Current account balances' divergence in the euro area: an appraisal of the underlying forces

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Abstract

This paper revisits the crucial issue of current account imbalances and focuses on the determinants of their gaps between eurozone Member States. We conduct robust estimations of the current account balances for a panel of ten founding euro area economies and construct a measure that allows us to diagnose why some countries have started to diverge from the eurozone mean in the last two decades. Our findings show evidence of remaining differences in countries' economic development, meaning that real macroeconomic convergence has failed in the zone. Price and cost competitiveness, as well as fiscal balances, have also participated in this growing macroeconomic divergence. Overall, while the European authorities cannot influence the part of the current account gaps due to demographic factors, the role of fiscal redistribution and investment at the euro area level could help achieve macroeconomic convergence and thus reduce current accounts' divergence in the zone.

Keywords: Current account; global imbalances; eurozone

JEL Classification: F32; O52; C33

1. Introduction

The first decade of the European Monetary Union (EMU) has been marked by significant and increased current account (CA) imbalances (Figure 1), reflecting diverse macroeconomic developments. Peripheral countries, such as Greece, Portugal, and Spain, have accumulated huge deficits, whereas countries like Germany and the Netherlands displayed

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large surpluses. Those disequilibria have long been interpreted as reflecting the convergence process of peripheral countries toward core economies— the well-known Balassa-Samuelson effect (De Gregorio et al., 1994; Wagner, 2005). In the same vein, Blanchard and Giavazzi (2002) explained that the CA imbalances within the euro area reflect increased financial integration, leading to surpluses in mature countries and deficits in economies with higher growth prospects. Therefore, CA imbalances were not worrisome because, once the convergence processes were completed, they were likely to be resolved.

However, the 2007-2008 financial crisis —highlighting the importance of private debt and its link with public debt (Zorell, 2017)— has revealed that peripheral countries' deficits were not the reflection of a convergence process but rather the sign of unsustainable imbalances. As noticed by Pierluigi and Sondermann (2018), the capital inflows received by peripherical countries (Portugal, Spain, and Italy) at the beginning of the 2000s widely increased their level of investment, thus deteriorating the CA balances. While investment should have materialized in productivity growth, it increased domestic demand in those countries, feeding the real estate bubbles. Indeed, as shown by Chen et al. (2012) in the Spanish case, productivity did not drive growth, and the rise in investment has mainly concerned the residential construction sector, which has been financed at the expense of the tradable sector. Being an unproductive investment, it called into question debt repayment prospects (Giavazzi and Spaventa, 2010).

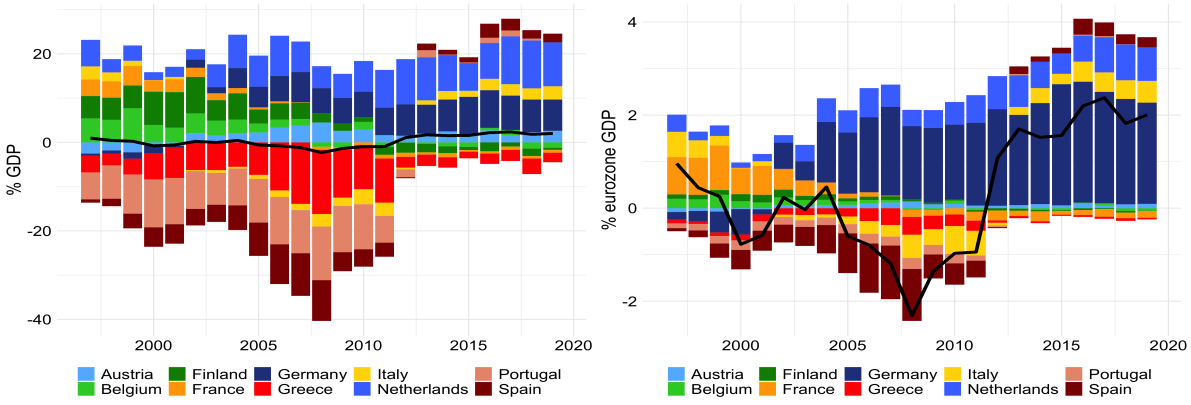


Figure 1 — Current account balances in the eurozone

Notes: The left-hand side chart reports CA expressed in percentage of domestic GDP, whereas CA are expressed in percentage of eurozone GDP in the right-hand side chart. The solid line indicates the eurozone CA balance based on the ten considered countries. The eurozone GDP corresponds to the sum of the same ten considered countries' GDP. Data on current accounts are extracted from the IMF WEO database.

While the 2008 crisis marked an important turning point due to the resorption of the growing trend of deficits, CA imbalances remain a crucial issue, with persistent structural

differences across member countries. As Blanchard and Milesi-Ferretti (2012) stressed in a global context, fighting CA imbalances is essential in many respects (e.g., macroeconomic stability, sustainable growth, and debt burden). In the euro area —like any other monetary union—, monitoring and reducing CA imbalances is even more critical for the good implementation and efficiency of the monetary policy and, more generally, for the sustainability of the zone. This can be illustrated by the Alert Mechanism Report —the starting point of the annual cycle of the macroeconomic imbalance procedure (MIP)— which is a document issued by the European Commission that aims at monitoring the internal and external macroeconomic imbalances within the euro area and producing recommendations if disequilibria are detected.

Understanding the underlying forces of CA imbalances —global imbalances— has been one of the major challenges in international economics during the late 2000s and 2010s. This paper tackles this key issue within the eurozone-specific context. It departs from the existing literature[2] in that its aim is not to identify the CA determinants but to assess their contribution to explain the CA gaps across the Member States, i.e., the deviation of the CA of a given country from the average Eurozone CA. As imbalances within the EMU were not considered harmful before the late 2000s, the literature dealing with CA disequilibria in the eurozone borrowed heavily from that on global imbalances.[3] In addition to being relatively scarce, studies relying on a specific framework tailored for the EMU have generally investigated one issue at a time —thereby creating an anchoring effect for ulterior research. To the best of our knowledge, no study aimed at unifying the analyses in a coherent and consistent framework to gauge the different viewpoints and get a richer narrative.

Competitiveness differentials have been a major research avenue, addressed in various ways. Significant heterogeneity in terms of competitiveness (price/cost and non-price) has actually been highlighted by a number of studies (see, e.g., ECB, 2012) and have fueled the "*Competitiveness legend*" (see Wyplosz, 2013); competitiveness being presented as the CA imbalances keystone. According to Belke and Dreger (2011), diverging competitiveness has been the primary factor of external imbalances in the eurozone. Similarly, Le Moigne and Ragot (2015) attribute half of the trade performance differences between France and Germany over the 1993-2012 period to wage divergence. With a different prism, that of

[2]See Calderón et al. (2002), Chinn and Prasad (2003), Gruber and Kamin (2007), Calderón et al. (2007), Chinn and Ito (2007, 2008), Cheung et al. (2010), and Brissimis et al. (2012).

[3]The literature focusing on the EMU actually emerged after the 2008 financial crisis and the European sovereign debt crisis, and investigates the relationship between the latter two crises and the intra-eurozone imbalances.

internal devaluation, Geerolf and Grjebine (2020) show that the social protection system reforms implemented by Germany have contributed to improving the trade balance —by simultaneously lowering the labor cost, which acts as an export subsidy and discouraging imports. Almunia et al. (2021) support this view, arguing that the contraction of the internal demand caused by the reforms has facilitated and encouraged firms to seek external opportunities to evacuate surpluses, explaining Germany's export performances.

The issue of the internal demand dynamics also connects with the well-established and related literature on the saving-investment approach and the "twin deficits" hypothesis. According to the saving-investment framework developed by Debelle and Faruqee (1996), CA surpluses can be viewed as an excess of savings —relative to investments— in a country; deficits therefore illustrate financial needs. In the eurozone, the German case has again concentrated the attention.[4] This approach permits accounting for the twin deficits hypothesis, fiscal and CA balances moving in the same direction (Chinn and Prasad, 2003; Phillips et al., 2013; Cubeddu et al., 2019). Focusing on EMU countries, Decressin and Stravrev (2009) find a positive and significant effect of the fiscal balance on the CA and show that demographic factors also affect saving behavior.

The intertemporal approach —relating the present consumption to the discounted value of future expected net output or net wealth— may be regarded as an extension of the saving-investment framework. While this approach was initially applied to explain the US CA deficits in the early 2000s, it has been revisited in the case of the EMU countries —especially Southern—, putting forward catching-up effects, hence explaining CA imbalances by the stage of development (see, e.g., Blanchard and Giavazzi, 2002). Decressin and Stravrev (2009) and Lane and Pels (2012) empirically corroborate this conjecture in the case of the EMU countries by highlighting a positive correlation between the stage of economic development—proxied by the relative income per capita —and the CA balance. In the same vein, in connection with countries' specialization, productivity differentials have been advanced as an argument for the CA balances' divergence in the eurozone. Considering a panel of advanced economies, Cova et al. (2008) show that countries with a specialization in the tradable sector tend to display higher-than-otherwise CA balances due to the higher productivity in the tradable sector relative to the non-tradable sector. Le Moigne and Ragot (2015) also show that Germany has benefited from an effective specialization, but its export orientation partly explains the differences from French exports.

[4] Indeed, it has been extensively discussed that the German fiscal reforms at the end of the 1990s —increases in VAT and fuel taxes— and labor reforms —Hartz law between 2003 and 2005— have led to a contraction of the household's revenues and pushed precautionary saving, explaining the increase of the German surplus. See, among others, Kollmann et al. (2015) and Ruppert and Stähler (2022).

In the present paper, we fall into this literature but follow a different and novel approach. Indeed, rather than concentrating on the CA determinants themselves, we seek to explain what causes the differences in CA (im)balances across eurozone countries and their evolution. Specifically, we are interested in explaining why the CA of a given country has diverged from that of the other Member States rather than focusing on the CA determinants of this country in absolute terms. In contrast with previous studies on EMU countries, we investigate several potential explanations put forward in the literature. As noted above, our examination will fill a significant gap by unifying the different analyses in a coherent and consistent framework. Also, we depart from the notion of sustainability which has been the subject of most of the literature on global imbalances. The sustainability notion is highly normative —due to the choice of the fundamentals and the definition of their sustainable levels— and only offers a cursory reading. Beyond sustainability, we provide a more objective and in-depth reading of CA imbalances by placing the convergence question at the heart of the approach, which is crucial for the proper conduct of economic policies in the eurozone and its prosperity. Therefore, understanding the reasons behind the divergences is fundamental to ensure these policies' effectiveness; this is the aim of the present paper.

To this end, we consider a panel of 10 EMU founding countries over the 1997-2018 period and rely on the Bayesian Moving Averaging approach to estimate a robust CA model, including usual and eurozone-specific determinants. Then, we assess the contribution of each considered factor in explaining heterogeneity between countries' CA balances. Our results show a remaining real divergence between eurozone countries as we find long-lasting differences in Members States' economic development.[5] The stage of development plays a determinant role in explaining the CA gaps, as well as differences in cost and price competitiveness. More structural determinants, such as demographics, also explain part of the CA gaps, while cyclical factors have impacted the countries heterogeneously.

The rest of the paper is organized as follows. Section 2 presents our empirical framework. Section 3 displays the results and related comments. Section 4 concludes the paper.

[5] In this sense, imbalances initially considered as "good imbalances" (Blanchard and Giavazzi, 2002) —because reflecting a catching-up process— turned out to be persistent "bad imbalances" (Belke and Dreger, 2013).

2. Empirical framework

2.1. Current account determinants

Uncovering the forces behind CA balances' divergences, i.e., providing economically relevant historical decompositions of the balances' gaps, presumes a sufficiently reasonable ability to apprehend the observed CA dynamics. To meet this requirement, the choice of the CA determinants should be as comprehensive as possible to account for all possible explanations while remaining intelligible.

A major strand of the literature has covered issues related to CA sustainability, providing us with several key determinants relevant in the medium and long term.[6] Among those factors, relative productivity dynamics, net foreign asset position, and demographics are essential. Policy variables also emerged as important drivers of the CA dynamics (Wollmershäuser and Schnabl, 2013), along with several cyclical factors (Debelle and Faruqee, 1996).

Based on this existing literature, we collect data on 32 potential CA determinants. To select the most relevant ones, we rely on Bayesian techniques (Bayesian Model Averaging, BMA), which allow us to address the issues of model uncertainty and parsimony.[7]

As expected, macroeconomic fundamentals enter with high PIPs. We retain (i) the GDP per capita —in PPP terms— relative to trading partners[8], (ii) the net foreign asset position, and (iii) the expected GDP growth —also relative to the trading partners. The relative GDP per capita stands for the development stage and accordingly captures the effects associated with the latter. Different predictions —not necessarily mutually exclusive— for higher-than-otherwise CA balances are associated with richer countries. The most widespread argument (Chinn and Prasad, 2003; Lee et al., 2008) is articulated around the idea that more developed countries —with already high capital-labor ratios— are expected to export capital to less developed countries. Say differently, capital flows should go downhill from richer to poorer countries as a result of the search for higher returns. Our proxy also captures the Balassa-Samuelson effect that associates higher CA balances with more developed countries due to higher productivity.[9] The expected

[6] See for instance Chinn and Prasad (2003), Lane and Milesi-Ferretti (2012), Cheung et al. (2013), and the references in Section 1.

[7] The methodology and related results are reported in Appendix C. Exploring a universe of 2^{32} —i.e., 4,294,967,296— possible models, the BMA analysis identified 15 robust determinants —i.e., determinants with a posterior inclusion probability (PIP) higher or equal than 0.50.

[8] We consider a sample of 186 trading partners.

[9] Roughly speaking, the Balassa-Samuelson effect refers to the real exchange rate appreciation inherent in a catching-up process. Since our proxy is computed vis-à-vis 186 trading partners, we rely on the total population instead of the working population for which data are often scarce for most developing and

—relative— GDP growth, capturing expectations, is an essential determinant of both investment and savings. Higher output growth is associated with higher consumption and lower savings. Accordingly, higher expected GDP growth is associated with a deteriorated CA in the intertemporal approach.[10] Finally, the inclusion of the net foreign asset position (NFA) is consistent with the findings that countries with large NFA tend to display higher CA balances owing to its positive effect on the net income balance.[11]

Looking now at structural determinants, demographics come first. Intuitively, demographic variables are intended to capture the influence of the population —both the structure and dynamics— on saving-investment behaviors. However, the relationship between the CA and demographics is not straightforward, owing to the multidimensionality of the latter. Indeed, the rationales underlying the standard proxies for demographics differ. Looking first at the population dynamics, the usual proxy is population growth. Its effect on the CA is generally found to be positive, as a rise in the population due to the birth rate increase is associated with higher consumption/investment and higher growth expectations. Turning to the population structure, the dependency ratio (generally old-age) and aging speed are often retained. For the old-age dependency ratio, a negative relationship with the CA is expected. Indeed, according to the life-cycle hypothesis, a higher old-age dependency ratio leads to an increase in consumption relative to income, which reduces private savings. The aging speed on its side captures the forward-looking aspect. The increase in the aging speed —owing, for instance, to a longer life expectancy due to medical progress— is generally associated with higher incentives to save and, therefore, an improved CA. Along with the demographic trends, we also control for trade openness. Beyond the structural characteristics, trade openness, measured as total exports and imports as a share of GDP, may capture not only the globalization trend and its associated cross-border trade increase, but also trade or industrial policies relevant to the CA dynamics.

emerging economies. The issue of data availability also prevented us from resorting to data on tradable/non-tradable relative productivity —even if it measures a specific dimension of the stage of development effect. However, comparing our measure with those of Mano and Castillo (2015), we find very high correlations and similarities between countries' differentials.

[10] The whole story actually relates rationale expectations, borrowing restrictions, and consumption smoothing. According to the intertemporal approach, if agents anticipate, for instance, a productivity shock in the —near— future, they will tend to smooth their consumption as much as possible in the absence of borrowing constraints. In this perspective, consumption today is equal to a share of the present discounted value of future expected net output or net wealth. This translates into smaller surpluses/larger deficits.

[11] It should however be noted that in some cases, a negative relationship could be observable due to the ability of certain countries to run deficits while remaining solvent. Such a negative relationship often occurs for large negative NFA-to-GDP ratios. Given the presence of debtor countries in our sample, we investigated this nonlinearity issue by adding interactions between the NFA-to-GDP ratio and dummy variables for different thresholds. Results, available upon request to the authors, do not corroborate the existence of nonlinearity in our sample.

Turning to policy variables, we first account for the effects of fiscal policies by considering the —cyclically adjusted— government balances. Also, to gain insights into the nature of the spending and the impact in terms of investment-saving behaviors, we construct a factor variable, *Welfare state*.[12] This variable accounts for the level of social security or the extent of precautionary savings. Similarly, we consider data on the private debt and foreign direct investment growth rates to reflect the financial cycles.[13] As is often the case, *(i)* a capital control measure —proxied by the *KAOPEN* index (see Chinn and Ito, 2008)— and *(ii)* a proxy for the international financial environment —the VIX index— accompany the aforementioned group of financial variables. We also consider a set of variables to better capture the multidimensionality of trade policies. In addition to trade openness, we account for *(i)* the level of applied tariffs, and *(ii)* the market performance of exports of goods and services on export-weighted imports of goods and services. Along with these trade policy proxies, we consider, in line with the debates on competitiveness differentials within the zone, *(i)* the unit labor costs (ULC) and the total factor productivity as cost-competitiveness proxies, and *(ii)* the currency misalignments as price-competitiveness indicator.

Finally, the output gap and the terms of trade form the group of cyclical variables. The output gap —output deviations (HP filter) in percent of potential GDP— is negatively associated with the CA, reflecting the business cycle's influence in terms of saving and investment on the CA. In contrast, the terms of trade are positively associated with the CA as their improvement goes along with —temporary— income gains generally matched by higher savings.

2.2. Data

Our sample consists of 10 early euro area countries: Austria (AUT), Belgium (BEL), Finland (FIN), France (FRA), Germany (DEU), Greece (GRC), Italy (ITA), the Netherlands (NLD), Portugal (PRT), and Spain (ESP). As is often the case, Luxembourg is excluded due to its tax-haven nature. In the same vein, we also discard Ireland due to the

[12] Drawing on data on current transfers, tax revenues, and public service expenditures, *Welfare state* is derived relying on factor analysis. The only factor retained opposes, on the left side, the government tax revenues, and on the right side, the public service expenditures, and current transfers. Hence, the higher the value of the factor, the higher the level of social security/the lower the level of precautionary savings. Further note that considering both the current transfers and public service expenditures —rather than only health expenditures— allows us to cover a broader range of fiscal policies. Along the same lines, the introduction of tax revenues measures the repercussion scale of those policies on households' disposable income.

[13] Note that the cyclical components —HP filter-based— of the two variables were also considered to capture the effect of financial excesses. However, these alternative measures gave any significant results.

massive presence of Tech companies (i.e., GAFAM) that distort economic indicators and complicate international comparisons (Honohan, 2021).

Due to data availability constraints, we consider annual series over the 1997-2018 period.[14] Table A.1 in Appendix A reports the variables' definitions and sources.

Finally, it should be noted that, for each country, some variables (see Table A.1) are computed relative to the trading partners' weighted average. This is so since relative positions rather than national dynamics make sense when focusing on the CA, which is, by definition, a summary variable of multilateral flows.[15]

2.3. Methodology

The state-of-the-art approach consists in estimating an augmented CA model, taking into account the heteroskedasticity issue as well as the autocorrelation of the CA data. We follow these lines and consider the whole set of determinants discussed above:

$$CA_{i,t} = \alpha + \sum_{i=1}^{k} \beta_i X_{i,t} + u_{i,t} \tag{1}$$

with k denoting the number of determinants $X_{i,t}$, $u_{i,t}$ being an i.i.d error term, and α the constant term. As stressed above, the retained determinants are chosen using the BMA methodology, leading us to select 15 robust variables (see Appendix C).

In line with the literature (Phillips et al., 2013; Coutinho et al., 2018; Cubeddu et al., 2019), we do not include country-specific effects as they do not provide an economic explanation of observed CA balances and may capture hysteresis effects (slow-moving determinants or lingering policy distortions). Besides, including country-fixed effects would *(i)* force the CA imbalances' average to be equal to 0 over the period for each country and therefore exclude the possibility of persistent CA imbalances, and *(ii)* not allow us to assess the contribution of a given variable in explaining the CA gap between a country and the rest of the panel.[16] Furthermore, potentially less exogenous variables are lagged to mitigate endogeneity issue(s) (see Table 2).

[14] Note that considering two years before the launch of the single currency allows us to gain degrees of freedom without impacting our findings. This was expected as EMU countries entered a convergence process ten years before the introduction of the euro. For the sake of completeness, we also rely on a less informative model than the one suggested by the BMA analysis, which allows us to cover the 1980-2018 period. Results are available upon request to the authors.

[15] This approach is also adopted by the IMF, see Phillips et al. (2013) and Cubeddu et al. (2019).

[16] In addition, from a methodological viewpoint, one case in which the feasible generalized least squares (FGLS) estimator —used to estimate Equation (1)— might be inconsistent is when individual-specific fixed effects are present.

Once Equation (1) is estimated, the assessments of the determinants' contributions follow a simple fitting exercise. Indeed, since we are interested in evaluating the effects associated with heterogeneity between countries, we consider the eurozone CA balance (GDP-weighted average) as the benchmark and accordingly derive the contributions of the factors by fitting Equation (1) with the variables' gaps relative to their GDP-weighted averages —using estimates in column (2.1) in Table 2. For a specific factor, say X, the contribution is thus derived as follows:

$$Contrib._{i,t}^{X} = \hat{\beta}_X(X_{i,t} - \bar{X}_t) \tag{2}$$

where $\hat{\beta}_X$ represents the estimated coefficient associated with variable X, and $\bar{X}_t$ indicates its yearly average (GDP weighted). Other things being equal, the obtained contributions illustrate to what extent the variables contributed to the CA balance gaps relative to the eurozone average (Figure 2).[17] To gain intelligibility, the variables' contributions are grouped into different categories (see Table 1).

Overall, and as previously mentioned, despite displaying common features —the most important being the estimation procedure—, our analysis differs from the above-cited previous studies, which aimed at explaining CA balances in "absolute terms". Instead, our approach allows us to assess CA balances' divergences between the selected eurozone countries, leading us to evaluate the cost of the divergence within the EMU. In other words, we depart from the existing literature in two ways: our approach *(i)* does not require the estimation of an equilibrium/benchmark CA position of the country,[18] and *(ii)* allows us to explain CA balances' divergence across the EMU Member States thanks to our measure of contribution (Equation (2)). Finally, it is worth noting that while the papers presented in Section 1 mainly focus on one issue at a time, we gather different viewpoints in a coherent and consistent framework.[19]

[17] Table B.1 in Appendix B provides details on the estimated average contributions. Note that weights are computed annually and are quite stable over time.

[18] This approach implies assessing the long-term value of the fundamentals.

[19] Along the same lines, while previous studies generally focus on two countries to analyze their CA gap, our method allows us to diagnose the CA gap of a country i relative to the rest of the panel —which is particularly relevant in the monetary union context.

Table 1 — Variables' grouping

Category	Sub-category	Variables
Competitiveness	Cost	Total factor productivity
		Unit labor costs
	Price	Currency misalignments
Conjuncture		Expected GDP growth
		Output gap
Demographics		Population growth
		Old-age dependency ratio
		Population aging
Development stage		Relative GDP per capita
Financial conditions		Private debt growth rate
		Financial openness
		Change in the VIX
		Foreign direct investments (net inflows)
Fiscal balance		Cyclically adjusted government balance
Trade policy		Market performance
		Trade openness
		Applied tariff rates
Welfare state		*Welfare_State*
Others		Net foreign asset position
		Terms of trade

3. Results

3.1. Estimation results

Table 2 displays the estimation results of Equation (1).[20] The usual regression coefficients are reported in column (2.1), while column (2.2) provides the standardized coefficients (betas) for comparison purposes.[21] Overall, the estimates are significant and have the expected signs. Furthermore, the model shows a relatively high explanatory power, with around 70% of the CA's variance explained. Say differently, our potential explanations for the differences in the CA balances between the countries find positive echoes in the empirical analysis.

Indeed, looking first at the *Competitiveness* side, both the price and cost competitiveness proxies appear highly significant. An increase in total factor productivity is associated with an improvement in the CA balances. In contrast, a rise in unit labor costs or currency misalignments —a reduction of the undervaluation or an increase in the overvaluation—

[20] Figure B.1 reports the actual CA balances as well as the model-fitted values.

[21] The estimates are derived using Prais-Winsten regression, i.e., linear regression with panel-corrected standard errors (heteroskedasticity and panel-specific AR(1) autocorrelation structure). Further note that OLS-based estimates are similar —which minors considerably estimation issues. Finally, it is worth mentioning that the estimates are stable over time (Chow's stability test results are available upon request to the authors).

deteriorates the CA balances. However, the cost competitiveness differential matters more than the price competitiveness differential, as indicated by the betas in column (2.2).

Similarly, the estimates confirm the importance of the relative cyclical position (relative output gap). The latter displays a negative sign, reflecting the influence of the business cycle on saving-investment behaviors: weak domestic demand —i.e., negative output gaps— goes along with higher saving/low investment. In contrast, the coefficient associated with the expected GDP growth does not appear statistically significant.[22]

As indicated by the coefficients, demographic developments have contributed negatively to CA balances over the period. Indeed, the positive effect associated with population aging —due to higher incentives to save— appears weaker than the negative one originating from the increase in the population growth rate (column (2.2)).

The relative GDP per capita —in PPP terms— is also positively associated with the CA, hence supporting the finding that more developed countries, other things being equal, tend to run higher CA balances.

Regarding financial aspects, all our variables are found to be significant and associated with a deterioration of the CA, as expected.[23] Accommodative policies (increased private credit or higher capital account openness) or higher uncertainty in financial markets negatively impact the EMU countries' CA.[24]

The results also confirm the validity —at least partially— of the twin deficits hypothesis with a positive coefficient indicating that the —cyclically adjusted— fiscal balances and CA balances tend to move together. In the same vein, we also find a significant and negative impact of *Welfare state*, our synthetic variable measuring the level of social security and proxying the level of precautionary saving. Hence, countries with a relatively high level of social security tend to run more important CA deficits due to lower savings/higher consumption.

Trade policy variables appear relevant as a rise in applied tariff rates (raising the cost of imports), and more open economies are associated with an improvement in the CA balance.

Finally, as expected, the coefficients associated with the net foreign asset position and terms of trade are significant with a positive sign.

[22]The lack of statistical significance should not be seen as evidence against the validity of the intertemporal approach. Indeed, according to the latter framework, favorable growth prospects entail consumption smoothing, which translates into the current economic activity.

[23]The relative GDP per capita (both the level and detrended data) interaction with the capital account openness was considered but turned out to be non-significant.

[24]The sensitivity of the countries' CA balances to uncertainty owes much to the euro's flaws (e.g., lack of safe assets, limited market size) that prevent(ed) it from challenging the US dollar as a safe-haven currency.

Table 2 — Estimation results

Variables			Coef.	Beta
			(2.1)	(2.2)
Competitiveness	Cost:	Total factor productivity (*l.CTFP*)	**0.074*** **	**0.210*** **
			(0.027)	(0.077)
		Unit labor cost (*l.d.ULC*)	**-0.159** **	**-0.055** **
			(0.080)	(0.028)
	Price:	Currency misalignments (*Mis*)	**-0.072** **	**-0.087** **
			(0.036)	(0.044)
Conjuncture	Expected growth (*Expected_GDPg*)		0.078	0.028
			(0.056)	(0.020)
	Output gap (*Output_gap*)		**-0.515*** **	**-0.186*** **
			(0.089)	(0.032)
Demographics	Population growth (*popg*)		**-0.211*** **	**-0.183*** **
			(0.067)	(0.058)
	Old-age dependency ratio (*OADepRatio*)		0.006	0.015
			(0.024)	(0.061)
	Aging (*aging*)		**0.402*** **	**0.225*** **
			(0.089)	(0.050)
Development stage	Relative GDP per capita (*l.GDP_PC*)		**0.142*** **	**0.441*** **
			(0.026)	(0.081)
Financial conditions	*Private debt (l.d.PrvD)*		**-0.074** **	**-0.053** **
			(0.034)	(0.024)
	Foreign direct investment, net inflows (*l.FDI*)		**0.087***	**0.072***
			(0.048)	(0.040)
	Capital openness (*l.KAOPEN*)		**-0.051***	**-0.078***
			(0.028)	(0.043)
	VIX (*d.VIX*)		**-0.010*** **	**-0.058*** **
			(0.004)	(0.022)
Government balance	Cyclically adjusted balance (*l.Gov_Bal*)		**0.307*** **	**0.154*** **
			(0.085)	(0.042)
Trade policy	Market performance (*d.MPerf_Exp*)		**0.103*** **	**0.077*** **
			(0.031)	(0.023)
	Applied tariffs (*Tariffs*)		**0.083*** **	**0.139*** **
			(0.021)	(0.036)
	Trade openness (*l.d.Trade*)		**0.120** **	**0.069** **
			(0.050)	(0.028)
Welfare State	(*Welfare_State*)		**-0.009*** **	**-0.093*** **
			(0.002)	(0.022)
Others	Terms of trade (*l.tot*)		**0.126** **	**0.087** **
			(0.063)	(0.043)
	Net foreign asset (*l.NFA*)		**0.015** **	**0.155** **
			(0.006)	(0.064)
	Constant		**-0.015***	-0.021
			(0.008)	(0.041)
Observations / N			190/10	190/10
R-squared			0.743	0.744

Notes: Robust standard errors in parentheses. *** (resp. **, *) indicates statistical significance at the 1% (resp. 5%, 10%) level. *l* (resp. *d*) stands for the lag (resp. difference) operator. Coef: usual regression coefficient; Beta: standardized coefficient.

3.2. On the heterogeneity within the eurozone

While the above results gave us clues regarding the importance of the variables, they remain too general, static, and so, limited in scope. In this respect, assessing the contributions of each variable/group of variables for each country and over time will undoubtedly give substance to the analysis. Figure 2 shows such historical decompositions of the CA balances over time.[25]

On average, Greece is the economy that suffered the most from competitiveness issues within the eurozone, with an estimated average cost of -3.08% of GDP per year (see Table B.1 for the average costs). As shown in Figure 2, this effect has been relatively stable over time. As Figure B.4 in Appendix B reveals at a more disaggregated level, this persistent competitiveness problem was mainly related to the low level of TFP. It is worth mentioning that following the sovereign debt crisis, the implemented austerity programs have had opposing effects by lowering the ULC but at the expense of the TFP. Say differently, the implemented policies led to "rob Peter to pay Paul" and thus did not improve the cost competitiveness issue. Furthermore, the Greek economy displays the most negative cost in terms of price competitiveness (proxied by the exchange rate misalignments), -0.8% of GDP on average per year (see Table B.1). This has been so since its entry to the eurozone (see Figure B.4), whereupon Greece registered a significant —and extant— overvaluation owing to the appreciation of the single currency after 2002.[26] As a result, the competitiveness issue was by the late 2010s even more important than it was in the early 2000s. In the case of Portugal, the second economy with the higher cost in terms of competitiveness, the main determinant was again the relatively low TFP levels, explaining around 90% of the costs. The middle cohort, formed by Finland, Belgium, and Spain, relatively close to the eurozone average, was not really penalized by competitiveness issues. In contrast, at the other end of the spectrum, the Netherlands, followed by Germany and France, have benefitted from competitive advantages. Once again, the largest contribution is associated with the TFP levels, particularly for the Netherlands and France. In the German case, the competitiveness determinants evolved over time. As visible in Figure B.4, before 2009, the ULC and the German undervaluations were the primary sources of the German advantage. From 2008-9, owing to the austerity programs within the zone,

[25] We illustrate the explanatory power of the model over time by showing the actual CA balance gaps (i.e., relative to the EMU average) along with the share of CA balance gaps that is not explained by the model ("*Unexplained*"). Figure B.4 in Appendix B displays the contributions of each variable.

[26] It is worth noting that the euro appreciation from 2003 has had different impacts depending on the countries' fundamentals. In most cases, it drove the exchange rate misalignments (upward trends), which, in turn, eroded the price competitiveness advantages.

the relative ULC gains eroded and then reversed.[27] However, as discussed in the Greek case, these austerity programs hampered growth prospects in several countries. As a result, with stronger fundamentals, the German economy benefitted from a higher level of TFP and an undervalued currency that maintained a competitive advantage. The extent of the undervaluation has even been the most important source of competitiveness in Finland during the 2000s and the early 2010s. Overall, our findings are in line with Arghyrou and Chortareas (2008), Belke and Dreger (2013), and Mirdala and Ďurčová (2017), who show that the lack of competitiveness is a crucial explanation for rising European CA imbalances.

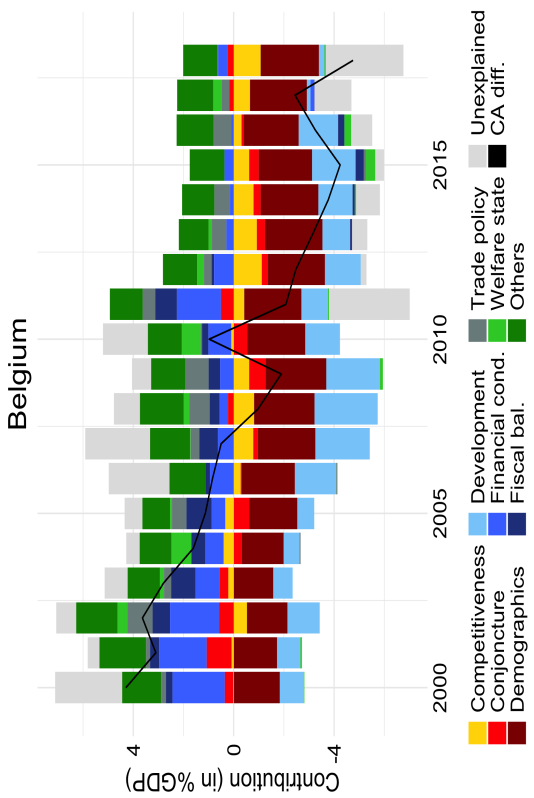
Turning to the relative cyclical position, Greece again ranks first regarding the magnitude of the contributions. Indeed, as visible in Figure 2, the years before the financial crisis are associated with substantial negative contributions compared with the other countries. The Greek boom during the late 2000s has thus plummeted the CA by 3.48% more —on average over the 2006-2009 period— compared to the zone's average. The unprecedented subsequent contraction in Greece after 2008 reversed these negative contributions into positive ones of similar amplitudes with a culminating point amid the sovereign debt crisis. Again, while most countries displayed the same pattern —although with smaller amplitudes—, France and Germany exhibited the opposite trend with negative contributions in the aftermath of the crises.

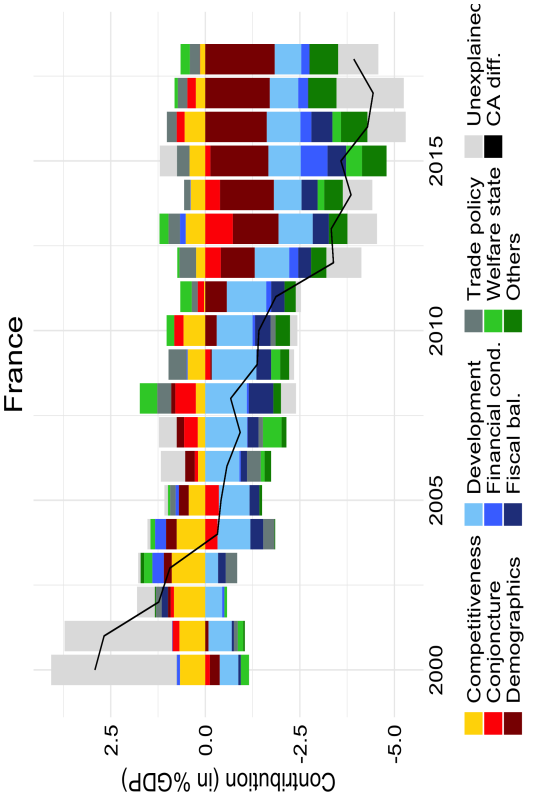
Regarding demographics, the relatively more dynamic population trends in Austria and Belgium have tended to deteriorate the CA balances by around 2% of GDP per year —on average.[28] On the other hand, thanks to their constant and relatively weaker population growth rates and high aging speed,[29] Greece and Portugal have benefitted from the demographic developments compared to the other countries. In Figure 2, the different evolutions of the costs associated with demographic heterogeneity are also worth noticing. Indeed, the 2000s are related to important changes in demographic trends in some countries (see Figure B.3 in Appendix B for more details). These breaks in the demographic trends, namely in the population growth in Germany, Greece, and Spain, led to somewhat

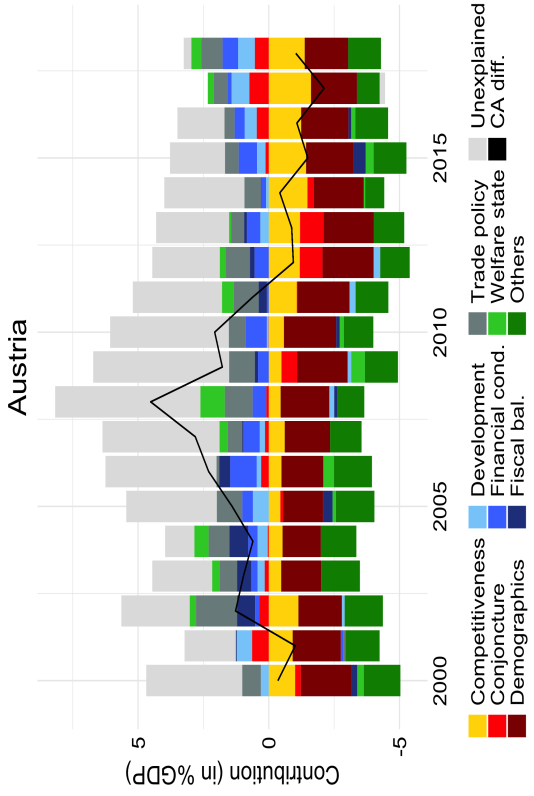
[27] This illustrates the relatively weak estimated contributions of ULC due to the important dispersions. This is especially the case in Southern countries, where there is a reversal of ULC contributions —from negative to positive— under the austerity programs in the aftermath of the global financial and sovereign debt crises.
[28] While the major part of the effects is attributable to the aging population in Belgium —the slowest compared to the retained countries— both the aging speed and the population growth explain the demographic costs in Austria (see Figure B.4).
[29] Recall that higher population growth rates are expected to deteriorate the CA balances because of the lack of saving among the very young. For instance, in Greece, the population growth rate was higher than that of the euro area prior to the beginning of the 2000s before turning to be lower since 2002, a pattern which is reflected in Figure 2 with a positive contribution of demographics to the CA since that date.

fluctuating averages, which explain the vanishing contributions of demographics in Italy and France during the 2000s.

Germany has been the first European country to register a massive fall in the fecundity rate; denatality has become structural. From the mid-1990s to 2012, the German population growth rate was lower than that of the eurozone before a reversal of the trend in 2013. Since that date, the superiority of the German growth rate over that of the eurozone is explained by very high immigration, particularly from Turkey. These demographic trends are fully reflected in Figure 2, which shows a positive contribution of demographics to the CA until the late 2010s, but a reversal afterward due to the relative increase in population.







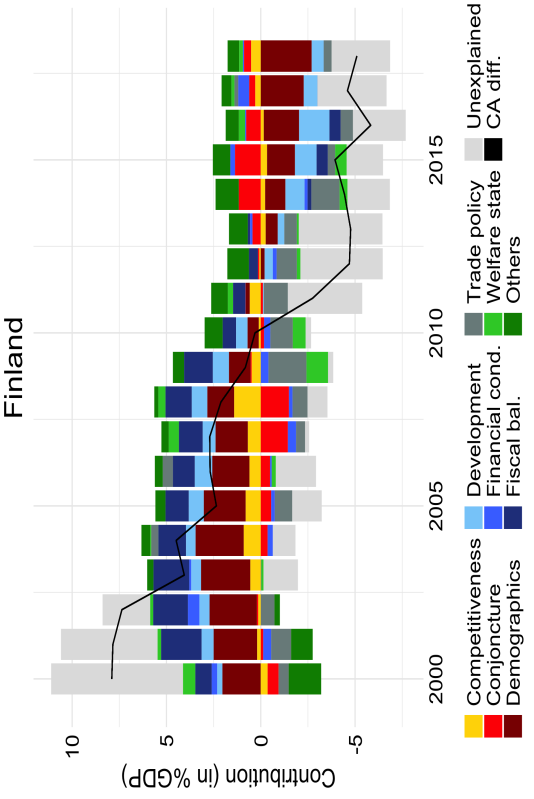


Figure 2 — Current accounts: actual values and model-based historical decompositions

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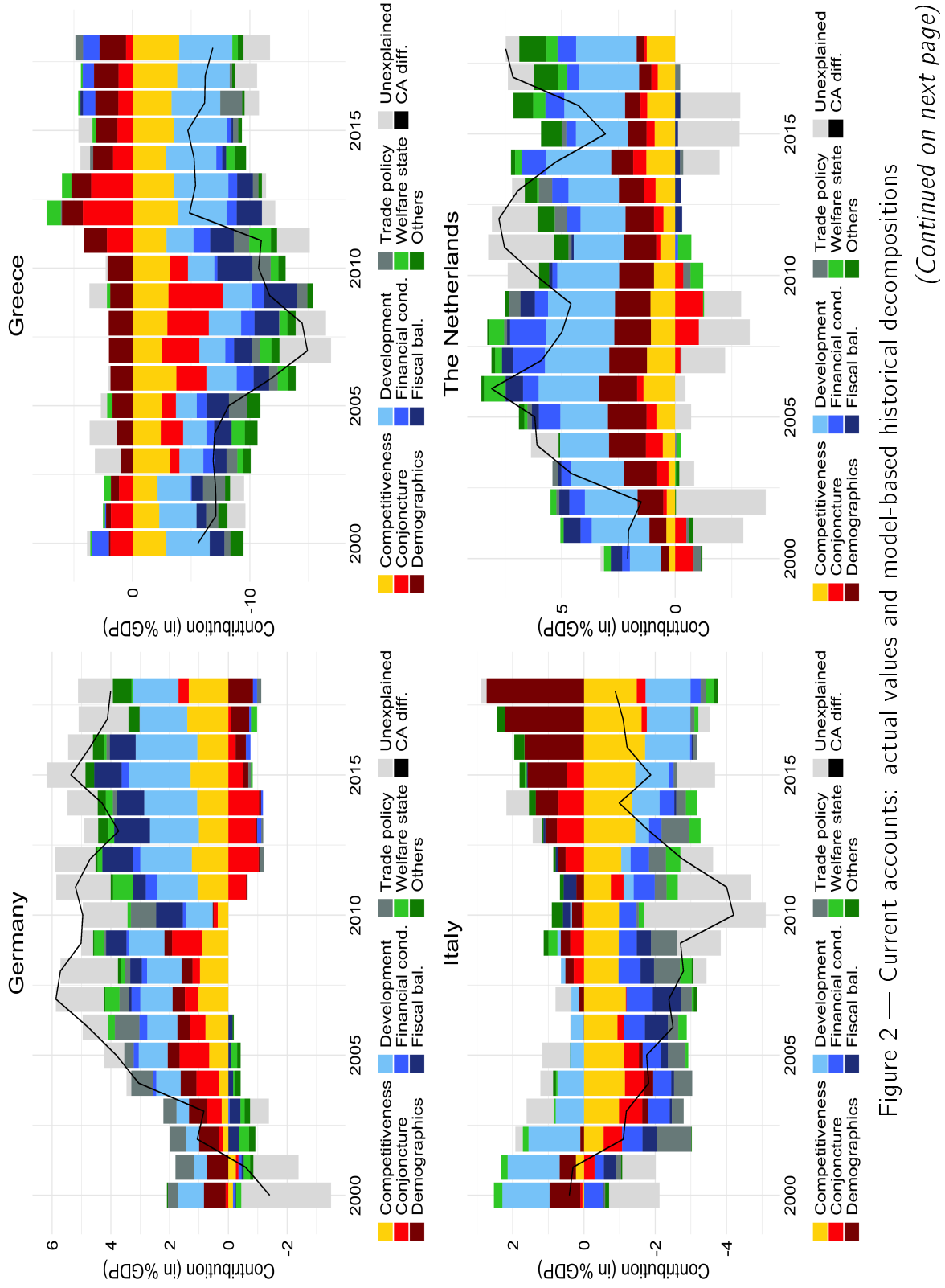

Figure 2 — Current accounts: actual values and model-based historical decompositions

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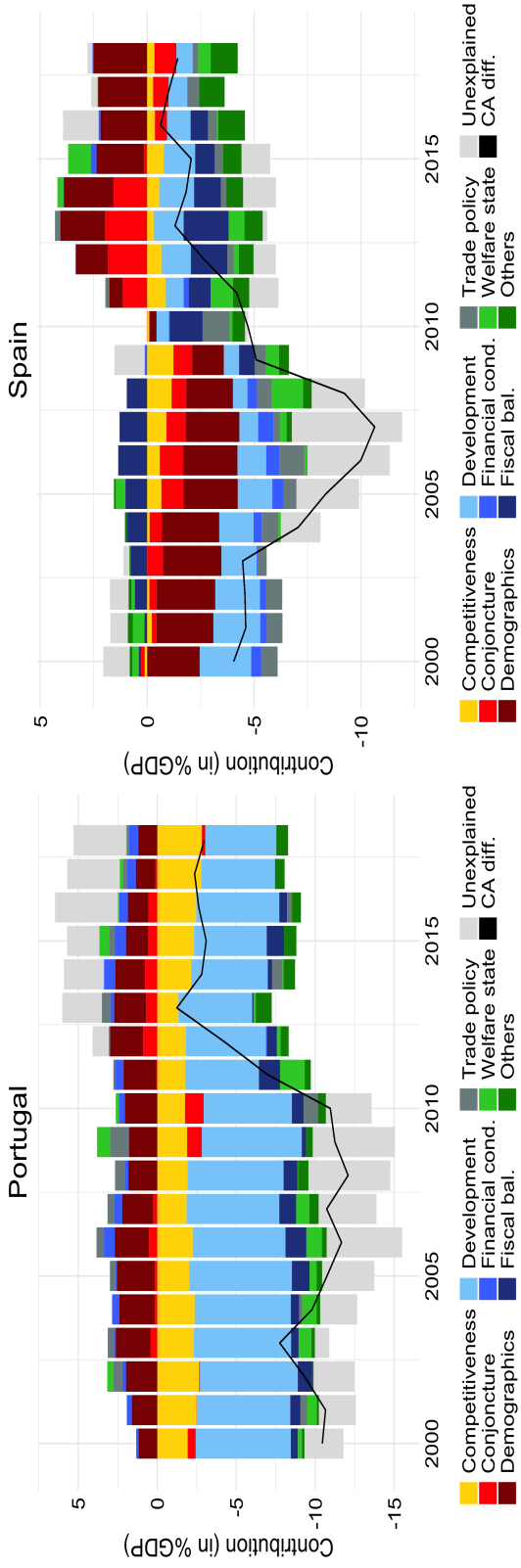

Figure 2 — Current accounts: actual values and model-based historical decompositions

Notes: The bars indicate the contributions of the different factors (in percent of domestic GDP) to the deviations from the eurozone average CA balances. For a given year, the different contributions sum to the CA balance gap relative to the eurozone average (indicated by the solid black line).

Spain experienced the opposite evolution. Indeed, until 2010, the contributions associated with the demographic developments were negative, -2.6% on average from 2000 to 2008, then gradually decreased to -1.48% in 2009, before turning positive in 2011. As in the German case, these effects are consistent with the demographic changes reported in Figure B.3. Indeed, the Spanish population trended upward until 2008 before slowing dramatically. This population growth, fueled by massive immigration during the early 2000s, put the Spanish population above the eurozone average hence penalizing the CA —relative to countries with higher inertia in the population.[30] With the slowdown in population growth after the 2008 global financial crisis, Spain almost swung to the other extreme (see Figure B.3), with a population growth among the lowest and an aging speed among the highest. By the late 2010s, the contributions associated with the demographic developments reversed —see Figure B.4 for further details on the evolution of the underlying factors.[31]

Overall, our findings show that demographics play a crucial role in determining CA gaps across eurozone members and are in line with Chinn and Prasad (2003)'s results according to which demographic profiles matter for the CA as soon as they differ across countries.

Looking now at the effects associated with the development stage —proxied by the relative GDP per capita in PPP terms—, one can note the peculiarity of Germany and the Netherlands. Indeed, these two nations benefitted from a development level well above the countries' average, which translated into positive —average— contributions of 1.23% and 2.45% of GDP, respectively. The gaps relative to the other countries mainly increased after the crises that manifestly curbed the convergence process between the economies. This is especially the case in Greece, where we observe a doubling of the —negative— contributions between 2008 and 2012 onwards, and Portugal, where the contribution reaches more than 5% of GDP on average per year. Similarly, in the case of Italy, we note a reversal of the contribution sign —from positive before the crisis to negative after 2010— reflecting

[30] Spain has indeed registered one of the biggest hikes in immigration in the world during the 2000s (European Commission). In 1999, the number of immigrants was estimated at 748,954 people (1.86% of the population). In 2008, the immigrant population grew to 5,268,762 (11.5% of the Spanish population), while over the same period, the total population in Spain increased by 5,955,662 (Swanson and Verdugo, 2011).

[31] The German and Spanish cases illustrate well what Cooper (2008) noted, i.e., the little attention given to demographic developments in explaining the CA (im)balances. Very few studies aimed at assessing the effects of demographics on the CA. Chinn et al. (2013) estimate the impact of the demographic change in the German case to be around +5% of GDP per year over the 2001-2008 period. For Felbermayr et al. (2017), the German CA surplus is mainly the result of higher savings driven by the aging population. Hence, in the framework of a "between-country differences exercise", our estimates do not appear wacky. Finally, note that Spain, due to its relatively small economic importance, is generally left behind. Nonetheless, in its External Balance Assessment methodology appendix (2018), the IMF provides a decomposition of the Spanish CA where the above observations, namely the changing sign of the contribution, are also visible.

the stall of the Italian economy, like any other severely hit by the crises. Obviously, these results stress the importance and the persistence of the lack of —real— convergence and their impact on the CA balances of the countries. As discussed above, the relative GDP per capita proxies the development stage to which different theories are related. In particular, this proxy allows us to account for *(i)* the Balassa-Samuelson effect that associates higher productivity to more developed countries, and *(ii)* the higher-than-otherwise CA balances —through capital export— associated with countries with higher capital-labor ratios. Hence, in a broad sense, the estimated contributions reflect the combination of different factors. For instance, the relative GDP per capita can be seen as a summary proxy for the structural determinants of exports. Such a perspective fits well with the observed export performances in all countries.

Contributions associated with the financial conditions highlight the relatively important heterogeneity within the zone. Indeed, CA balances of countries like Austria, Belgium, and Portugal have tended to be structurally higher than those of the other countries —other things being equal— owing to the relatively lower capital account openness in these economies, as opposed to Italy. On average, differences in the private credit growth rate have played a very marginal role, except in Germany and Greece. In Germany, the private credit dynamics lifted the CA balance by around 0.14% of GDP per year on average; in Greece, it deteriorated the CA balance by about -0.27% of GDP per year —with a much more pronounced impact — -0.5% — during the 2000s. However, drawing on lessons from the crises, the change in the credit policies —and capital account openness in Greece— have considerably abated the negative impacts on the CA balances at the end of the period, even reversing the negative effects in the case of Greece. In the same vein, the effects associated with the FDI net inflows were relatively modest. On average, FDI net inflows deteriorated the Greek CA by 0.1% of GDP per year while lifting the Dutch CA by 0.56% of GDP.

Fiscal stances in Greece and Portugal, predominantly in deficit and below the eurozone average, have tended to pull down the CA balances relative to the other countries. These negative contributions were particularly important in the late 2000s, exceeding -2% and -1% of GDP in Greece and Portugal, respectively. To a smaller extent, the picture also holds for France and Italy. Conversely, the relative fiscal position in Finland has tended to lift the CA balances —at least during the 2000s and early 2010s. In the late 2010s, however, the relatively more expansionary policies fueled the downward trend in the CA balance. Actually, over the same period, only Germany, due to its longstanding fiscal dis-

cipline (see Figure B.2 in Appendix B), registered positive contributions of 1% GDP on average.[32]

Beyond the relative fiscal stances, the government spending orientations appear to have been a significant determinant of CA balances' divergences within the eurozone. The social security levels in Portugal and Greece have thus tended to deteriorate more the CA balances compared to other economies. This has been so throughout the 2000s. Conversely, in the Netherlands and, to a smaller extent, in Belgium and Austria, the levels of social security were rather supportive of higher CA balances relative to the rest of the panel. This has also been the case in Germany since the mid-2000s —in line with the decreasing negative contributions observed since the early 2000s along the social reforms (pensions and labor market in 2001 and 2005).

Trade policies in the euro area (relative to that of global partners) have also participated in the CA balances' divergence within the eurozone.[33] While countries like Austria, followed by Belgium and Germany, have seen their CA balances positively impacted by their effective trade policies, Finland, Greece, Italy, and Spain, on the contrary, have seen their CA balances deteriorate —on average. This negative effect is largely due to the decreasing trend in the applied tariffs during the 2000s. This evolution led to a deterioration of the CA balances in peripheral countries that already suffered from competitiveness issues. While some of them benefitted from improvements in the export performances (market performance of exports on exports weighted imports) over the same period, such performances were insufficient to counter the breakthrough of trading partners in the domestic markets. Countries like Finland and Italy have been particularly harmed by their greater opening to trade while others cushioned it relatively well —especially Germany.

Finally, looking at the terms of trade, the contexts were substantially different. France and Germany are the only countries exhibiting negative contributions —on average— relative to the eurozone average because of their less favorable terms of trade. In contrast, Belgium, Finland, and Portugal benefitted the most. However, these positive effects have

[32] To some extent, the results in Figure 2 also illustrate the relationship between the —cyclically adjusted— fiscal balances and the CA balances. Pieces of evidence on the twin deficits hypothesis validity are visible with the CA balance dynamics reflecting the fiscal stance (e.g., Belgium and Finland over the whole period, France and Italy during the 2000s). However, in contrast with the widespread view that fiscal deficits go hand in hand with CA deficits, results in Figure 2 show that this relationship is not systematic. An illustrative example is the case of Germany during the first half of the 2000s for which we observe, concomitantly, rising negative contributions of the fiscal balance and improvements in the CA balance.

[33] It is worth recalling that the effects discussed are attributable to the trade policies and not the overall trade performances. Indeed, the latter can be appraised by conciliating the different contributions of *Competitiveness*, *Development stage* as well as *Trade policy*. This is the result of our structural approach focusing on determinants and not the CA items.

been offset by the net foreign asset position —except in Belgium, where it magnified the positive impact of the terms of trade. The above developments have been detrimental to Southern economies, except for Italy.

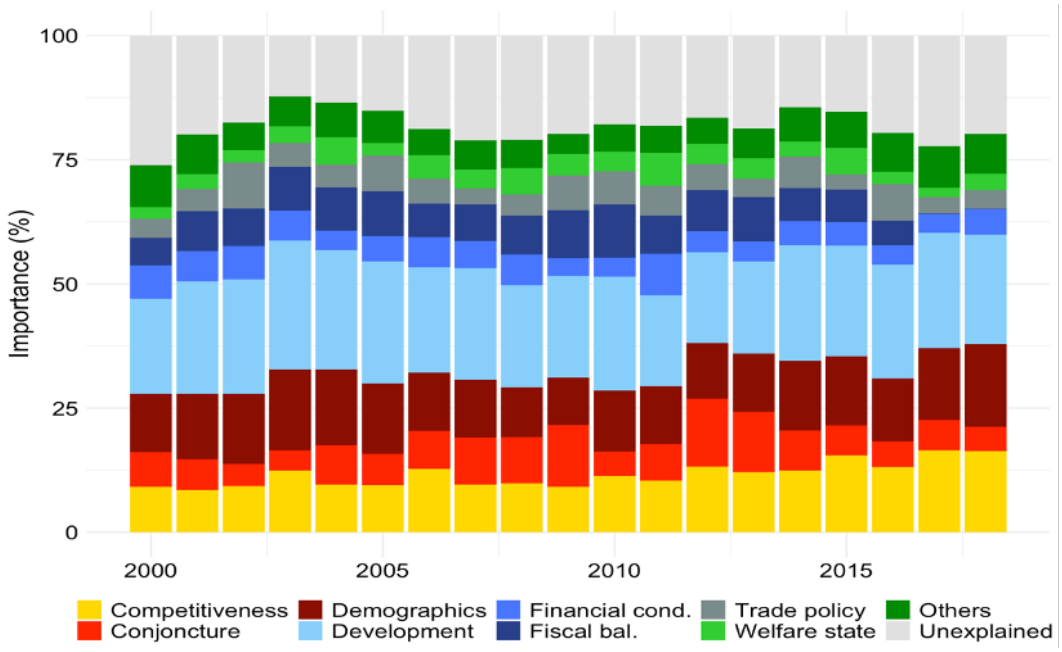

Figure 3 — Importance of the factors

Note: The importance of the factors is computed using their contributions' ranges —the Min-Max intervals considering all the countries— divided by the yearly sum of all contributions' ranges.

Overall, our analysis provides a rich portrait of the factors underlying the CA divergences within the eurozone. Figure 3, in which we plot the relative importance of the different factors underlined above, provides a compendium of the key takeaways at the scale of the euro area.[34] Two of them are particularly worth noting. First and foremost, the issue of real convergence remains crucial. Figure 3 indeed shows evidence of persistent differences in economic development between countries. By explaining around a fifth of the CA divergences, the lack of real convergence —resulting from an unsuccessful catching-up process— has been the key determinant of the CA balances' divergence. This observation further stresses the relevance of our methodological approach. As noted above, the focus on the sustainable nature of CA balances has, for many years, offered a cursory and circumstantial reading of the CA (im)balances. The austerity programs therefore permitted to fix the situation in the short run —amid the crises— but by treating the symptoms and not the causes. Consequently, the subdued prospects in most countries have interrupted the convergence process. Second, the *competitiveness legend* appears

[34] Factors' importance is assessed using their contributions' ranges —the Min-Max intervals considering all the countries— divided by the annual sum of all contributions' ranges.

to be founded and accounts for more than 10% of the divergences. As shown above, in nations like Greece and Italy, the competitiveness issue has even been the main/first factor for some time. While Figure 3 depicts the importance of the competitiveness differentials at an aggregated level, it is worth mentioning that at a more disaggregated level, data point to the relative stability of the cost-competitiveness gap and the growing/fluctuating importance of the price competitiveness gap since 2002. By nature, the combination of these two structural weaknesses increases the euro area member countries' vulnerability to a number of shocks that could further widen the gaps. Priority should thus be given to setting up balanced and consistent convergence paths.

4. Conclusion

Countries' external positions are crucial to macroeconomic stability and growth prospects, and identifying the factors underpinning the CA balances' dynamics is thus essential to guide policymakers. Our paper contributes to this objective by explaining CA balances' divergences between the EMU Member States. Specifically, by relying on a robust estimation of the CA balances, we assess the contributions of several factors in explaining the CA differences in the euro area over the last two decades. In doing so, we provide a reading grid beyond the usual dichotomy of sustainable and unsustainable balances that has prevailed since the late 2000s. Among the different factors, the stage of economic development and the competitiveness level (both cost and price) appear to have been the primary drivers of the CA balances' divergence between EMU Member States —particularly the deficits in Southern countries. Gaps regarding fiscal policy, particularly loose in the periphery, have also contributed to the divergences. Unfortunately, the changes in the fiscal policy stances in the aftermath of the 2008 financial crisis and the European sovereign debt crisis, while correcting CA balances towards their —deemed— sustainable levels, have halted, even overturned, a —long course and difficult— real convergence process within the zone.

Real convergence thus appears as the main challenge. Indeed, while the European authorities cannot influence a part of the gap —due to, e.g., demographic factors, international environment—, the role of fiscal redistribution and investment at the eurozone level could help achieve macroeconomic convergence.

One way to resorb CA gaps would be that Germany initiates politics to reduce its surplus. Given that European authorities do not have the power to force Germany to apply such reforms, a new avenue may come from China. Indeed, putting potential domestic demand as a driver of China's economic growth —as announced in the Global China 2049

Initiative in 2020— could impact the Chinese demand for German production.[35] Such a new Chinese economic model —from an export driver growth to a model emphasizing domestic production and consumption— could force Germany to reorient its supply to eurozone countries. This dynamic could help reduce CA gaps within the eurozone if Germany does not pass on China's demand to other European countries.

On the macroeconomic convergence issue, we found signs of convergence at the beginning of the period for countries such as Spain and Italy, but the financial crisis has strongly slowed the process. Supporting productive economic investment in the eurozone, especially in peripheral countries, could help achieve macroeconomic convergence. These reforms would resonate with the willingness of the European institutions, Commission and Parliament, to develop economic and energetic resilience in case of external shocks (such as the Covid-19 pandemic and the Ukrainian War). This can be illustrated by the debate on the ecological transition, expressed in the European Recovery Plan, EU Next Generation, and several speeches as the opening speech of President von der Leyen at the European Development Days in June 2022. These new challenges plenty justify massive investment and indebtedness at the eurozone level.

Overall, the current context of China's transformation of its economic model, the willingness of European authorities to develop economic and energetic resilience to external shocks, and the urge for ecological transition appear to be various opportunities to help achieve macroeconomic convergence within the EMU.

[35] It is worth mentioning that the German economy is relatively dependent on Chinese demand for products such as agricultural machinery and tools, and cars.

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Appendices

A. Data

Table A.1 — Data information

Variables	Name	Relative to trade partners	Construction	Data source
Aging growth rate	*aging*	✓	Difference between the old dependency ratio in $t+20$ and the old dependency ratio in t	UNCTADstat
Capital Control (lagged)	*l.KAOPEN*	✓		Chinn & Ito
Currency misalignments	*Mis*		Real effective exchange rate misalignments	EQCHANGE (CEPII)
Current account	*CA*		Current account balance expressed in percentage of GDP	WEO (IMF)
Expected GDP growth rate	*Expected_GDPg*	✓	GDP growth rate in $t+3$	WEO (IMF)
Foreign Direct Investment (lagged)	*l.FDI*	✓	Growth of Foreign Direct Investment (net inflows) expressed in percentage of GDP	WDI (World Bank)
Government balance (lagged)	*l.Gov_Bal*	✓	Cyclically adjusted government balance expressed as a percentage of GDP	WEO (IMF)
Market performance of exports on exports weighted imports	*d.MPerf_Exp*	✓		AMECO
Net foreign asset position (lagged)	*l.NFA*		Net foreign asset position expressed in percentage of GDP	Lane & Milesi-Ferretti
Old dependency ratio	*OADepRatio*	✓	Ratio of the population exceeded 64 years old and the population between 15 and 64	UNCTADstat
Output Gap	*Output_gap*	✓	Output gap expressed as a percentage of GDP (GDP per capita in PPP, HP filtered)	WEO (IMF)
Population growth rate	*popg*	✓	Population growth rate	UNCTADstat
Private sector debt (lagged)	*l.d.PrvD*	✓	Growth of the private sector debt expressed in GDP	WDI (World Bank)
Relative income per capita in PPP (lagged)	*l.GDP_PC*	✓	Log of the GDP per capita in PPP	WEO (IMF)
Tariff rate, applied, simple mean, all products	*Tariffs*	✓		WDI (World Bank)
Terms of trade (lagged)	*l.tot*	✓	Lagged ratio of export price to import price	UNCTADstat
Total factor productivity (lagged)	*l.CTFP*	✓	Total factor productivity at current PPPs	Penn World Table
Trade openness (lagged)	*l.d.Trade*	✓	Sum of imports and exports divided by GDP	WDI (World Bank)
Unit Labor Cost (lagged)	*l.d.ULC*	✓	Nominal unit labor cost in log difference	AMECO
VIX	*d.VIX*		Chicago VIX index	CBOE

Note: Time-varying weights have been used to compute variables in effective terms against 186 trading partners (source: EQCHANGE, CEPII).

B. Additional results

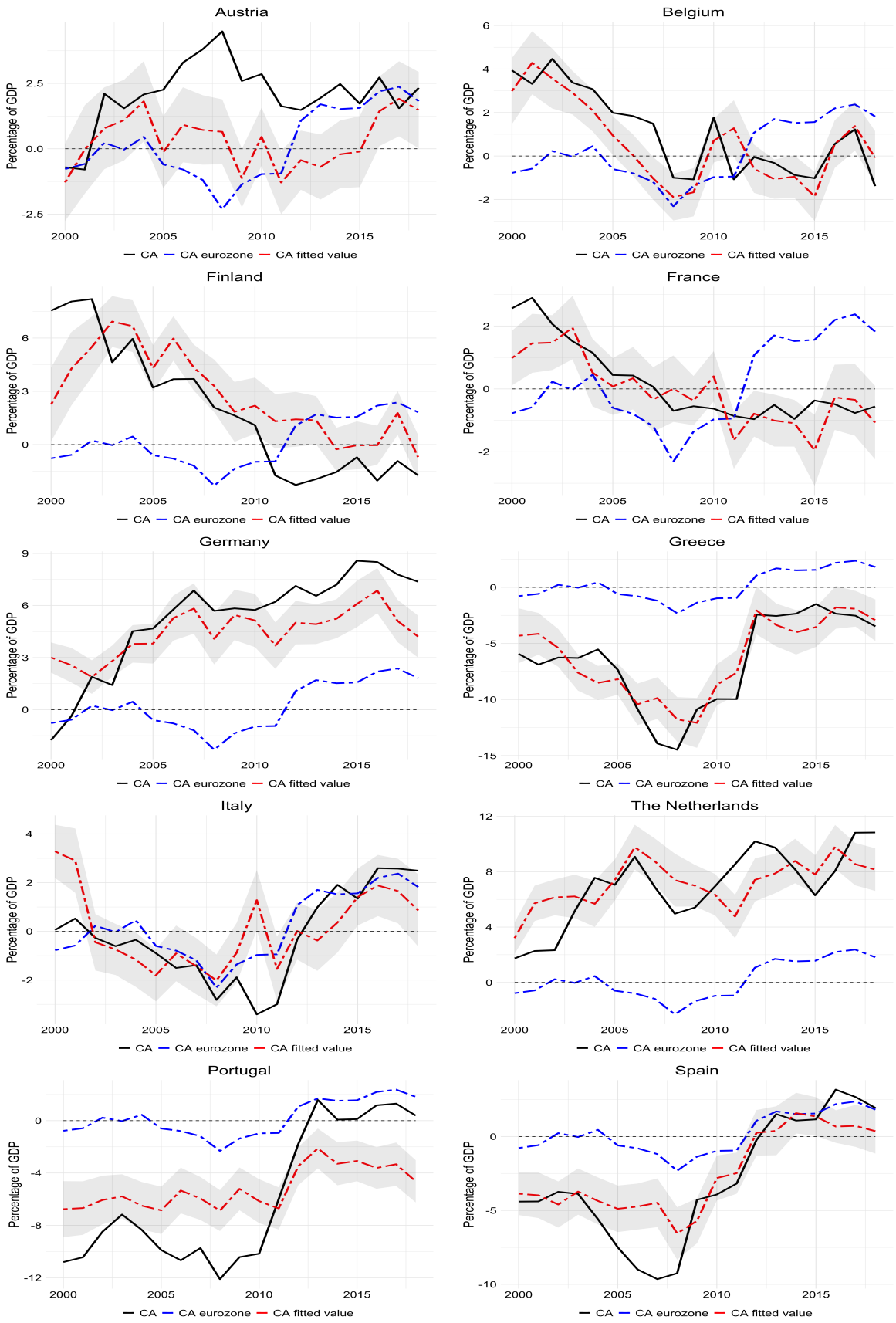

Figure B.1 — Current accounts: actual and fitted values

Note: The eurozone current account balance is computed as the GDP-weighted average of the countries' current account balances.

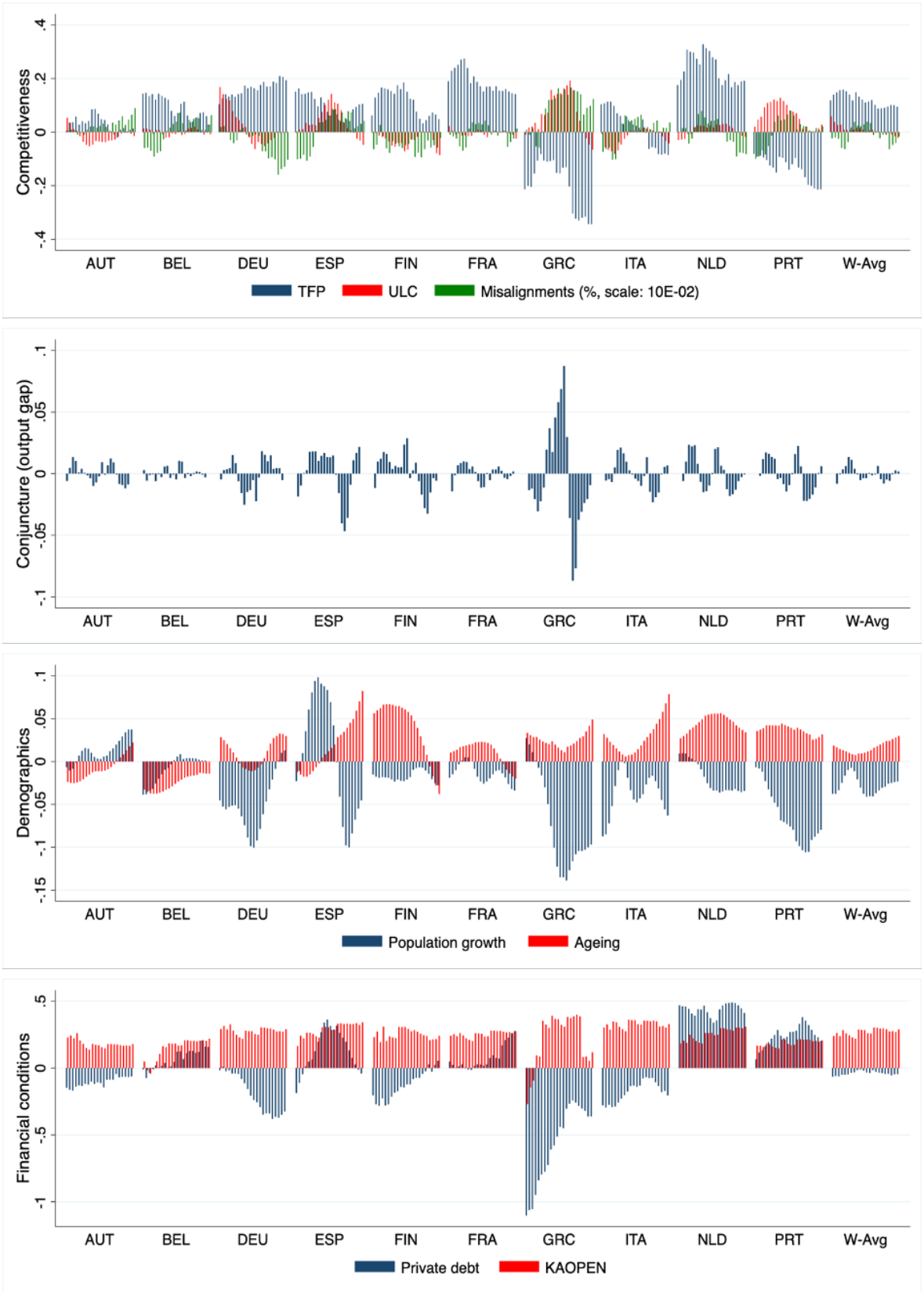

Figure B.2 — Variables' evolutions (1997-2018)

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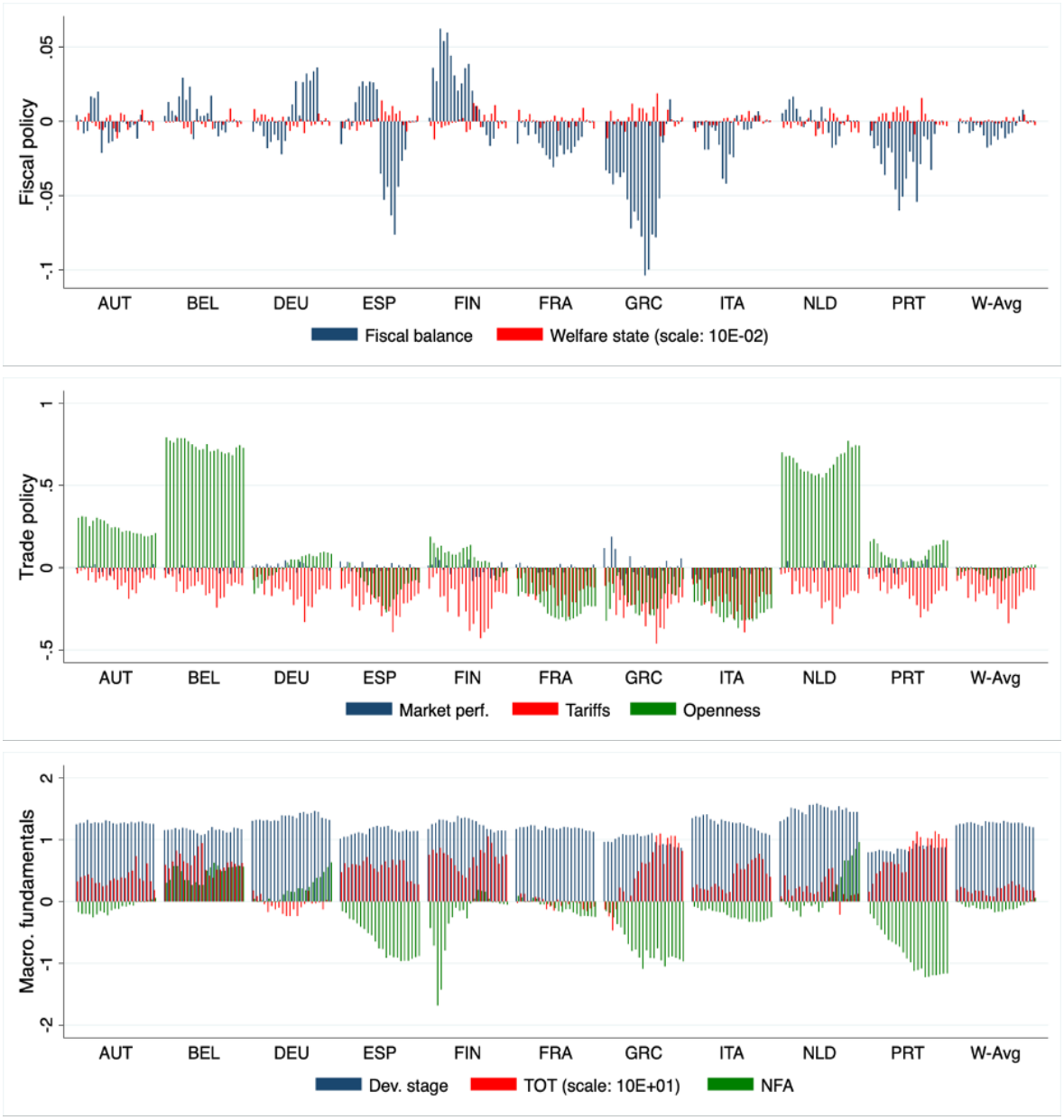

Figure B.2 — Variables' evolutions (1997-2018 ; Continued)

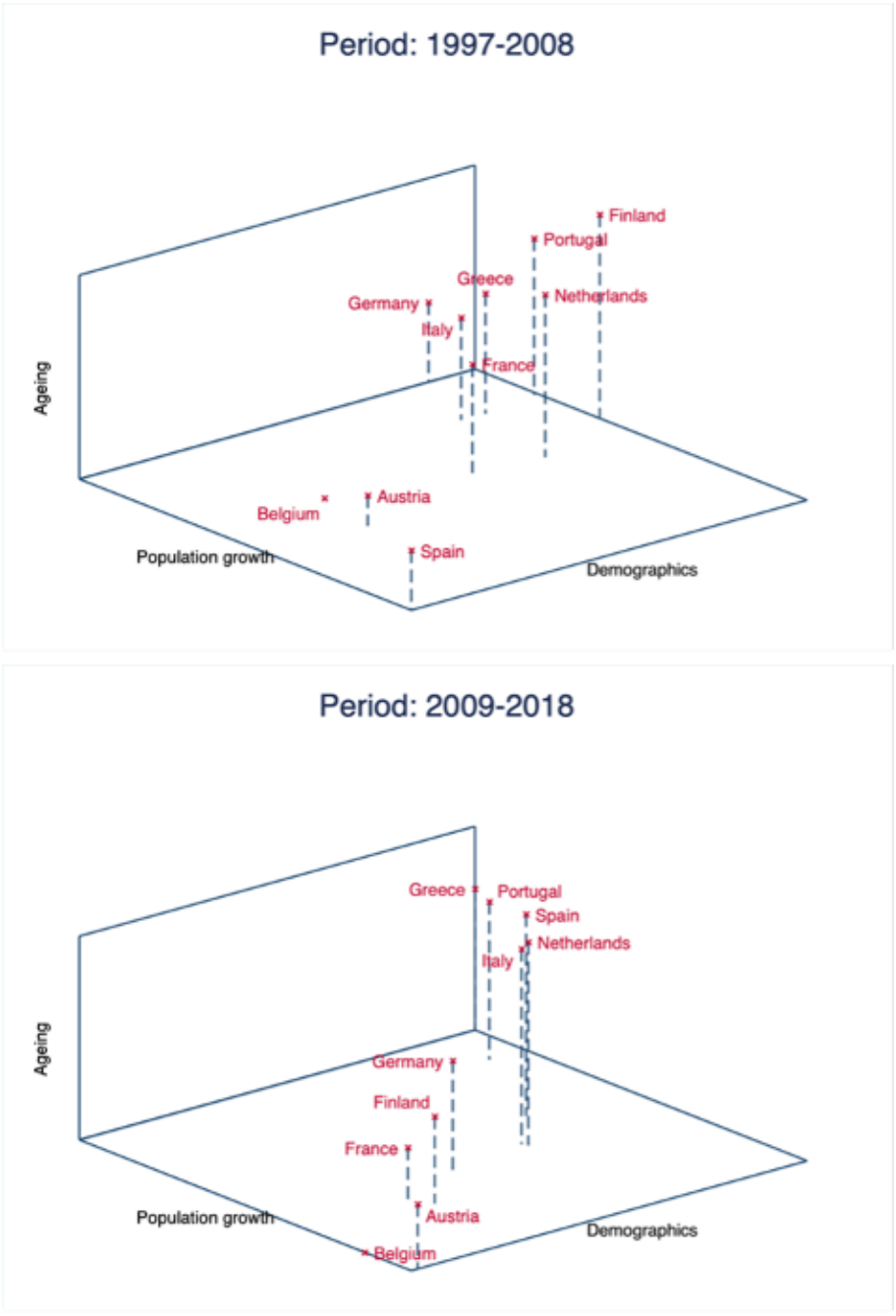

Figure B.3 — Demographic developments

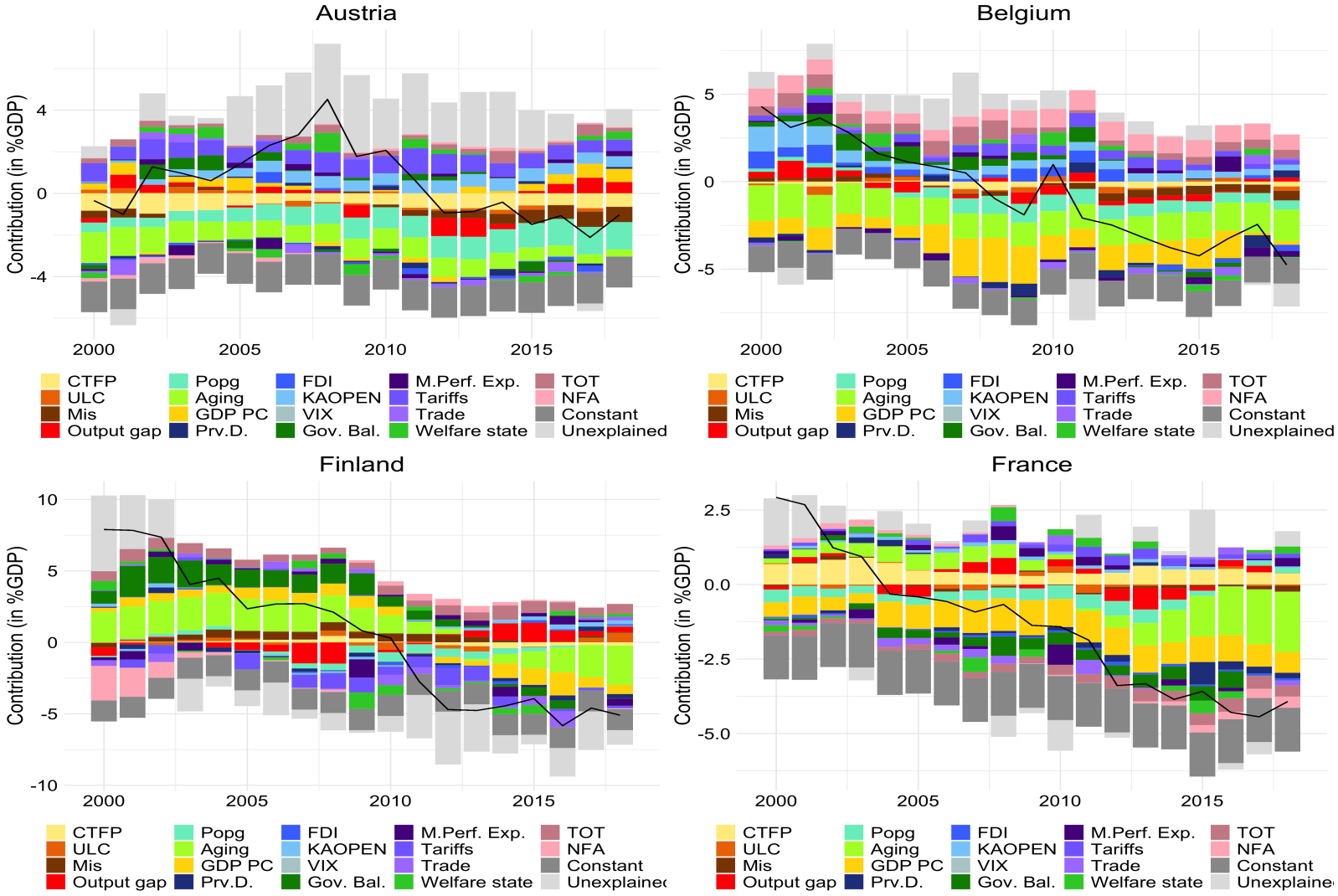

Figure B.4 — Current accounts: actual values and model-based historical decompositions

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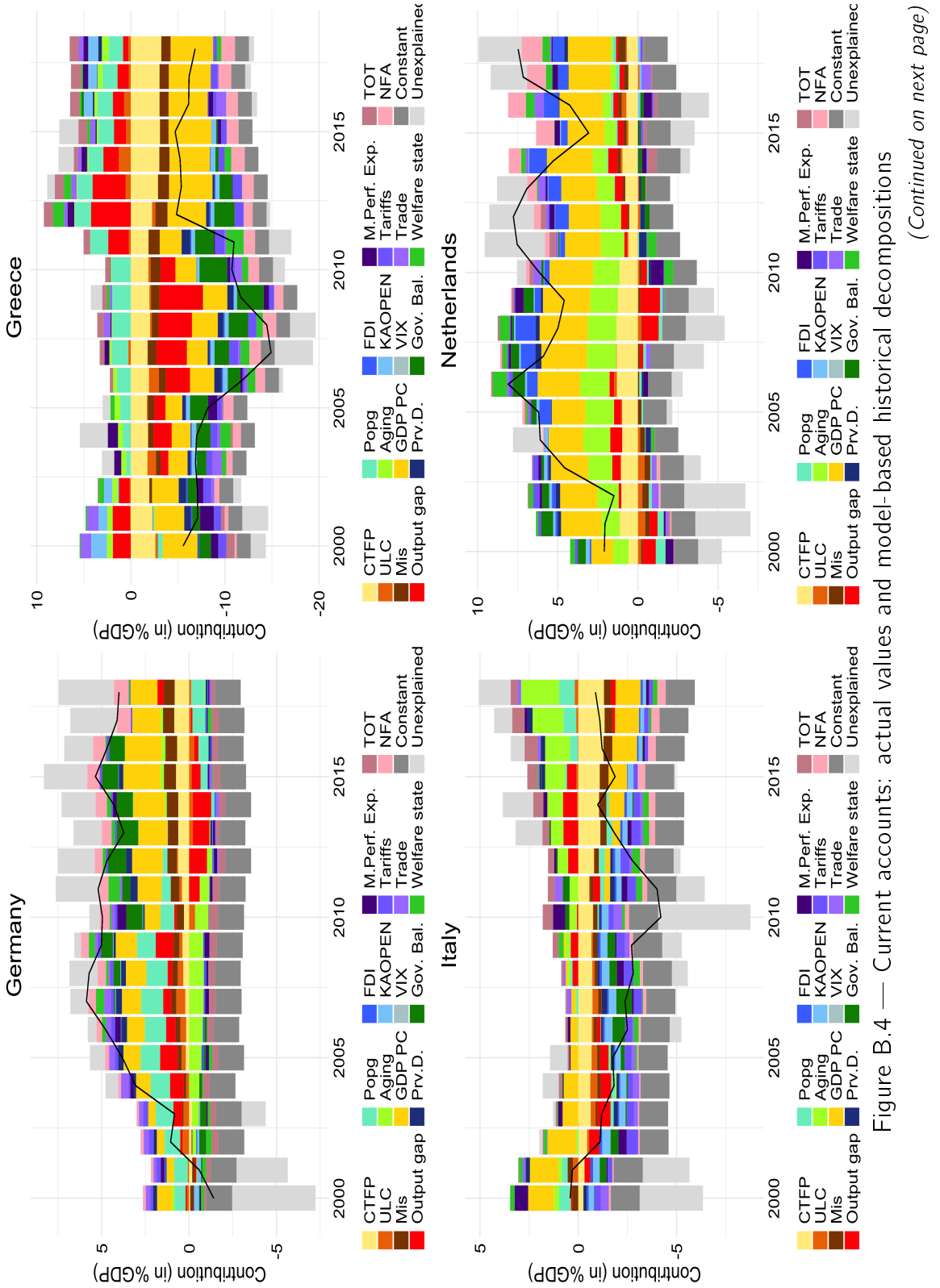

Figure B.4 — Current accounts: actual values and model-based historical decompositions

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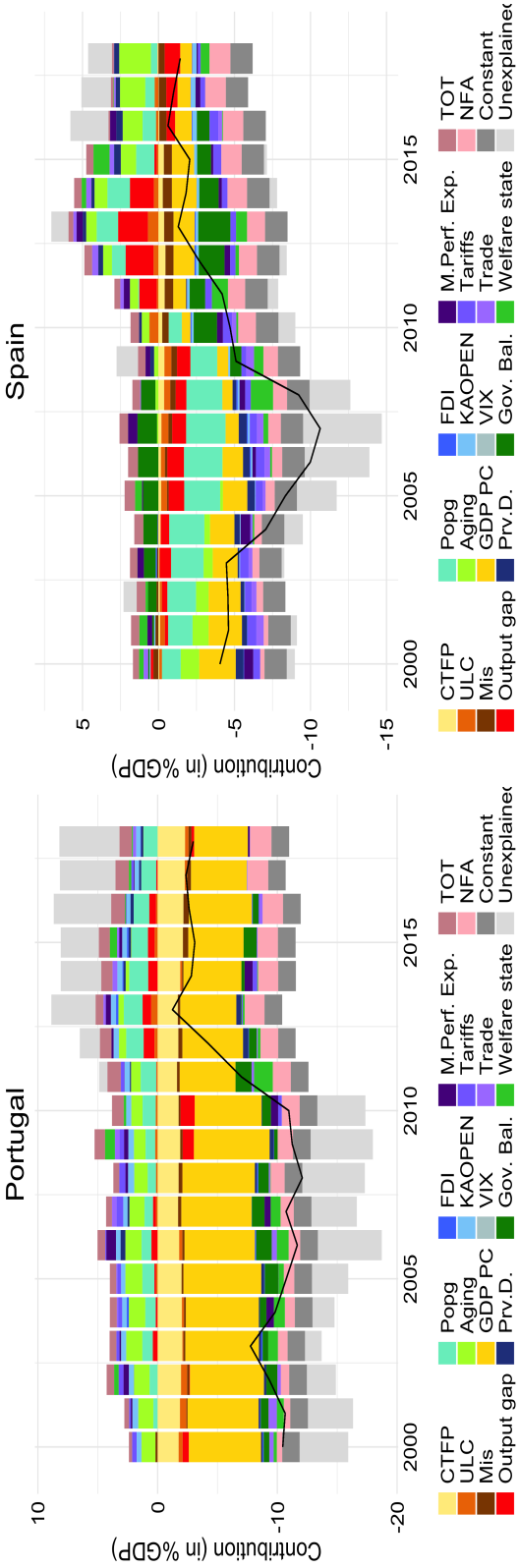

Figure B.4 — Current accounts: actual values and model-based historical decompositions

Notes: The bars indicate the contributions of the different factors (in percent of domestic GDP) to the deviations from the eurozone average CA balances. For a given year, the different contributions sum to the CA balance gap relative to the eurozone average (indicated by the solid black line).

Table B.1 — Detailed average contributions: deviations from the eurozone average CA (2000-2018)

	Austria	Belgium	Finland	France	Germany	Greece	Italy	Netherlands	Portugal	Spain
Competitiveness	-0.93 (0.41)	-0.41 (0.48)	0.31 (0.48)	0.44 (0.25)	0.76 (0.50)	-3.08 (0.56)	-1.02 (0.50)	0.84 (0.36)	-2.15 (0.39)	-0.48 (0.38)
CTFP	-0.66 (0.16)	-0.21 (0.14)	-0.01 (0.22)	0.52 (0.17)	0.34 (0.34)	-2.33 (0.56)	-0.79 (0.32)	0.93 (0.28)	-1.91 (0.20)	-0.20 (0.15)
Mis	-0.26 (0.30)	-0.16 (0.29)	0.31 (0.27)	-0.04 (0.07)	0.35 (0.29)	-0.80 (0.36)	-0.18 (0.20)	-0.03 (0.24)	-0.21 (0.14)	-0.27 (0.30)
ULC	-0.01 (0.16)	-0.05 (0.22)	0.02 (0.28)	-0.03 (0.11)	0.08 (0.25)	0.05 (0.53)	-0.05 (0.16)	-0.06 (0.19)	-0.03 (0.29)	-0.01 (0.34)
Conjuncture	0.04 (0.46)	-0.01 (0.45)	-0.03 (0.73)	-0.03 (0.31)	0.04 (0.64)	0.07 (2.47)	-0.01 (0.43)	0.04 (0.57)	0.12 (0.55)	-0.10 (1.00)
Demographics	-1.79 (0.17)	-2.10 (0.28)	0.58 (1.79)	-0.53 (0.78)	0.16 (0.45)	1.61 (0.61)	0.57 (0.82)	1.17 (0.47)	1.82 (0.39)	-0.48 (2.24)
Aging	-0.89 (0.28)	-1.61 (0.19)	0.79 (1.73)	-0.25 (0.90)	-0.32 (0.40)	0.33 (0.25)	0.49 (0.58)	1.24 (0.54)	0.83 (0.53)	0.29 (0.89)
Pop growth	-0.90 (0.30)	-0.49 (0.44)	-0.21 (0.31)	-0.28 (0.20)	0.48 (0.71)	1.28 (0.76)	0.09 (0.33)	-0.08 (0.20)	0.99 (0.42)	-0.77 (1.53)
Development	0.22 (0.30)	-1.25 (0.64)	0.06 (0.79)	-0.82 (0.23)	1.23 (0.53)	-3.20 (1.03)	0.03 (0.88)	2.45 (0.40)	-5.52 (0.69)	-1.33 (0.54)
Financial conditions	0.40 (0.29)	0.80 (0.67)	-0.03 (0.31)	-0.06 (0.23)	0.07 (0.17)	-0.32 (0.91)	-0.43 (0.20)	0.64 (0.42)	0.37 (0.24)	-0.18 (0.28)
FDI	-0.04 (0.17)	0.30 (0.42)	-0.01 (0.11)	-0.06 (0.03)	-0.05 (0.05)	-0.10 (0.04)	-0.09 (0.03)	0.56 (0.37)	0.00 (0.09)	-0.03 (0.05)
KAOPEN	0.47 (0.17)	0.59 (0.34)	0.09 (0.18)	0.09 (0.04)	-0.02 (0.09)	0.05 (0.75)	-0.30 (0.07)	0.07 (0.12)	0.41 (0.04)	-0.12 (0.11)
Private debt	-0.03 (0.14)	-0.09 (0.33)	-0.11 (0.21)	-0.09 (0.22)	0.14 (0.17)	-0.27 (0.38)	-0.04 (0.16)	0.01 (0.21)	-0.04 (0.25)	-0.03 (0.35)
Fiscal balance	0.10 (0.32)	0.32 (0.40)	0.81 (0.84)	-0.28 (0.21)	0.33 (0.53)	-1.27 (0.94)	-0.14 (0.29)	0.18 (0.34)	-0.65 (0.42)	-0.16 (1.09)
Welfare state	0.09 (0.36)	0.11 (0.30)	-0.03 (0.45)	0.00 (0.26)	0.07 (0.26)	-0.18 (0.76)	-0.08 (0.21)	0.16 (0.38)	-0.24 (0.60)	-0.13 (0.59)
Trade policy	0.70 (0.36)	0.38 (0.34)	-0.66 (0.64)	0.11 (0.26)	0.27 (0.33)	-0.68 (0.73)	-0.36 (0.28)	0.07 (0.26)	0.15 (0.49)	-0.51 (0.38)
Market Perf.	0.01 (0.23)	0.00 (0.37)	-0.04 (0.48)	0.01 (0.26)	-0.01 (0.21)	-0.07 (0.68)	0.03 (0.28)	-0.01 (0.33)	0.03 (0.40)	-0.02 (0.38)
Tariffs	0.78 (0.18)	0.42 (0.18)	-0.49 (0.48)	0.17 (0.11)	0.16 (0.07)	-0.68 (0.24)	-0.35 (0.12)	0.06 (0.15)	0.15 (0.26)	-0.42 (0.14)
Trade	-0.09 (0.26)	-0.03 (0.28)	-0.13 (0.42)	-0.07 (0.19)	0.12 (0.18)	0.07 (0.64)	-0.05 (0.22)	0.03 (0.29)	-0.02 (0.30)	-0.06 (0.30)
Others	0.24 (0.20)	1.42 (0.19)	0.41 (0.75)	-0.30 (0.28)	0.09 (0.24)	-0.60 (0.33)	0.06 (0.13)	0.37 (0.43)	-0.47 (0.25)	-0.46 (0.51)
NFA	-0.01 (0.13)	0.87 (0.18)	-0.22 (0.79)	-0.02 (0.17)	0.45 (0.23)	-1.04 (0.35)	-0.21 (0.13)	0.37 (0.49)	-1.23 (0.45)	-0.91 (0.39)
TOT	0.25 (0.14)	0.55 (0.26)	0.63 (0.17)	-0.28 (0.11)	-0.35 (0.09)	0.44 (0.55)	0.27 (0.22)	0.00 (0.22)	0.76 (0.27)	0.46 (0.17)
Unexplained	1.76 (1.32)	0.45 (1.10)	-0.82 (2.36)	0.29 (0.74)	0.78 (1.98)	-0.38 (1.84)	-0.33 (1.67)	-0.25 (2.22)	-0.68 (3.83)	-0.56 (2.02)

Notes: Entries correspond to the averages of the contributions over the 2000-2018 period. Standard deviations are reported in parentheses. The average euro area CA is computed —on a yearly basis— as the GDP-weighted average of the considered economies' CA.

C. Selecting CA determinants

This Appendix is devoted to presenting the Bayesian analysis on which we rely to select the CA determinants used in the paper. We begin with a brief presentation of the Bayesian Model Averaging (BMA) methodology, followed by a discussion on the data, and conclude with the results.

The Bayesian Model Averaging (BMA) methodology

We resort to Bayesian Model Averaging techniques to deal with the issue of model uncertainty and for parsimony purposes. Before going into technical details —although the BMA is briefly presented here[36]—, note that the starting point of the BMA methodology is the finding that there are different possible models, each defined by a different combination of regressors and by a probability of being the "true" model. It proceeds by estimating these different models and constructing a weighted average of all of them.

Considering X potential determinants, one obtains 2^X possible combinations of determinants and thus 2^X potential models M_j with $j = 1, \ldots, 2^X$. Denoting D the dataset available, and considering θ a function of θ^j parameters to be estimated, the posterior density of the parameters for all the models under consideration is given by:

$$p(\theta|D) = \sum_{j=1}^{2^X} P(M_j|D)\ p(\theta|D, M_j) \tag{C.1}$$

Thus, the posterior density of the parameters is defined by the weighted sum of the posterior density of each considered model, with weights being their posterior model probability.

Given the prior model probability $p(M_j)$, the posterior model probability is calculated using the Bayes theorem as follows:

$$P(M_j|D) = \frac{p(D|M_j)\ p(M_j)}{\sum_{j=1}^{2^X}\ p(D|M_j)\ p(M_j)} \tag{C.2}$$

[36] See Hoeting et al. (1997, 1999) and Fernàndez et al. (2001a, b) for further details.

where $p(D|M_j) = \int p(D|\theta^j, M_j)\ p(\theta^j|M_j)\ d\theta^j$ is the marginal likelihood of the data given the model M_j; $p(\theta^j|M_j)$ is the prior density of the parameter θ^j under the model M_j; $p(D|\theta^j, M_j)$ is the likelihood and $p(M_j)$ is the prior probability that M_j is the "true" model.

Summing the posterior model probabilities for all the models including a specific regressor (determinant), we derive the *posterior inclusion probability* (PIP), i.e., the probability that this regressor belongs to the "true" model. It is calculated as:

$$p(\theta_h \neq 0|D) = \sum_{\theta_h \neq 0} p(M_j|D) \tag{C.3}$$

Generally, a variable is considered robust if its posterior inclusion probability is greater or equal to 0.50. We here follow the same strategy. However, we also take advantage of the model statistics and consider variables belonging to at least one of the best three models, provided that their PIP are relatively close to the threshold (i.e., 0.5). Regarding the BMA methodology, we follow Fernàndez, Ley and Steel (2001a)'s (hereafter, FLS) BMA approach as we do not prefer any specific model.[37] We also use improper noninformative priors for the parameters that are common to all models, and a g-prior structure for the slope parameters (with two values for the latter, identified as "*Prior 1*" and "*Prior 9*" as discussed in FLS (2001b)).

The data

Taking advantage of the vast literature presented in Sections 1 and 2, we consider a set of 32 potential determinants. Accordingly, the set of fundamental variables is relatively trivial.

Regarding the macroeconomic fundamentals, we retain *(i)* the net foreign asset position (NFA), *(ii)* the GDP growth (*GDPg*), *(iii)* the expected GDP growth (*Expected_GDPg*), and *(iv)* the GDP per capita —in PPP terms— relative to trading partners (*GDP_PC*) —proxying for the Balassa-Samuelson effect. In addition to this standard set of macroeconomic fundamentals, we also select the net international investment position (*NIIP*). Looking now at structural fundamentals, demographics come first. Rather than considering the

[37] The FLS methodology assumes equal probabilities for all models, i.e., $p(M_1) = p(M_2) = ... = p(M_{2^X}) = 1/2^X$.

usual three variables —i.e., the population growth, the aging rate, and the dependency ratio— we take advantage of the high correlations between the variables and compute a factor —*Demographics*— summarizing both the structure and the dynamics of the population.[38] To account for the importance and the multidimensionality of trade, we collect different variables: *(i)* trade openness (*Trade*), *(ii)* exports of goods (*Goods_Exp_pgdp*), *(iii)* manufacturing value added (*Manuf*), *(iv)* market performance of exports of goods and services on export-weighted imports of goods and services (*MPerf_Exp*), and *(v)* a measure of global market share (*Market_share*).

Policy variables are also considered. To account for the effect of fiscal policy, we consider the cyclically adjusted government balances (*Gov_Bal*). To gain insights into the nature of the spending and the effect in terms of investment-saving behaviors, we collect data on current transfers, tax revenues, and public services expenditures, and summarize those three variables into a factor, Welfare state. To reflect the financial cycles, we consider data on the private debt and foreign direct investment growth rates (*dPrivDebt* and *dFDI*, respectively).[39] As is often the case, capital control measures —proxied here by the Quinn and the *KAOPEN* indices— accompany the aforementioned set of variables.

Turning now to cyclical factors, we retain *(i)* the output gap (*Output_gap*), and *(ii)* the terms of trade (*TOT*).

Finally, we consider a set of variables that might prove relevant in explaining the differences in the countries's current account balances: *(i)* the currency misalignments (*Mis*), *(ii)* the institutional quality (*Insti*), *(iii)* the applied tariff rates (*Tariffs*), *(iv)* the capital stock (*Capital_stock*), *(v)* the inflation rate (*Inflation*), *(vi)* the remittances outflows (*Remit*), *(vii)* the unit labor cost (*ULC*), *(viii)* the real effective exchange rate (*REER*), *(ix)* a measure of the evolution of China in international trade (China) —to proxy the China shock, and *(x)* two measures of the total factor productivity (*RTFP* and *CTFP*).[40]

[38] Demographics opposes, on the left side, the total population growth rate, and, on the right side, the old-age-dependency ratio, and the population aging. Hence, the lower the score on this factor, the more dynamic the population is. We also test separately the importance of related variables: *(i)* the working population (*Working_pop*), and *(ii)* the level of human capital (*Human_Cap*).

[39] Note that the cyclical components —HP filter-based— of the two variables were also considered to capture the effect of financial excesses. However, these alternative measures gave any significant results.

[40] "China" refers to the exports of China's goods and services relative to world's exports of goods and services; "*RTPF*" is the total factor productivity at constant national prices (2017=1); "*CTPF*" is the total factor productivity level at PPPs (USA=1).

Table C.1 — Posterior Inclusion Probabilities

Variable	Posterior Inclusion Probability				
	Model prior				
	Uniform	Fixed		Random	
		Prior 1	*Prior 9*	*Prior 1*	*Prior 9*
Capital_stock	0.1390	0.0064	0.0492	0.0880	0.1194
dChina	0.0294	0.0010	0.0116	0.0084	0.0297
Demographics	**0.9594***	0.3927	**0.9685***	**0.9227***	**0.9628***
dIREER	0.0644	0.0018	0.0195	0.0152	0.0581
dMarket_share	0.0370	0.0018	0.0170	0.0176	0.0350
Expected_GDPg	**0.7582***	0.3099	**0.6341***	**0.5808***	**0.7458***
Goods_Exp_pgdp	0.2612	0.1694	0.3203	**0.3032***	0.2706
Human_Cap	0.2371	0.0308	0.1032	0.1404	0.2058
Insti	0.0579	0.0495	0.0308	0.0296	0.0577
KAOPEN	**0.8855***	0.2489	**0.8505***	**0.8400***	**0.8517***
ICTFP	**0.9974***	0.2369	**0.9933***	**0.9874***	**0.9972***
ldFDI	0.0446	0.0026	0.0192	0.0131	0.0451
ldPrivDebt	**0.9914***	**0.9983***	**0.9873***	**0.9891***	**0.9894***
ldULC	0.0786	**0.1191***	0.0504	0.0459	0.0743
lGDP_PC	**1.0000***	**1.0000***	**1.0000***	**1.0000***	**1.0000***
lGDPg	0.0599	0.0064	0.0423	0.0290	0.0612
lGov_Bal	**0.9442***	**0.9310***	**0.9625***	**0.9170***	**0.9528***
lInflation	**0.4564***	0.0088	0.2634	**0.2160***	**0.4753***
lNFA	**0.9494***	0.1526	**0.8888***	**0.8595***	**0.9136***
Manuf	0.0846	0.0336	0.0255	0.0235	0.0828
Mis	**0.8175***	**0.4070***	**0.7595***	**0.7360***	**0.7664***
MPerf_Exp	**0.6946***	0.0340	**0.5226***	**0.4344***	**0.7040***
NIIP	0.1574	0.0137	0.0617	0.0630	0.1514
Output_gap	**0.9995***	**0.8627***	**0.9991***	**0.9995***	**0.9996***
Quinn	0.0391	0.0076	0.0200	0.0133	0.0369
Remit	0.1493	0.0199	0.1549	0.1581	0.1370
RTFP	0.0566	0.0034	0.0176	**0.0210***	0.0571
Tariffs	**1.0000***	**0.5730***	**0.9987***	**0.9964***	**1.0000***
TOT	**0.9797***	0.1405	**0.9052***	**0.8739***	**0.9773***
Trade	**0.7766***	0.0472	**0.6308***	**0.5971***	**0.8027***
Welfare_State	**0.9981***	**0.8951***	**0.9899***	**0.9850***	**0.9953***
Working_Pop	0.0532	0.0010	0.0199	0.0146	0.0513

Notes: The dependent variable is the current account (% of GDP). The results are based on 100,000 burns-ins and 200,000 draws. Simulations made using birth-death MCMC sampler. "*" over the PIPs indicates that the variable belongs at least to one of the best three models. "*d*" (resp. "*l*") stands for the difference (resp. lag) operator. The variable transformations obey the stationarity and exogeneity exigencies.

The results

Table C.1 presents the results of the estimations (the posterior inclusion probabilities) based on a universe of 2^{32} — i.e., 4,294,967,296— possible models. For comparison purposes, we also report results obtained using alternative model priors.

Overall, the BMA analysis identifies 15 robust determinants with posterior inclusion probability (PIP) higher than 0.50. Among these factors, *CTFP*, *Demographics*, the GDP per capita, the government balance, the net foreign asset position, the private debt, the output gap, the tariff rates, the terms of trade (*TOT*), and *Welfare_State* display very high PIPs. The middle cohort comprises the expected GDP growth, *KAOPEN*, currency misalignments, market performance (*MPerf_Exp*), and Trade. However, in addition to these variables, we also retain the inflation rate, which not only appears with a PIP close to the threshold but also generally belongs to the best three models (see Figure C.1).

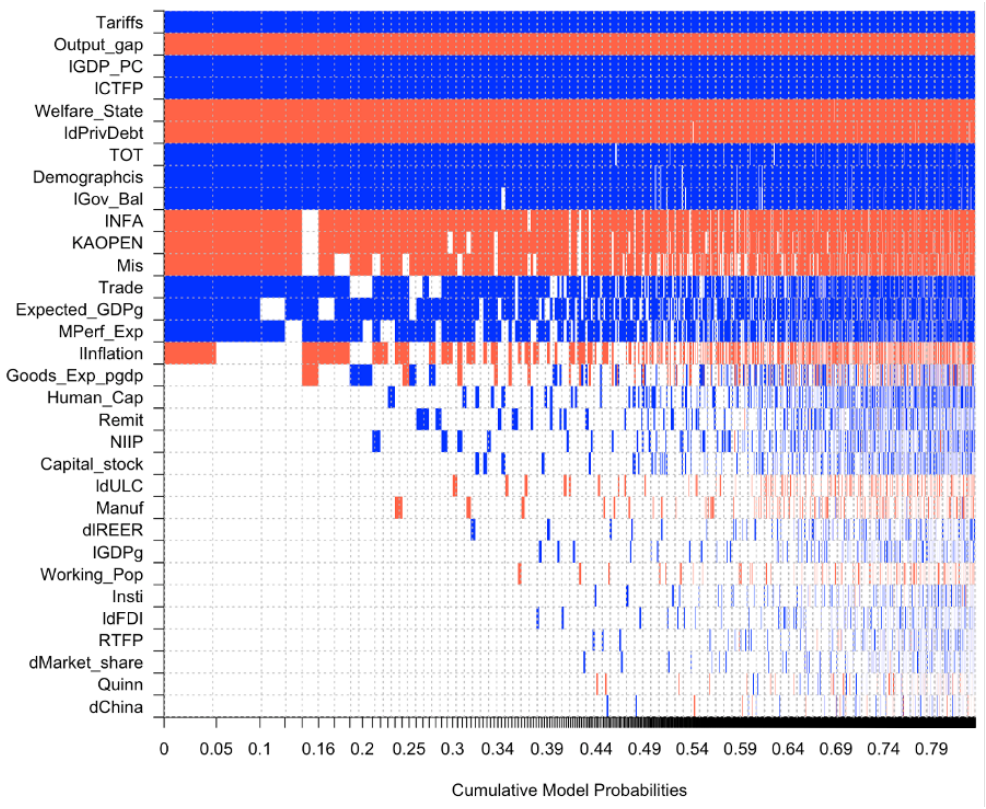

Figure C.1 — Model inclusion based on the best 2000 models

Note: The colors reflect the variables' post mean signs, blue for positive and red for negative.

As a final remark, it is worth recalling that the above exercise does not purport to provide an extensive and up-to-date analysis of the current account determinants for the

selected countries. Hence, variables displaying PIPs below our threshold —and so not retained— should not necessarily be interpreted as not having impacts on the current accounts. These low PIPs could, for instance, reflect low discriminating power owing to the low variance between the selected countries.

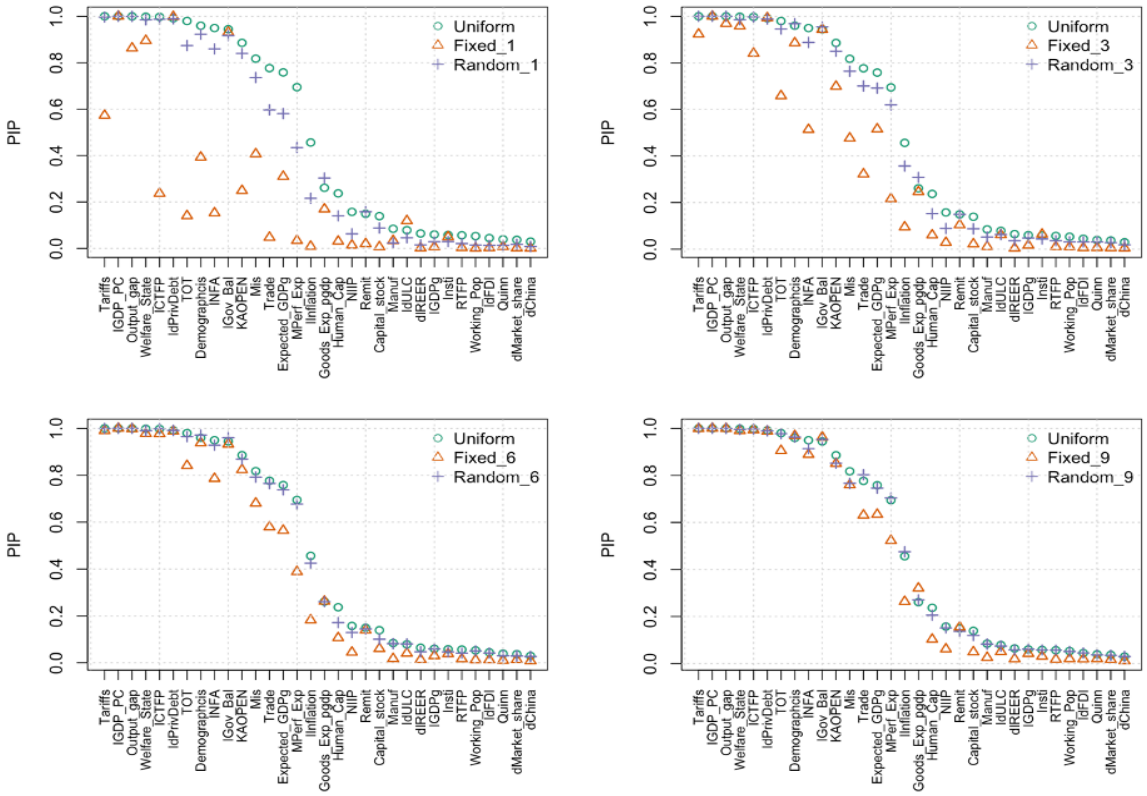

Figure C.2 — PIPs' sensitivity to priors' choice

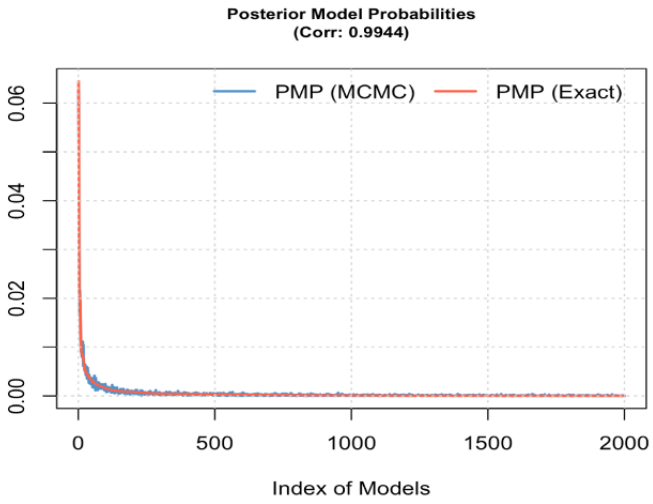

Figure C.3 — Posterior model probabilities