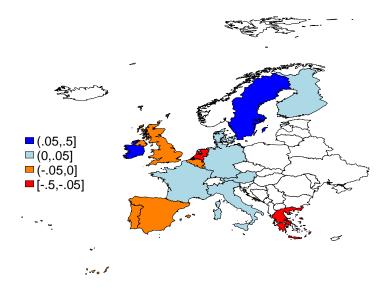

FIGURE 3 Extra balances for the EU-15 countries (ratio to GDP) during the period of 1999–2011.

Schmitz and von Hagen (2011, 1676) found that "with the introduction of the common currency the elasticity with respect to per-capita incomes of net capital flows within the euro area has increased for the members of the euro zone." However, they included only government budget balances and oil prices as additional explanatory variables. Our paper provides evidence that, if we include a set of explanatory variables that has become standard in the current account literature, this result largely disappears. In the 1980s, intertemporal optimizing models of trade and current account balances replaced the Keynesian non-optimizing models (Singh 2007). According to this intertemporal approach, a trade deficit is seen as a transfer of consumption opportunities over time (Singh 2007, 30 and Obstfeld and Rogoff 1996, 6).

Our set of explanatory variables is derived from the current account literature. Therefore, in Section 2 we summarize this literature. In Section 3, we describe our data more closely and explain the reasons we choose to use the Prais-Winsten estimation with panel corrected standard errors. We present our results in Section 4. Section 5 concludes the paper.

2. Current account imbalances in the euro area

2.1. Empirical literature on current accounts

Chinn and Prasad (2003) explored the medium-term determinants of current account balances using data on 18 industrial and 71 developing countries over the period of 1971–1995. The following set of economic fundamentals turned out to be statistically significant (the theoretical framework and a prediction of the sign are in parenthesis): government budget balances (Ricardian equivalence (no effect) / twin deficit hypothesis (positive)), relative income (neoclassical growth model (positive)), dependency ratios (life-cycle hypothesis (negative)), terms of trade volatility (linear-quadratic utility function and certainty equivalence principle (no effect) / precautionary saving (positive)), financial deepening, and net foreign assets. Chinn and Ito (2007) and Gruber and Kamin (2007) included institutional variables to account for heterogeneity in the domestic financial markets and the quality of government insti-

tutions because investors are more willing to invest in countries that are highly developed in these respects.

There is a strand of literature that follows Chinn and Prasad (2003) in methodology but tries to uncover the special features of the euro area with respect to current account dynamics. Slavov (2009) used data on 39 different episodes of common currency agreements between 1976 and 2005. He found that common currency participants had larger current account imbalances.[2] Further, in a monetary union, the current accounts of the member countries become more sensitive to the economic fundamentals, including relative income. (Slavov 2009.) Hillmann and Wilde (2011) estimated a monetary policy reaction function for the aggregate euro area and used the obtained reaction coefficients together with country-level data on output and inflation to find the Taylor rule deviations for all member countries. They observed that Taylor rule deviations were one of the strongest determinants of current account balances for the euro member countries from 1999 to 2009. (Hillmann and Wilde 2011.) Schnabl and Wollmershäuser (2013) stressed the role of diverging fiscal stances for the current account imbalances among the EU-15 countries. According to Jaumotte and Sodsriwiboon (2010), the Southern euro area countries have had current account deficits far beyond what can be explained by the IMF's macroeconomic balance (MB) approach or external sustainability (ES) approach (see also International Monetary Fund (2006)). Barnes, Lawson and Radziwill (2010) came very close by pointing out that the predictive power of standard models to explain the imbalances in the euro area has become weaker (see also Ca' Zorzi, Chudik, and Dieppe (2012)).

2.2. A catching-up process or diverging competitiveness?

By using a simple intertemporal model, Blanchard and Giavazzi (2002) show that for a converging country the recommended level of current account deficit increases with the expected output growth (relative to others) and with the elasticity of substitution between domestic and foreign goods and decreases with the wedge between

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[2] Berger and Nitsch (2010) used bilateral trade data on 18 European countries from 1948 to 2008. They observed that, as a result of introduction of the euro, the trade imbalances among the euro area members widened and became more persistent.

the domestic interest rate and foreign interest rate. The single European market, goods market integration, has increased the elasticity of substitution, and the monetary union has decreased the wedge within the euro area. In addition, as financial integration reduces the costs to finance investments, investments and the expected future output will increase. Hence, it has become optimal for the poorer countries to run larger deficits. They provide evidence that for the euro area, the relation between the current account balance and income per capita was much stronger during the 1994–2000 period than during the 1985–1993 period. When they shift from the OECD countries to the European Union member countries and finally to the euro area member countries, they observe that the correlation between savings and investments, the Feldstein-Horioka puzzle, largely disappear with the increased integration.[3] (Blanchard and Giavazzi 2002.)

Schmitz and von Hagen (2011) empirically test whether, among the EU-15 countries, the net capital flows follow differences in per capita incomes. They distinguish between trade balances against euro area and the rest of the world. Their main finding is that the net capital flows follow differences in per capita incomes and that, as a result of introduction of the euro, this elasticity increased but only concerning the trade flows inside the euro area. They interpret this as evidence of deepened financial market integration in the euro area and conclude that the widening of current account balances within the euro area should be considered a sign "of the proper functioning of the euro area rather than a sign of improper macroeconomic adjustment". (Schmitz and von Hagen 2011.)

Giavazzi and Spaventa (2010) note that in contrast to Blanchard and Giavazzi's (2002) model, foreign borrowing is not necessarily devoted to the production of tradable goods. If a country is borrowing to finance the production of nontradables, it might be unsuccessful in generating the required trade surpluses in the future. Giavazzi and Spaventa note that fast economic growth in Ireland and Spain resulted mainly from a construction boom that was accompanied by a large expansion of domestic credit. Foreign capital financed the excess of consumption and budget defi-

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[3] See Feldstein and Horioka (1980).

cits in Greece, whereas Portugal lagged further behind other euro area countries with respect to GDP per capita. They argue that these events are not in line with the typical convergence pattern. (Giavazzi and Spaventa 2010.)

Arghyrou and Chortareas (2008) explore the role of real exchange rates in current account determination for the euro member countries. They observe that the real exchange rate enters the cointegrating vector with a nonzero coefficient for most of the countries. For Italy and Finland, the absolute value of the coefficient of the real exchange rate is larger than those of domestic national income and foreign income. Consequently, the competitiveness losses, or gains, have, in some cases, been important for the current account imbalances. (Arghyrou and Chortareas 2008.) By using data for 11 euro countries from 1982 to 2011 and applying the pooled mean group estimator, Belke and Dreger (2013) attempt to examine the relative importance of catching up and competitiveness for the current accounts. Both of these components are statistically significant with correct signs, but a one percent decrease in competitiveness relative to the euro area average has a larger deteriorating effect on the current account balance than a one percent increase in real per capita income relative to the average. If the sample is from 1991 onwards, competitiveness remains statistically significant, but the catching-up component becomes insignificant. For the deficit countries, Greece, Portugal and Spain, the catching-up component is statistically insignificant or even negative, whereas the real exchange rate is the main determinant for explaining current account deficits. For the surplus countries, competitiveness has not been important, which implies that an asymmetric response would be needed to reduce the imbalances within the euro area. (Belke and Dreger 2013.)

Chen, Milesi-Ferretti, and Tressel (2013) make an important observation by saying that the explanations for euro area current account imbalances highlighted above, namely, the catching-up process and diverging competitiveness, rely on intra-euro area factors. However, the euro area as a whole is an open economy; therefore, trade and financial linkages between the euro area and the rest of the world are also important. They detect the following pattern: Debtor countries, namely, Greece, Ireland, Italy, Portugal, and Spain, experienced real appreciation, but this largely resulted

from the strengthening of the euro.[4] Greece, Portugal and Spain had a trade deficit not only against the eurozone but also against the rest of the world. The investors outside the euro area primarily invested in core euro area countries such as Germany and France, whereas private capital flows from the core countries financed the deficits in the GIIPS countries. Consequently, they put forth a hypothesis that external shocks might have had an asymmetric impact on the export performance of Germany and GIIPS countries. They find evidence that there were differences on how the rise of China, higher oil prices, and the integration of Central and Eastern European countries affected the trade performance of GIIPS countries compared to Germany. (Chen, Milesi-Ferretti, and Tressel 2013.) Sinn and Wollmershäuser (2012) emphasize the role of Target balances for the deficit countries to sustain their large current account deficits during the euro crisis. At the time of the financial crisis, the direction of private capital flows changed, and deficit countries financed large parts of their current account deficits with the printing press. (Sinn and Wollmershäuser 2012.) Eurosystem liquidity support has made the external adjustment smoother (Cour-Thimann 2013, 23).

2.3. Lucas paradox

The simple neoclassical growth model predicts that capital will flow from rich capital-abundant countries to poor capital-scarce countries because the marginal product of capital is positive but strictly decreasing in the stock of capital. In the world economy, we have observed just the opposite: China and other developing countries together with the OPEC countries have financed the United States' current account deficit. This contradiction is the so-called Lucas paradox. Lucas (1990) himself proposed four candidate answers to this paradox: differences in human capital, external benefits of human capital (learning-by-doing), capital market imperfections, and the legacy of European colonialism (the optimal policy for an imperialist was to retard capital flows to a colony to keep wage levels there as low as possible).[5]

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[4] Greece, Ireland, Italy, Portugal and Spain are commonly called as GIIPS countries.
[5] Heterogeneity in domestic financial markets and/or government institutions are widely considered good explanations for the direction of net international capital flows (see, e.g., Gertler

Schnabl and Freitag (2012) remind us that a large number of developing countries have pegged their currencies more or less to the US dollar. By contrast, a large number of European countries have pegged their currencies to the euro. Schnabl and Freitag use the concepts of a dollar bloc and euro bloc, which they define in the following way: In the dollar bloc, the U.S. serves as the center country, and East Asia, the Middle East, Latin America, and the Commonwealth of the Independent States are considered the periphery. In the euro bloc, Germany is the center country, and emerging Europe and industrialized Europe are considered the periphery. With regard to the Lucas paradox, they detect an interesting distinction between the two blocks. In the euro bloc, capital flows from the rich center country, Germany, to the poorer periphery. The fact that the dollar periphery countries have a higher degree of freedom in managing international capital flows and doing non-market-based interventions than the euro periphery countries might explain this difference. They find evidence that a decrease in the U.S. interest rate, an increase in the U.S. government deficit, sterilization in the dollar periphery, and an increase in the reserves of the dollar periphery all have an enhancing effect on the current account balance of East Asia. By contrast, a decrease in the German interest rate, an increase in the German government deficit, and an increase in the reserves of the euro periphery all have a deteriorating effect on the current account balance of emerging Europe. (Schnabl and Freitag 2012.)

2.4.   One currency, two ways of living

Although all of the EU-15 countries can be considered developed economies, large cultural differences exist between the countries. Holinski, Kool, and Muysken (2012) claim that fundamental economic factors cannot explain the combination of no convergence in per capita incomes and persistent imbalances within the euro area between the South and the North. They call for a recognition of cross-country differences in time preference, planning horizon, and risk aversion as a way to proceed. (Holinski, Kool, and Muysken 2012.) De Castro Campos, Kool, and Muysken (2013)

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and Rogoff (1990), Mendoza, Quadrini, and Ríos-Rull (2009), Gourinchas and Jeanne (2013), Alfaro, Kalemli-Özcan, and Volosovych (2008)).

provide evidence that indicators of thrift, trust and religiosity from the World Values Survey / European Values Study help to explain cross-country heterogeneity in private saving.

In the economic growth literature, there has been a debate on whether formal economic institutions or culture are more important for economic development (see, e.g., Acemoglu (2009, 122–136), Acemoglu and Robinson (2012, 56–63), Weil (2009, 407–436), Landes (1999, 516), Tabellini (2010), and Greif (1994)). It might also be the case that differences in institutional quality result from differences in culture. Maseland (2013) notes that proving this would be difficult not only because of endogeneity problems but also because it is difficult to isolate one from the other. Maseland himself uses Toxoplasma gondii as an instrumental variable for certain aspects of culture because this infection tends to change an individual's personality but its prevalence rate is not related to any aspect of economic development. First, toxoplasma seroprevalence has a strong negative effect on cultural indicator (the first principal component of Hofstede's power distance, individualism, and uncertainty avoidance and World Values Survey's distrust).[6] Second, culture has a strong positive effect, instrumented by toxoplasma seroprevalence, on institutional quality (the first principal component of the quality of political institutions, governance and rule of law.) (Maseland 2013.)

Gorodnichenko and Roland (2010) build a Schumpeterian growth model with some new flavors: collectivist cultures are more efficient in combining (existing) intermediate inputs, individualist entrepreneurs obtain higher utility from producing intermediate goods of higher than average quality, and the government acts in a predatory way by expropriating the profits from innovations. They are able to prove that the ratio of labor devoted to research increases with the level of individualism, decreases with the strength of the predatory government institutions and is independent of the collectivist culture's competitive edge in the production of final goods. Thus, although collectivism generates static efficiency gains, it has no effect on economic growth, which is largely determined by innovations. Using genetic distance to

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[6] Power distance, uncertainty avoidance and distrust loaded negatively whereas individualism positively.

population in the US as an instrumental variable, Gorodnichenko and Roland also provide empirical evidence that individualistic culture has a strong causal effect on economic development. (Gorodnichenko and Roland 2010.)

3.   Data and empirical methodology

Our sample consists of EU-15 countries, but because Belgium and Luxembourg are aggregated, we actually have 14 countries.[7] The sample covers the period from 1984 to 2011. Neither the countries that adopted the euro after 2001 nor the countries that joined the EU after 1995 are included into our sample. There are three reasons for this: First, these countries would differ substantially from the EU-15 countries. Second, those countries that adopted the euro after 2001, namely, Slovenia in 2007, Cyprus and Malta in 2008, Slovakia in 2009, and Estonia in 2011, have only a brief experience with the common currency. Third, we want to follow Schmitz and von Hagen (2011) as closely as possible.

The correlation between trade balances (excluding services) and current account balances is strong: 0.59 when Ireland is included and 0.81 when it is excluded.[8] Hence, the current account literature is a good starting point for finding the main determinants of trade balances as well. The evolution of our dependent variables, intra balances and extra balances, are presented in TABLE 1. Neither intra balance nor extra balance includes services.

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[7] Belgium and Luxembourg are aggregated because, before 1997, there are no numbers for these countries separately in the IMS's Direction of Trade Statistics. Consequently, with regard to our dependent variables, Intra balance and Extra balance, and Target balance, we use aggregated numbers for Belgium-Luxembourg. With regard to other explanatory variables, we use values of Belgium because the relative size of Luxembourg is so small. (Between 1984–2011 GDP of Luxembourg was only 7.6% of the of Belgium.)

[8] The numbers for the current account balances were taken from WDI and WEO. For Belgium-Luxembourg, we used Belgium's numbers.

TABLE 1 Intra balances and extra balances (ratio to GDP) for the EU-15 countries during the period of 1984–2011.

Country		1984	1993	2002	2011
Austria	(Intra balance)	-0.055	-0.038	-0.031	-0.068
	(Extra balance)	-0.003	-0.006	0.033	0.028
Bel-Lux		-0.020	0.039	0.027	0.015
		-0.021	-0.006	0.021	-0.023
Denmark		-0.030	0.015	-0.002	-0.004
		0.018	0.031	0.045	0.042
Finland		-0.006	0.018	0.027	-0.024
		0.027	0.042	0.058	0.000
France		-0.012	0.002	-0.016	-0.041
		-0.001	0.009	0.018	-0.001
Germany		0.013	0.009	0.028	0.007
		0.013	0.009	0.032	0.035
Greece		-0.042	-0.053	-0.075	-0.053
		-0.059	-0.055	-0.069	-0.048
Ireland		0.060	0.144	0.188	0.149
		-0.061	0.006	0.106	0.101
Italy		-0.010	0.007	-0.008	-0.010
		-0.016	0.014	0.014	0.005
Netherlands		0.094	0.077	0.142	0.244
		-0.068	-0.031	-0.086	-0.171
Portugal		-0.018	-0.063	-0.074	-0.066
		-0.093	-0.033	-0.023	-0.025
Spain		0.011	-0.014	-0.028	-0.008
		-0.042	-0.024	-0.025	-0.040
Sweden		0.000	0.008	-0.001	-0.022
		0.022	0.029	0.063	0.026
UK		-0.014	-0.007	-0.007	-0.022
		-0.010	-0.018	-0.029	-0.050

From TABLE 2, one can see the trade weights of intra trade separately for exports and imports. Typically, for the EU-15 countries, intra trade has accounted for approximately half of their trade.

TABLE 2 Share of intra trade of total trade (excluding services) for the EU-15 countries during the period of 1984–2011.[a]

Country		1984	1993	2002	2011
Austria	(Exports)	0.506	0.606	0.546	0.504
	(Imports)	0.594	0.650	0.632	0.610
Belgium				0.609	0.606
				0.611	0.575
Denmark		0.346	0.460	0.433	0.384
		0.435	0.489	0.506	0.448
Finland		0.235	0.343	0.327	0.289
		0.281	0.354	0.330	0.342
France		0.434	0.489	0.491	0.482
		0.466	0.514	0.565	0.563
Germany		0.456	0.453	0.426	0.403
		0.450	0.448	0.415	0.432
Greece		0.494	0.541	0.304	0.280
		0.461	0.513	0.457	0.398
Ireland		0.359	0.402	0.383	0.402
		0.238	0.205	0.203	0.240
Italy		0.427	0.490	0.445	0.409
		0.423	0.513	0.499	0.443
Netherlands		0.638	0.634	0.631	0.619
		0.472	0.496	0.418	0.339
Portugal		0.473	0.641	0.666	0.636
		0.367	0.647	0.698	0.660
Spain		0.425	0.603	0.582	0.535
		0.286	0.547	0.569	0.465
Sweden		0.412	0.454	0.394	0.388
		0.448	0.499	0.489	0.463
UK		0.468	0.485	0.525	0.463
		0.480	0.460	0.468	0.418

[a] Intra trade is defined in the same fashion as intra balance. Consequently, partner countries include Austria, Belgium-Luxembourg, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, and Spain.

Descriptive statistics for the sample are provided in TABLE 3. For measuring the potential cultural differences among the EU-15 countries, we use Hofstede's (2001) dimensions of national culture. Hofstede's uncertainty avoidance index and individualism versus collectivism index measure the following:

> My basic proposition, supported in the present chapter with a wealth of research data, is that on the national cultural level, tendencies towards prejudice, rigidity and dogmatism, intolerance of different opinions, traditionalism, superstition, racism, and ethnocentrism all relate to a norm for intolerance of ambiguity that I have measured and expressed in a national Uncertainty Avoidance Index. … Individualism stands for a society in which the ties between individuals are loose: Everyone is expected to look after him/herself and her/his immediate family only. Collectivism stands for a society in which people from birth onwards are integrated into strong, cohesive in-groups, which throughout people's lifetime continue to protect them in exchange for unquestioning loyalty. (Hofstede 2001, 146, 225)

TABLE 3 Descriptive statistics of the sample.

Variable	Units	Mean	Min	Max	St. dev.	share of over time variance
Intra balance	ratio to GDP	0.004	-0.108	0.244	0.063	0.138
Extra balance	ratio to GDP	-0.004	-0.171	0.124	0.043	0.289
GDP per capita	in tens of thousands of euros	2.103	0.322	4.318	0.884	0.662
Fiscal balance	ratio to GDP	-0.034	-0.309	0.070	0.042	0.704
Oil price	euros/barrel*0.01	0.291	0.114	0.807	0.185	1.000
Dependency ratio (aged)		0.232	0.162	0.319	0.032	0.496
Dependency ratio (child)		0.271	0.202	0.495	0.045	0.445
Domestic credit by banks	ratio to GDP	1.138	0.482	2.344	0.403	0.824
Bureaucracy quality	index, scaled from 0 to 4	3.640	1.750	4.000	0.551	0.215
Real interest rate	percentages multiplied by 0.01	0.029	-0.051	0.123	0.028	0.966
Change in NULC[a]	change in the index value (2005=100 for all countries)	0.003	-0.182	0.217	0.043	0.984
Change in RULC[b]	change in the index value (2005=100 for all countries)	-0.000	-0.089	0.085	0.018	0.980
Hofstede's uncertainty avoidance	index (original numbers were multiplied by 0.01)	0.661	0.230	1.120	0.276	0.000
Hofstede's individualism	Index (original numbers were multiplied by 0.01)	0.646	0.270	0.890	0.166	0.000
Change in Target balances	ratio to GDP	-0.003	-0.586	0.244	0.046	0.953

[a] NULC: nominal unit labor costs
[b] RULC: real unit labor costs

Even though we are using annual data, both the intra balance and extra balance vary more across countries than within countries over time. Therefore, it is not meaningful to use a within estimator. Beck and Katz (1995) provide evidence that the Parks-Kmenta method, FGLS for panel models accounting for heteroskedasticity, cross-correlation, and serial correlation of the residuals, is overconfident, for example, when N=15 and T=30. For these reasons, we use the Prais-Winsten estimation with panel-corrected standard errors, which allows residuals to be contemporaneously correlated across panels. This is crucial in our context when we are estimating Intra balances. Within the euro area, the economies are closely linked, and the surplus of one country is always the deficit of another country. In addition to contemporaneous correlation, our standard errors allow for panel-level heterogeneity and a common AR(1) autocorrelation structure. Schmitz and von Hagen (2011) used the Prais-Winsten estimator with panel-corrected standard errors. We do not include period

dummies in our model because these cannot be identified when we are including Oil price, which is assumed to be the same for all countries. Consequently, our regression model has the following very simple form:

$$balance_{it} = \alpha + x'_{it}\beta + \varepsilon_{it}, \tag{1}$$

where balance$_{it}$ is either the intra balance (ratio to GDP) excluding services or the extra balance (ratio to GDP) excluding services for country i in period t, α is a constant (common for all countries), x_{it} is a column vector including all explanatory variables for country i in period t, β is a column vector including all estimated coefficients (common for all countries) and ε_{it} is an error term.

Based on our discussion in Sections 2.1 and 2.2, we include the real interest rate and changes in unit labor costs into our model. We include the real interest rate instead of Taylor rule deviations because it would be very difficult to derive monetary policy reaction functions for the euro member countries from 1984 onwards.

In FIGURE 4, we graphically represent how relative unit labor costs have developed when country-specific averages during the 1981–2011 period are set as 100.[9] One can create misleading figures by forcing all countries to have a value of 100 at some arbitrary year. During the euro era, Germany has gained competitiveness, whereas for Portugal, real unit labor costs were high before the euro crisis. However, there is not clear dichotomy between surplus countries and deficit countries in real unit labor costs. For example, Finland has been steadily losing its competitiveness. However, recently, Finland's overall trade balance went into a deficit, as expected based on its rising relative real unit labor costs.

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[9] During the period of 1999–2011, Greece (161% of GDP), Portugal (120% of GDP), and Spain (66% of GDP) were the Southern euro area countries that accumulated the largest trade deficits, whereas the Netherlands (62% of GDP), Germany (58% of GDP), and Finland (33% of GDP) were the Northern euro area countries that accumulated the largest trade surpluses. Thus, these countries are selected for FIGURE 4.
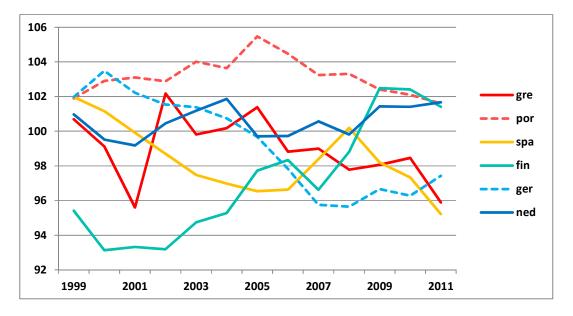
FIGURE 4 Relative real unit labor costs (1981–2011 average = 100) during the period of 1999–2011.

4.   Empirical findings

In our empirical analysis, we take Schmitz and von Hagen (2011) as a starting point. We augment their model by dependency ratios, variables measuring institutional quality, real interest rate, and variables measuring changes in competitiveness. In the last phase, we add variables measuring the dimensions of national culture developed by Hofstede (2001). We include the following dummy variables: EMU, which equals one if the country has adopted the euro and zero otherwise; DKSEUK, which equals one for Denmark, Sweden, and the UK throughout the sample period; and Non-EMU, which equals one if the country has not adopted the euro after the euro was introduced and zero otherwise. Thus, we allow Sweden, Denmark, and the UK to differ from the EMU member countries even before the introduction of the common currency in some respects that our variables fail to measure. By including an interaction term between the EMU dummy variable and GDP per capita, we can detect if the introduction of the euro somehow changed the sensitivity of trade balances on differences in per capita incomes. Chen, Milesi-Ferretti, and Tressel (2013) criticized previous studies for concentrating on intra-euro area factors. In our case, this is what we desire because we are trying to understand trade imbalances within the euro area.

4.1. Panel regressions

In model (1), we are able to replicate the main results of Schmitz and von Hagen (2011): GDP per capita contributes positively to intra balances, and the introduction of common currency increased the elasticity of trade flows to per capita incomes within the euro area for the member countries.[10] However, if we include dependency ratios in our model, the latter disappears (see model (2)). The aged dependency ratio has a negative effect on intra balances, whereas the child dependency ratio has a positive effect. Neither of these contribute to the extra balances. This result remains robust throughout the different specifications. In model (3), we include variables measuring institutional quality. The private credit ratio (domestic credit by banks) is our proxy for the state of the domestic banking sector. Bureaucracy quality measures the quality of government institutions. Within the euro area, capital tends to flow from the highly developed countries to the less developed countries. By contrast, domestic credit by banks contributes negatively to extra balances. In the current account literature, usually both the state of domestic financial markets and the quality of government institutions contribute negatively to current account balances. This finding is very interesting and indicates that in this respect, the euro area differs from the world economy as a whole.

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[10] In TABLE A. 5, we use the period of 1981–2005 and fixed effect panel estimator in addition to the Prais-Winsten estimator just like in Schmitz and von Hagen (2011), and we are able to replicate their results.

TABLE 4 Regression results for trade balances and per capita incomes in Europe 1984–2011.

Variables:	Dependent variable: Intra balance			Dependent variable: Extra balance		
	(1)	(2)	(3)	(1)	(2)	(3)
EMU	-0.072***	0.011	0.002	-0.006	-0.009	-0.003
	(0.026)	(0.016)	(0.016)	(0.013)	(0.014)	(0.014)
DKSEUK	0.021	0.051***	0.036**	0.032**	0.030**	0.023
	(0.013)	(0.016)	(0.017)	(0.014)	(0.015)	(0.016)
Non-EMU	-0.032	0.000	-0.003	-0.007	-0.009	-0.004
	(0.023)	(0.015)	(0.014)	(0.018)	(0.019)	(0.019)
GDP per capita	0.019***	0.036***	0.030***	0.019***	0.017***	0.020***
	(0.007)	(0.007)	(0.007)	(0.005)	(0.006)	(0.006)
GDP per capita*EMU	0.028**	-0.006	-0.001	0.002	0.004	0.002
	(0.012)	(0.008)	(0.007)	(0.006)	(0.007)	(0.007)
GDP per capita*DKSEUK	-0.020***	-0.032***	-0.029***	-0.008	-0.007	-0.005
	(0.007)	(0.007)	(0.007)	(0.006)	(0.006)	(0.007)
GDP per capita*Non-EMU	0.012	0.001	0.002	0.005	0.005	0.003
	(0.009)	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)
Fiscal balance	-0.010	-0.040	-0.020	-0.038	-0.038	-0.069*
	(0.057)	(0.042)	(0.043)	(0.039)	(0.040)	(0.041)
Oil price	-0.030**	-0.001	-0.005	-0.051***	-0.051***	-0.045***
	(0.012)	(0.009)	(0.009)	(0.009)	(0.010)	(0.010)
Dependency ratio (aged)		-0.552***	-0.509***		-0.003	0.012
		(0.162)	(0.155)		(0.123)	(0.124)
Dependency ratio (child)		0.358***	0.412***		-0.044	-0.056
		(0.135)	(0.123)		(0.107)	(0.104)
Domestic credit by banks			0.018***			-0.019***
			(0.006)			(0.006)
Bureaucracy quality			0.017***			0.005
			(0.004)			(0.004)
R²	0.144	0.174	0.264	0.156	0.157	0.188
Observations	387	387	387	387	387	387

In addition, all regressions include a constant. Notes: Estimation was performed using the Prais-Winsten estimator with panel-corrected standard errors (panel-level heteroskedastic and correlated across panels, common AR(1) autocorrelation structure, which is estimated from the autocorrelation of residuals (*xtpcse* command in STATA with *correlation(ar1)* and *rhotype(tscorr)* options)). Panel-corrected standard errors are in parenthesis. *, ** and *** denote statistical significance at the 10, 5 and 1 percent levels.

In TABLE 5, we include the real interest rate, nominal unit labor costs and real unit labor costs in our model one by one. We expect a low real interest rate to have a deteriorating effect on trade balances because a low real interest rate can reflect a loose monetary policy. However, in model (4), we observe just the opposite. The explanatory power of our model increases dramatically when we include unit labor costs (models 5 and 6). Unit labor costs are measured at the total economy level and relative to the rest of EU-15 countries (see TABLE A. 1). Both the nominal and real unit labor costs have the expected sign: if a country loses its price competitiveness relative to EU-15 countries, its intra surplus (deficit) tends to decrease (increase). We will choose to use real unit labor costs because it seems to capture the aspects of competi-

tiveness that are important for the intra balance better than nominal unit labor costs.[11] Actually, it might be more appropriate to use unit labor costs in the manufacturing sector, but due to there not being a long enough time series for other competitiveness indicators, we used unit labor costs at the total economy level. Ca' Zorzi and Schnatz (2007) provide evidence that there is not much difference between the alternative cost and price competitiveness indicators in explaining or predicting extra-euro area export volumes. When extra balance is the dependent variable, neither the real interest rate nor competitiveness indicators are statistically significant.

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[11] In the literature, there is no consensus about the preferable competitiveness indicator.

TABLE 5 Regression results for trade balances and per capita incomes in Europe 1984–2011 (including the real interest rate channel or competitiveness channel).

Variables:	Dependent variable: Intra balance			Dependent variable: Extra balance		
	(4)	(5)	(6)	(4)	(5)	(6)
EMU	-0.000	0.004	0.001	-0.004	-0.001	-0.003
	(0.016)	(0.015)	(0.015)	(0.014)	(0.015)	(0.014)
DKSEUK	0.034**	0.035**	0.040***	0.022	0.020	0.023
	(0.016)	(0.016)	(0.015)	(0.016)	(0.016)	(0.016)
Non-EMU	-0.001	0.001	0.001	-0.003	-0.002	-0.003
	(0.014)	(0.014)	(0.015)	(0.019)	(0.020)	(0.020)
GDP per capita	0.029***	0.034***	0.035***	0.019***	0.022***	0.021***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
GDP per capita*EMU	-0.001	-0.003	-0.001	0.002	0.000	0.001
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
GDP per capita*DKSEUK	-0.027***	-0.028***	-0.030***	-0.004	-0.004	-0.005
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
GDP per capita*Non-EMU	0.001	-0.000	-0.001	0.003	0.002	0.003
	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)
Fiscal balance	-0.016	-0.021	-0.017	-0.068*	-0.071*	-0.070*
	(0.042)	(0.043)	(0.044)	(0.041)	(0.041)	(0.041)
Oil price	-0.002	-0.007	-0.009	-0.044***	-0.045***	-0.045***
	(0.009)	(0.009)	(0.009)	(0.010)	(0.010)	(0.010)
Dependency ratio (aged)	-0.540***	-0.550***	-0.566***	0.004	0.006	0.012
	(0.150)	(0.144)	(0.138)	(0.124)	(0.123)	(0.122)
Dependency ratio (child)	0.412***	0.438***	0.439***	-0.058	-0.051	-0.054
	(0.119)	(0.112)	(0.106)	(0.104)	(0.103)	(0.102)
Domestic credit by banks	0.018***	0.017***	0.018***	-0.020***	-0.021***	-0.020***
	(0.006)	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)
Bureaucracy quality	0.019***	0.018***	0.018***	0.005	0.005	0.005
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Real inteerest rate	-0.090**			-0.039		
	(0.040)			(0.042)		
Change in NULC		-0.028**			-0.022	
		(0.013)			(0.014)	
Change in RULC			-0.099***			-0.029
			(0.038)			(0.039)
R²	0.290	0.325	0.366	0.190	0.195	0.194
Observations	387	387	387	387	387	387

In addition, all regressions include a constant. Notes: Estimation was performed using the Prais-Winsten estimator with panel-corrected standard errors (panel-level heteroskedastic and correlated across panels, common AR(1) autocorrelation structure, which is estimated from the autocorrelation of residuals (*xtpcse* command in STATA with *correlation(ar1)* and *rhotype(tscorr)* options)). Panel-corrected standard errors are in parenthesis. *, ** and *** denote statistical significance at the 10, 5 and 1 percent levels.

In TABLE 6, we present the models that we prefer. In model (7), we have included all variables (real unit labor costs instead of nominal unit labor costs). These variables are derived from the current account literature (Section 2.1) and studies that stress the importance of competitiveness for trade balances (Section 2.2). Overall, our model is more capable of explaining intra balances than extra balances, which is understandable because our analysis relies mainly on intra-euro area factors. We write out interpretations for the regression coefficients that, according to model (7), differ

statistically significantly from zero: Denmark, Sweden and the UK have, on average, 4% (of GDP) larger (smaller) intra surpluses (deficits) than the other EU-15 countries. If a country has a GDP per capita that is 10,000 euros larger, our model predicts that its intra surplus (deficit) is 3% (of GDP) larger (smaller). However, for Denmark, Sweden, and the UK, this effect is smaller, on average, only 1% (of GDP). If the aged dependency ratio increases by 0.1, a country tends to have a 6% (of GDP) smaller (larger) intra surplus (deficit). By contrast, if the child dependency ratio increases by 0.1, a country tends to have a 4% (of GDP) larger (smaller) intra surplus (deficit). If a country has a 10% higher private credit ratio, its extra deficit (surplus) tends to be 0.2% (of GDP) larger (smaller). For the intra balances, it is just the opposite. This result is interesting and in line with both Schnabl and Freitag's (2012) and Chen, Milesi-Ferretti, and Tressel's (2013) observations concerning the direction of net capital flows inside the "euro bloc". In addition, bureaucracy quality has a positive effect on intra balances: if the index increases by one standard deviation, a country tends to have a 1% (of GDP) larger (smaller) intra surplus (deficit). If a country experiences a 10% increase in real unit labor costs relative to the other EU-15 countries, its intra balance will deteriorate by 1% (of GDP). If oil prices increase by 10 euros (per barrel), EU-15 countries will experience, on average, a 0.5% (of GDP) decrease in their extra balances. It is strange that the government budget balance has a negative coefficient in the extra balance regression. However, this result is not robust for the different specifications.

In models (8) and (9), we provide preliminary empirical evidence that some dimensions of national culture are related to trade balances.[12] In model (8), we include Hofstede's (2001) uncertainty avoidance index. Countries that have high uncertainty avoidance tend to have negative intra and extra balances. However, some of the results of model (8) are most likely skewed by the high negative correlation (-0.71) between uncertainty avoidance and the DKSEUK-dummy variable. Consequently, in model (9), we include Hofstede's (2001) individualism versus collectiv-

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[12] We tested other cultural dimensions by Hofstede (2001), but uncertainty avoidance and individualism were much more strongly related to intra balances than masculinity and power distance.

ism index. According to Gorodnichenko and Roland (2011), this cultural variable influences economic performance more robustly than other variables.[13] If a country has an individualism score that is one standard deviation higher, its intra balance tends to be 2% (of GDP) higher. The individualism index seems to be unrelated to extra balances.

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[13] Hofstede (2001, 211) has made this same observation.

TABLE 6 Regression results for trade balances and per capita incomes in Europe 1984–2011 (including the Hofstede's dimensions of national cultures).

Variables:	Dependent variable: Intra balance			Dependent variable: Extra balance		
	(7)	(8)	(9)	(7)	(8)	(9)
EMU	-0.000	-0.005	0.002	-0.004	-0.006	-0.004
	(0.016)	(0.013)	(0.014)	(0.014)	(0.014)	(0.015)
DKSEUK	0.038**	-0.069***	-0.023	0.021	-0.031	0.028
	(0.015)	(0.019)	(0.019)	(0.016)	(0.021)	(0.017)
Non-EMU	0.002	0.003	0.010	-0.003	-0.003	-0.004
	(0.014)	(0.012)	(0.013)	(0.020)	(0.017)	(0.021)
GDP per capita	0.034***	0.012*	0.019***	0.020***	0.009	0.023***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)
GDP per capita*EMU	-0.001	0.002	0.001	0.002	0.003	0.002
	(0.007)	(0.006)	(0.006)	(0.007)	(0.006)	(0.007)
GDP per capita*DKSEUK	-0.028***	-0.013*	-0.008	-0.004	0.003	-0.006
	(0.007)	(0.007)	(0.008)	(0.007)	(0.007)	(0.007)
GDP per capita*Non-EMU	-0.002	-0.002	-0.007	0.003	0.003	0.003
	(0.006)	(0.005)	(0.006)	(0.007)	(0.007)	(0.008)
Fiscal balance	-0.014	-0.012	0.005	-0.069*	-0.067*	-0.071*
	(0.043)	(0.039)	(0.043)	(0.041)	(0.040)	(0.041)
Oil price	-0.007	-0.004	-0.004	-0.045***	-0.043***	-0.045***
	(0.009)	(0.008)	(0.009)	(0.010)	(0.009)	(0.010)
Dependency ratio (aged)	-0.575***	-0.234**	-0.529***	0.008	0.167	0.006
	(0.137)	(0.116)	(0.129)	(0.122)	(0.137)	(0.118)
Dependency ratio (child)	0.438***	0.266***	0.355***	-0.054	-0.146	-0.040
	(0.105)	(0.085)	(0.099)	(0.102)	(0.099)	(0.102)
Domestic credit by banks	0.018***	0.020***	0.021***	-0.021***	-0.019***	-0.022***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Bureaucracy quality	0.019***	0.008**	0.008**	0.005	-0.000	0.007*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Real interest rate	-0.058	-0.067*	-0.077*	-0.031	-0.036	-0.027
	(0.043)	(0.039)	(0.044)	(0.044)	(0.042)	(0.044)
Change in RULC	-0.084**	-0.074**	-0.087**	-0.021	-0.015	-0.023
	(0.040)	(0.034)	(0.039)	(0.041)	(0.038)	(0.042)
Hofstede's uncertainty avoidance		-0.170***			-0.083***	
		(0.017)			(0.020)	
Hofstede's individualism			0.174***			-0.019
			(0.019)			(0.020)
R^2	0.370	0.483	0.490	0.196	0.224	0.202
Observations	387	387	387	387	387	387

In addition, all regressions include a constant. Notes: Estimation was performed using the Prais-Winsten estimator with panel-corrected standard errors (panel-level heteroskedastic and correlated across panels, common AR(1) autocorrelation structure, which is estimated from the autocorrelation of residuals (*xtpcse* command in STATA with *correlation(ar1)* and *rhotype(tscorr)* options)). Panel-corrected standard errors are in parenthesis. *, ** and *** denote statistical significance at the 10, 5 and 1 percent levels.

In Section 1, we made an observation that some countries have positive intra balances but negative extra balances or vice versa (see also TABLE 1). Now, we will use our regression model to explain some of these patterns. In FIGURE 5, we represent graphically the contribution of different components for the intra balances. We employ model (16), which is similar to model (7) in all other aspects, but it is estimated using deviations from unweighted sample means. The actual numbers that we put

into the regression equation are the country-specific 1999–2011 averages of these deviations. For the change in real unit labor costs, labeled drulc in the figure, we input the percentage change between 1999 and 2011. FIGURE 6 is drawn in the same fashion for the extra balances. This analysis enables us to explain some of the patterns seen in FIGURES 2–3 and TABLE 2. During the 1999–2011 period, Ireland had a huge intra surplus (15.6% of the GDP on average) but a smaller extra surplus (7.4% of the GDP on average). Based on our regression analysis, dependency ratios are statistically significant only for the intra balances. Ireland had the lowest old dependency ratio (this variable has a negative effect on intra balance) and the highest child dependency ratio (this variable has a positive effect on intra balance) in our sample. The Netherlands had a positive intra balance, whereas its extra balance was negative. To some extent, this comes from the fact that the Netherlands have had the most developed banking sector. Domestic credit by banks, which we used as a proxy for the state of the domestic banking sector, contributes positively to intra balances and negatively to extra balances. Naturally, this explains only a small fraction of the difference in the Netherlands' intra and extra balances. Italy's intra balance was negative, but its extra balance was positive. Italy had the lowest bureaucracy quality in our sample. Bureaucracy quality contributes positively to intra balances but is statistically insignificant for extra balances.
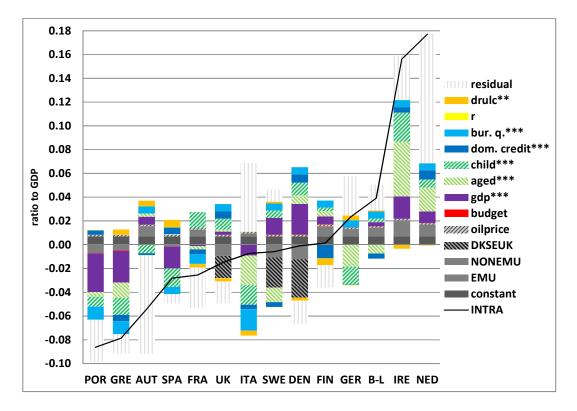
FIGURE 5 Contribution of different components for the intra balances (model (16) and 1999–2011 averages).
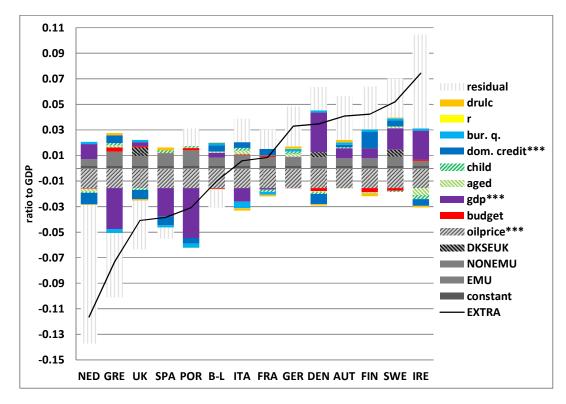

FIGURE 6 Contribution of different components for the extra balances (model (16) and 1999–2011 averages).

4.2. Robustness checks

FIGURES 5–6 indicate that the Netherlands is potentially an outlier in our sample. To some extent, this might result from the Rotterdam effect. For example, part of Germany's overseas imports are incorrectly recorded as Dutch overseas imports and then as a Germany's import from the Netherlands when goods are shipping via Rotterdam's port (see, e.g., Baldwin 2006, 59, and Flam and Nordström 2006, 6). Consequently, the Rotterdam effect has a tendency to increase Netherlands' intra exports and extra imports. In FIGURES 5-6, the Netherlands exhibit a large positive residual term in the intra balances and a large negative residual term in the extra balances. However, we are unable to detect how large fractions of these residuals are caused by the Rotterdam effect. The simplest way to control for the Rotterdam effect is to subtract trade with the Netherlands from the intra balances and to include a dummy variable for the Netherlands in both regressions. Naturally this is a very crude thing to do because we are assuming that all intra trade between the Netherlands and rest of the EU-15 countries consist of transit between overseas countries and rest of the EU-15 countries.[14] These results are shown in TABLE 7. The statistical significance of the aged dependency ratio shifts to some extent from intra balances towards extra balances compared to TABLE 6. The statistical significance of domestic credit by banks becomes weaker; however, in models (12) and (13), it is still positively statistically significant at the 0.10 level. Finally, in model (13), Hofstede's individualism index becomes statistically significant and positive for the extra balances.

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[14] A less crude way to control for the Rotterdam effect is to just add a dummy for the Netherlands, which is done in TABLE A. 6.

TABLE 7 Regression results for trade balances and per capita incomes in Europe 1984–2011 (subtracting the trade with Netherlands from the intra balances).

Variables:	Dependent variable: Intra balance (subtracting NED)			Dependent variable: Extra balance		
	(11)	(12)	(13)	(11)	(12)	(13)
EMU	-0.006	-0.010	-0.005	0.002	-0.003	0.002
	(0.014)	(0.012)	(0.013)	(0.016)	(0.014)	(0.015)
DKSEUK	0.028**	-0.030*	-0.020	0.031*	-0.079***	0.019
	(0.014)	(0.017)	(0.017)	(0.016)	(0.023)	(0.018)
Non-EMU	0.003	0.004	0.008	-0.004	-0.003	-0.003
	(0.013)	(0.011)	(0.012)	(0.020)	(0.016)	(0.019)
Netherlands	0.099***	0.085***	0.076***	-0.098***	-0.122***	-0.104***
	(0.017)	(0.017)	(0.016)	(0.017)	(0.019)	(0.016)
GDP per capita	0.029***	0.017***	0.018***	0.025***	0.002	0.022***
	(0.006)	(0.005)	(0.006)	(0.007)	(0.007)	(0.007)
GDP per capita*EMU	0.003	0.005	0.004	-0.001	0.002	-0.001
	(0.006)	(0.006)	(0.006)	(0.007)	(0.006)	(0.007)
GDP per capita*DKSEUK	-0.022***	-0.014**	-0.008	-0.010	0.005	-0.006
	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)
GDP per capita*Non-EMU	-0.002	-0.002	-0.005	0.003	0.003	0.002
	(0.005)	(0.005)	(0.005)	(0.007)	(0.006)	(0.007)
Fiscal balance	-0.024	-0.023	-0.011	-0.061	-0.057	-0.057
	(0.040)	(0.038)	(0.040)	(0.038)	(0.035)	(0.038)
Oil price	-0.001	-0.000	0.002	-0.051***	-0.046***	-0.050***
	(0.008)	(0.007)	(0.007)	(0.011)	(0.010)	(0.010)
Dependency ratio (aged)	-0.216*	-0.060	-0.232*	-0.346***	-0.070	-0.348***
	(0.128)	(0.117)	(0.126)	(0.130)	(0.140)	(0.131)
Dependency ratio (child)	0.449***	0.354***	0.362***	-0.065	-0.277***	-0.090
	(0.098)	(0.080)	(0.095)	(0.093)	(0.093)	(0.092)
Domestic credit by banks	0.007	0.009*	0.010*	-0.009	-0.006	-0.008
	(0.005)	(0.005)	(0.005)	(0.006)	(0.005)	(0.006)
Bureaucracy quality	0.016***	0.011***	0.009**	0.008*	-0.002	0.006
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Real interest rate	-0.043	-0.049	-0.060	-0.045	-0.057	-0.049
	(0.039)	(0.037)	(0.039)	(0.043)	(0.039)	(0.043)
Change in RULC	-0.072*	-0.068*	-0.072**	-0.033	-0.020	-0.032
	(0.038)	(0.035)	(0.035)	(0.037)	(0.031)	(0.036)
Hofstede's uncertainty avoidance		-0.092***			-0.177***	
		(0.017)			(0.025)	
Hofstede's individualism			0.137***			0.039**
			(0.015)			(0.016)
R²	0.476	0.530	0.542	0.323	0.407	0.328
Observations	387	387	387	387	387	387

In addition, all regressions include a constant. Notes: Estimation was performed using the Prais-Winsten estimator with panel-corrected standard errors (panel-level heteroskedastic and correlated across panels, common AR(1) autocorrelation structure, which is estimated from the autocorrelation of residuals (*xtpcse* command in STATA with *correlation(ar1)* and *rhotype(tscorr)* options)). Panel-corrected standard errors are in parenthesis. *, ** and *** denote statistical significance at the 10, 5 and 1 percent levels.

To further check the robustness of our baseline results (model (7)), we exposed our specification to some testing. We included changes in Target balances in the model (14) because during the euro crisis, debtor countries financed their deficits through Target balances as private capital flew away. However, we were unable to find any statistically significant results for this variable, which is most likely because the im-

portance of Target balances increased only recently. In model (15), we used the level of real unit labor costs instead of changes, which cause the competitiveness indicator to lose its statistical significance. Current account imbalances or trade imbalances are always measured with respect to other countries; therefore, in the current account literature, the so-called rest of the world effect is usually taken into account using deviations from sample means. Hence, in model (16), we add deviations from the unweighted sample means. Comparing models (7) and (16), one can observe that our results are robust to this transformation, although naturally the values of the coefficients change.

TABLE 8 Regression results for trade balances and per capita incomes in Europe 1984–2011 (including change in Target balances, using RULC instead of changes in RULC or using deviations from unweighted sample means).

vDependent variable:	Dependent variable: Intra balance			Dependent variable: Extra balance		
Variables:	(14)	(15)	(16)	(14)	(15)	(16)
EMU	0.001	-0.000	0.006	-0.004	-0.004	0.007*
	(0.016)	(0.016)	(0.004)	(0.014)	(0.014)	(0.004)
DKSEUK	0.038**	0.034**	-0.017*	0.020	0.021	0.007
	(0.015)	(0.016)	(0.009)	(0.015)	(0.016)	(0.008)
Non-EMU	0.002	-0.000	-0.009*	-0.005	-0.003	0.008
	(0.014)	(0.014)	(0.005)	(0.021)	(0.019)	(0.005)
GDP per capita	0.034***	0.030***	0.025***	0.022***	0.019***	0.030***
	(0.006)	(0.006)	(0.008)	(0.006)	(0.006)	(0.008)
GDP per capita*EMU	-0.001	-0.001	0.010	0.002	0.002	-0.004
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
GDP per capita*DKSEUK	-0.028***	-0.027***	-0.015	-0.004	-0.004	-0.003
	(0.007)	(0.007)	(0.010)	(0.007)	(0.007)	(0.011)
GDP per capita*Non-EMU	-0.002	-0.000	-0.003	0.003	0.003	-0.001
	(0.006)	(0.006)	(0.007)	(0.008)	(0.007)	(0.008)
Fiscal balance	-0.029	-0.017	0.008	-0.067	-0.068*	-0.066
	(0.042)	(0.043)	(0.052)	(0.041)	(0.041)	(0.052)
Oil price	-0.005	-0.004	0.003	-0.046***	-0.044***	-0.036***
	(0.009)	(0.009)	(0.006)	(0.010)	(0.010)	(0.008)
Dependency ratio (aged)	-0.585***	-0.551***	-0.559***	0.027	0.005	0.066
	(0.138)	(0.146)	(0.168)	(0.115)	(0.124)	(0.133)
Dependency ratio (child)	0.432***	0.434***	0.410***	-0.039	-0.055	-0.053
	(0.107)	(0.111)	(0.111)	(0.096)	(0.100)	(0.102)
Domestic credit by banks	0.018***	0.018***	0.019***	-0.024***	-0.020***	-0.022***
	(0.006)	(0.006)	(0.007)	(0.006)	(0.006)	(0.007)
Bureaucracy quality	0.019***	0.020***	0.017***	0.006	0.005	0.005
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Real interest rate	-0.055	-0.084**	-0.032	-0.027	-0.038	0.017
	(0.043)	(0.040)	(0.048)	(0.046)	(0.042)	(0.052)
Change in RULC	-0.078**		-0.090**	-0.029		-0.037
	(0.039)		(0.040)	(0.044)		(0.044)
RULC		-0.000			-0.000	
		(0.000)			(0.000)	
Change in Target balances	0.015			-0.006		
	(0.019)			(0.019)		
R²	0.368	0.317	0.352	0.214	0.190	0.201
Observations	387	387	387	387	387	387

In addition, all regressions include a constant. Notes: Estimation was performed using the Prais-Winsten estimator with panel-corrected standard errors (panel-level heteroskedastic and correlated across panels, common AR(1) autocorrelation structure, which is estimated from the autocorrelation of residuals (*xtpcse* command in STATA with *correlation(ar1)* and *rhotype(tscorr)* options)). Panel-corrected standard errors are in parenthesis. *, ** and *** denote statistical significance at the 10, 5 and 1 percent levels.

Finally, we checked whether our results were robust to the manner in which the autocorrelation parameter was calculated and whether we allowed the autocorrelation parameter to be panel specific (see TABLE A. 7). None of these had an effect on our results. In addition, we performed the following test: We dropped interaction terms between country group dummies and GDP per capita from model (7) and instead

included interaction terms between country group dummies and every explanatory variable one by one.[15] We were unable to find a single case in which both the explanatory variable and its interaction term with the EMU dummy would have been statistically significant. Thus, our largely linear specification in model (7) is approved in this respect.

5.   Conclusions

Schmitz and von Hagen (2011) provide evidence that the elasticity of trade flows to per capita incomes within the euro area for member countries increased as a result of the euro. When we augment their model using standard variables from the current account literature, we find out that this result largely disappears. However, their framework of analysis is fascinating; one can obtain some interesting new results by decomposing trade balances into intra balances (trade balances vis-à-vis the euro area) and extra balances (trade balances vis-à-vis the rest of the world). The child dependency ratio has a positive effect on intra balances but no effect or a negative effect on extra balances. The sophistication of the banking sector has a positive effect on intra balances but a negative effect on extra balances. This finding is very interesting. However, this result is, to some extent, sensitive to how the Netherlands and the possible Rotterdam effect have been tackled. Additionally, bureaucracy quality has a positive effect on intra balances. In the current account literature, both the quality of the domestic financial sector and the quality of government institutions are assumed to have a negative effect on current account balances. If real relative unit labor costs increase, the intra balance deteriorates. Our paper provides preliminary evidence that some dimensions of national culture, such as individualism, are important for the intra balances and extra balances. Overall, our model seems to perform better in explaining intra balances than extra balances. It is very likely that with respect to extra balances, external factors, such as the euro's exchange rate, dominate.

For example, with respect to Greece and Portugal, which have had the largest cumulative trade deficits during the euro era, our model points a finger at their low

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[15] In the interest of space, these are not reported.

relative income (the two poorest countries in our sample), low bureaucracy quality (the second and the third worst systems in our sample after Italy) and collectivistic culture (the two countries with the lowest individualism scores).[16] Naturally reducing their real relative unit labor costs further might help also, although those are not above the long-run averages. For Portugal, a major part of its trade deficits has resulted from trade with the EMU countries. If, along the integration process, both its GDP per capita and bureaucracy quality converge to the EU-15 averages, its trade balance will become more balanced in the future. It will most likely take much longer for the national culture to change. Greece's trade deficit has resulted from both intra and extra trade. For its extra balance to improve, Greece might need the euro to devalue and, consequently, for example, Germany's trade surplus vis-à-vis the rest of the world to decrease.

Acknowledgements

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[16] Alternatively, Portugal and Greece were the two countries with the highest uncertainty avoidance scores.

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Appendix

TABLE A. 1 Data description.

Variable	Description	Source[a]
Bilateral trade balances	Trade balance (ratio to GDP) excluding services against the euro area; Trade balance excluding services against the rest of the world	DOTS/WDI[17]
GDP per capita	Gross domestic product at current market prices per head of population (1000 EUR) divided by 10, "HVGDP"	AMECO[18]
Fiscal balance	Net lending (Mrd EUR) "UBLG" divided by Gross domestic product at current prices (Mrd ECU/EUR) "UVGD"	AMECO[18], WEO, GFS, IFS yearbook 1998
Oil price	Crude oil dated brent U$/BBL divided by the US to euro exchange rate multiplied by 0.01	Datastream (Thomson Reuters)
Dependency ratios	Number of people aged 65 or more (or aged 0–14) divided by the number of people aged 15–64	WDI[19]
Domestic credit by banks	Domestic credit provided by banking sector (ratio to GDP)	WDI[19]
Bureaucracy quality	International Country Risk Guide: The political risk components: Bureaucracy quality	PRS[18]
Real interest rate	Real short-term interest rates, deflator GDP "ISRV"	AMECO[19]
Change in NULC	Change (0.01 denotes 1%) in nominal unit labour costs: total economy (performance relative to the rest of the former EU-15: double export weights (USD: 2005=100) "PLCDQ"	AMECO[19]
Change in RULC	Change (0.01 denotes 1%) in real unit labour costs: total economy (performance relative to the rest of the former EU-15: double export weights (2005=100) "QLCDQ"	AMECO[19]
Hofstede's uncertainty avoidance	Hofstede's dimensions of national cultures: Uncertainty avoidance	Hofstede[19]
Hofstede's individualism	Hofstede's dimensions of national cultures: Individualism (high values) versus collectivism (low values)	Hofstede[19]
Change in Target balances	Change in Target balances divided by the GDP (current LCU)	CESifo/WDI[20]

[a] AMECO: Annual macro-economic database of the European Commission's Directorate General for Economic and Financial Affairs; CESifo:
<http://www.cesifo-group.de/dms/ifodoc/docs/politikdebatte/C_Haftungspegel/Target-

[17] Intra balance was calculated by summing up the bilateral trade balances with respect to Austria, Belgium, Luxembourg, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal and Spain (not by using "Euro Area" as a partner country). Extra balance was calculated as a remainder of bilateral trade balance with respect to World and intra balance. Both of these numbers were divided by GDP (current US$) fromWDI.

[18] For Belgium-Luxembourg values of Belgium was used and for Germany between 1984–1990 values of West Germany was used.

[19] For Belgium-Luxembourg values of Belgium was used.

[20] GDP is from WDI. We created zeros for Austria, Belgium-Luxembourg, Finland, France, Germany, Ireland, Italy, Netherlands, Portugal and Spain from 1984 to 1998 (pre-euro period), for Greece from 1984 to 2000 (pre-euro period), and for Denmark, Sweden and UK from 1984 to 2011 (the whole period).

countries/Target-countries-2013-10-07.xls>. 3.9.2013; DOTS: Direction of Trade Statistics, International Monetary Fund; GFS: Government Finance Statistics; Hofstede: <http://www.geerthofstede.com/media/651/6%20dimensions%20for%20website.xls>. 8.4.2013; IFS year-book: International Financial Statistics Yearbook 1998; PRS: Political Risk Services' International Country Risk Guide (Table 3B); WEO: World Economic Outlook Database, October 2010; WDI: World Development Indicators, The World Bank.

The list of countries in the sample: Austria (adopted euro in 1999), Belgium-Luxembourg (adopted euro in 1999), Denmark, Finland (adopted euro in 1999), France (adopted euro in 1999), Germany (adopted euro in 1999), Greece (adopted euro in 2001), Ireland (adopted euro in 1999), Italy (adopted euro in 1999), Netherlands (adopted euro in 1999), Portugal (adopted euro in 1999), Spain (adopted euro in 1999), Sweden, United Kingdom.

TABLE A. 2 Omitting observations.

Variable	Number of lacking annual observations	Lacking observations	Created values
Intra balance	0/392		
Extra balance	0/392		
GDP per capita	0/392		
Fiscal balance	5/392	Greece 1984–1987, Ireland 1984	
Oil price	0/28		
Dependency ratio (aged)	0/392		
Dependency ratio (child)	0/392		
Domestic credit by banks	4/392	Austria 1998, Belgium-Luxembourg 1998, France 1998, Netherlands 1998	Austria 1998, Belgium-Luxembourg 1998, France 1998, Netherlands 1998
Bureaucracy quality	0/392		
Real interest rate	0/392		
Change in NULC	0/392		
Change in RULC	0/392		
Hofstede's uncertainty avoidance	0/14		
Hofstede's individualism	0/14		
Change in Target balances	0/141	zeros (euro countries during the pre-euro period and DKSEUK during the whole period)	

TABLE A. 3 Data for the figures and tables.

Figure	Variable / Code	Source
FIGURE 1	Current account balances	WDI, WEO
FIGURES 2–3	Trade balances / GDP	DOTS / WDI
FIGURES 2–3	Shape file (TM_WORLD_BORDERS_SIMPL-0.3.zip package)	Downloaded from <http://thematicmapping.org/downloads/world_borders.php>. 26.11.2012.
TABLES 1–2	Trade balances / GDP	DOTS / WDI
TABLE 2	Current account balances	WDI, WEO
FIGURE 4	Real unit labor costs (relative to the rest of the EU-15)	AMECO

TABLE A. 4 Correlation matrix (calculated without created values, 383 observations).

Variable	Intra bal	Extra bal	EMU	DKSE UK	Non-EMU	GDP per capita	Fiscal bal	Oil price	Dep. Ratio aged	Dep. Ratio child	Dom. credit by banks	Bu-reau-cracy	Real inter-est rate	Change in nulc	Change in rulc	Hof-stede UAI	Hof-stede IDV	Change in Target
Intra balance	1																	
Extra balance	0.015	1																
EMU	0.093	-0.034	1															
DKSEUK	-0.093	0.221	-0.405	1														
Non-EMU	-0.084	0.125	-0.264	0.612	1													
GDP per capita	0.315	0.374	0.436	0.271	0.433	1												
Fiscal balance	0.166	0.268	0.120	0.208	0.230	0.411	1											
Oil price	-0.003	-0.047	0.569	-0.006	0.236	0.585	0.037	1										
Dep. ratio (aged)	-0.443	0.080	0.354	0.264	0.186	0.321	0.062	0.414	1									
Dep. ratio (child)	0.397	-0.006	-0.392	0.094	0.015	-0.246	-0.046	-0.273	-0.599	1								
Domestic credit	0.137	-0.160	0.370	0.089	0.315	0.543	-0.077	0.595	0.243	-0.280	1							
Bureaucracy quality	0.435	0.372	-0.137	0.347	0.195	0.466	0.391	-0.046	-0.119	0.088	0.073	1						
Real interest rate	-0.020	0.012	-0.563	0.078	-0.171	-0.444	-0.170	-0.477	-0.331	0.314	-0.422	0.143	1					
Change in NULC	-0.107	-0.069	0.022	-0.004	-0.025	0.009	0.107	0.009	0.002	-0.033	-0.052	-0.115	-0.062	1				
Change in RULC	-0.107	-0.009	-0.008	0.068	0.015	0.082	0.134	-0.008	0.036	-0.069	-0.002	0.007	0.164	0.535	1			
Hofstede UAI	-0.464	-0.409	0.283	-0.711	-0.413	-0.454	-0.364	0.009	0.120	-0.311	-0.076	-0.628	-0.112	0.084	-0.020	1		
Hofstede IDV	0.532	0.218	-0.165	0.422	0.232	0.418	0.206	-0.005	-0.017	0.162	0.082	0.612	0.115	-0.098	0.034	-0.669	1	
Change in Target balances	0.022	-0.065	-0.095	0.038	0.025	0.009	0.270	-0.078	0.042	0.006	-0.172	0.086	-0.037	0.026	-0.041	-0.053	0.100	1

TABLE A. 5 Regression results for trade balances and per capita incomes in Europe 1981–2005.

Variables:	Dependent variable: Intra balance		Dependent variable: Extra balance	
	PW-OLS with PCSE	FE	PW-OLS with PCSE	FE
EMU	-0.074**	-0.058***	-0.022**	-0.023
	(0.030)	(0.019)	(0.011)	(0.033)
DKSEUK	0.020*		0.045***	
	(0.012)		(0.009)	
Non-EMU	-0.039	-0.027**	-0.008	-0.027
	(0.026)	(0.010)	(0.016)	(0.023)
GDP per capita	0.020***	0.011**	0.025***	0.018**
	(0.006)	(0.005)	(0.004)	(0.008)
GDP per capita*EMU	0.031**	0.023**	0.009	0.010
	(0.014)	(0.010)	(0.005)	(0.015)
GDP per capita *DKSEUK	-0.021***	-0.001	-0.015***	-0.020
	(0.006)	(0.008)	(0.005)	(0.013)
GDP per capita *Non-EMU	0.015	0.005	0.005	0.015*
	(0.010)	(0.003)	(0.006)	(0.008)
Fiscal balance	0.034	0.075	-0.000	0.011
	(0.049)	(0.102)	(0.040)	(0.050)
Oil price	-0.017	-0.010	-0.066***	-0.064***
	(0.017)	(0.020)	(0.015)	(0.015)
R^2	0.154		0.263	
R^2 within		0.244		0.269
R^2 between		0.453		0.003
Observations	339	339	339	339

In addition all regressions include a constant. Notes: PW-OLS with PCSE: Prais-Winsten regression with panel-corrected standard errors (panel-level heteroskedastic and correlated across panels, common AR(1) autocorrelation structure, which is estimated from autocorrelation of residuals (*xtpcse* command in STATA with *correlation(ar1)* and *rhotype(tscorr)* options)); FE = within estimator using panel robust standard errors (clustering on the panel variable). Panel-corrected standard errors or panel robust standard errors are in parenthesis. *, ** and *** denote statistical significance at the 10, 5 and 1 percent levels.

TABLE A. 6 Regression results for trade balances and per capita incomes in Europe 1984–2011 (including a dummy for the Netherlands).

Variables:	Dependent variable: **Intra balance**			Dependent variable: **Extra balance**		
	(17)	(18)	(19)	(17)	(18)	(19)
EMU	0.002	-0.003	0.003	-0.006	-0.009	-0.006
	(0.015)	(0.013)	(0.014)	(0.015)	(0.013)	(0.014)
DKSEUK	0.036**	-0.049***	-0.010	0.025	-0.058***	0.009
	(0.015)	(0.018)	(0.017)	(0.016)	(0.021)	(0.016)
Non-EMU	0.004	0.005	0.011	-0.004	-0.004	-0.003
	(0.014)	(0.012)	(0.013)	(0.020)	(0.016)	(0.019)
Netherlands	0.100***	0.082***	0.078***	-0.101***	-0.119***	-0.109***
	(0.018)	(0.018)	(0.016)	(0.018)	(0.019)	(0.017)
GDP per capita	0.033***	0.015***	0.023***	0.022***	0.006	0.018***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)
GDP per capita*EMU	-0.002	0.001	-0.000	0.003	0.005	0.003
	(0.007)	(0.006)	(0.006)	(0.007)	(0.006)	(0.006)
GDP per capita*DKSEUK	-0.025***	-0.013**	-0.010	-0.008	0.003	-0.003
	(0.007)	(0.006)	(0.008)	(0.007)	(0.007)	(0.007)
GDP per capita*Non-EMU	-0.003	-0.002	-0.007	0.003	0.003	0.002
	(0.006)	(0.005)	(0.006)	(0.007)	(0.006)	(0.007)
Fiscal balance	-0.018	-0.016	-0.002	-0.065*	-0.061*	-0.061*
	(0.043)	(0.040)	(0.044)	(0.037)	(0.034)	(0.036)
Oil price	-0.010	-0.008	-0.008	-0.043***	-0.040***	-0.042***
	(0.008)	(0.008)	(0.008)	(0.010)	(0.009)	(0.010)
Dependency ratio (aged)	-0.295**	-0.065	-0.324**	-0.274**	-0.067	-0.276**
	(0.130)	(0.117)	(0.127)	(0.123)	(0.130)	(0.125)
Dependency ratio (child)	0.533***	0.386***	0.457***	-0.137	-0.291***	-0.170*
	(0.101)	(0.080)	(0.095)	(0.090)	(0.087)	(0.089)
Domestic credit by banks	0.010*	0.013**	0.013**	-0.012**	-0.010*	-0.011**
	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Bureaucracy quality	0.015***	0.007*	0.008*	0.009**	0.001	0.007*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Real interest rate	-0.046	-0.056	-0.063	-0.040	-0.049	-0.046
	(0.043)	(0.040)	(0.045)	(0.041)	(0.038)	(0.041)
Change in RULC	-0.092**	-0.083**	-0.095**	-0.016	-0.007	-0.015
	(0.041)	(0.036)	(0.041)	(0.036)	(0.032)	(0.035)
Hofstede's uncertainty avoidance		-0.135***			-0.132***	
		(0.017)			(0.023)	
Hofstede's individualism			0.126***			0.049***
			(0.014)			(0.015)
R²	0.503	0.581	0.576	0.334	0.395	0.340
Observations	387	387	387	387	387	387

In addition, all regressions include a constant. Notes: Estimation was performed using the Prais-Winsten estimator with panel-corrected standard errors (panel-level heteroskedastic and correlated across panels, common AR(1) autocorrelation structure, which is estimated from the autocorrelation of residuals (*xtpcse* command in STATA with *correlation(ar1)* and *rhotype(tscorr)* options)). Panel-corrected standard errors are in parenthesis. *, ** and *** denote statistical significance at the 10, 5 and 1 percent levels.

TABLE A. 7 Regression results for trade balances and per capita incomes in Europe 1984–2011 (changing the method to calculate autocorrelation parameter, or allowing autocorrelation to be panel-specific).

Variables:	Dependent variable: Intra balance		Dependent variable: Extra balance	
	(20)	(21)	(20)	(21)
EMU	0.000	-0.005	-0.005	0.001
	(0.016)	(0.015)	(0.014)	(0.014)
DKSEUK	0.035**	0.034**	0.024	0.045***
	(0.016)	(0.014)	(0.018)	(0.016)
Non-EMU	0.001	0.004	-0.001	0.001
	(0.014)	(0.015)	(0.018)	(0.018)
GDP per capita	0.031***	0.038***	0.013*	0.025***
	(0.006)	(0.007)	(0.007)	(0.006)
GDP per capita*EMU	-0.001	0.000	0.003	-0.001
	(0.007)	(0.007)	(0.007)	(0.006)
GDP per capita*DKSEUK	-0.027***	-0.029***	-0.003	-0.012*
	(0.007)	(0.007)	(0.007)	(0.007)
GDP per capita*Non-EMU	-0.001	-0.004	0.002	0.002
	(0.006)	(0.006)	(0.007)	(0.007)
Fiscal balance	-0.018	-0.004	-0.063*	-0.072**
	(0.042)	(0.037)	(0.038)	(0.037)
Oil price	-0.004	-0.012	-0.042***	-0.045***
	(0.009)	(0.008)	(0.010)	(0.010)
Dependency ratio (aged)	-0.550***	-0.389***	-0.038	-0.104
	(0.146)	(0.131)	(0.151)	(0.115)
Dependency ratio (child)	0.410***	0.562***	-0.120	-0.048
	(0.115)	(0.108)	(0.124)	(0.075)
Domestic credit by banks	0.017***	0.015***	-0.014**	-0.014**
	(0.006)	(0.006)	(0.006)	(0.006)
Bureaucracy quality	0.018***	0.029***	0.002	0.004
	(0.004)	(0.005)	(0.004)	(0.004)
Real interest rate	-0.060	-0.056	-0.041	-0.029
	(0.041)	(0.041)	(0.040)	(0.041)
Change in RULC	-0.079**	-0.096**	-0.011	-0.016
	(0.037)	(0.039)	(0.034)	(0.036)
R^2	0.308	0.536	0.161	0.244
Observations	387	387	387	387

In addition all regressions include a constant. Notes: In models (20)-(21) estimation was performed using Prais-Winsten estimator with panel-corrected standard errors: In model (20) panel-level heteroskedastic and correlated across panels, common AR(1) autocorrelation structure, which is estimated from regression using lags (*xtpcse* command in STATA with *correlation(ar1)* and *rhotype(regress)* options). In model (21) panel-level heteroskedastic and correlated across panels, panel-specific AR(1) autocorrelation structure, which is estimated from autocorrelation of residuals (*xtpcse* command in STATA with *correlation(psar1)* and *rhotype(tscorr)* options). Panel-corrected standard errors are in parenthesis. *, ** and *** denote statistical significance at the 10, 5 and 1 percent levels.