NBP Narodowy Bank Polski

NBP Working Paper No. 320

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Narodowy Bank Polski
Warsaw 2019

Kamila Kuziemska-Pawlak – Economic Analysis Department, Narodowy Bank Polski;
kamila.kuziemska-pawlak@nbp.pl
Jakub Mućk – Economic Analysis Department, Narodowy Bank Polski;
jakub.muck@nbp.pl

Acknowledgements:
Special thanks go to Jan Baran and Jan Hagemejer. Moreover, the authors would like to thank, without implication, Beata Bierut, Andrea Colabella, Tatsiana Kliatskova, Robert McNown, Julia Wörz, and anonymous referee for comments. The paper was presented at the 4th CESEEnet research workshop on Current economic policy challenges in CESEE, the 23rd Annual Conference on Macroeconomic Analysis and International Finance and a seminar at Narodowy Bank Polski. We thank the workshop, the conference and the seminar participants for useful suggestions. Jakub Mućk thanks for financial support from the Foundation for Polish Science within the START fellowship. The views expressed are those of the authors and do not necessarily reflect those of Narodowy Bank Polski.

Published by:
Narodowy Bank Polski
Education & Publishing Department
ul. Świętokrzyska 11/21
00-919 Warszawa, Poland
www.nbp.pl

ISSN 2084-624X

Contents

Abstract

This paper provides an empirical investigation of the medium- to long- term (structural) determinants of current account to GDP ratio. Cross-section regressions are run on the data for a large group of countries (94 economies) averaged over the period 2008-2016. The traditional set of factors explaining the current account is extended with the level of price-cost competitiveness proxied by national price level. The link between the national price level and the current account proves to be of a non-linear nature and depend on the level of economic development. Based on a battery of estimates, structural current accounts are calculated and compared with actual current accounts for 28 EU countries. In the aftermath of the crisis that escalated in 2008, narrowing gaps between actual and structural current accounts were observed in many EU deficit countries. On the other hand, large positive current account gaps persisted in surplus countries. Decomposition of changes in structural current account since 1995, conducted for the subset of the EU Member States for which the data were available, indicates that the changes in structural current account were mainly driven by the changes in income and the changes in general government balance.

Keywords: determinants of current account, current account thresholds, cross-section estimation, panel data estimation

JEL codes: F32, F41

1. Introduction

Between the mid-1990s and the escalation of the financial crisis in 2008 the average current account of the European Union (EU) was roughly zero. Still, there were considerable current account imbalances within the EU. On the one hand, countries like Greece and Spain recorded protracted current account deficits. On the other hand, countries like Germany and the Netherlands mostly run current account surpluses. The global financial turmoil forced some current account adjustment. Still, the decline in current account deficits has not been accompanied by a mirror movement in current account surplus countries.

The financial crisis showed that macroeconomic imbalances, such as a large current account deficit, in one country can adversely affect other countries. That made policy makers adopt macroprudential measures. The EU has introduced the Macroeconomic Imbalance Procedure (MIP) that, *inter alia*, introduced thresholds to current account imbalances. The thresholds for 3-year backward moving average of the current account balance as percent of GDP are +6% and -4%. Still, the application of two, time- invariant current account thresholds to countries characterized by different economic fundamentals does not seem to be justified. Hence, the estimation of fundamentally determined current account outcomes remains the subject of prominent importance.

Given this background, the purpose of this paper is to determine the factors that explain medium- and long-term current account variation across countries and to calculate the structural levels of current account, i.e. levels of current account that can be explained by medium- and long-term fundamentals, for the countries of the European Union (EU).

This article contributes to the existing literature in several dimensions. First, contrary to the majority of current account literature that uses panel econometric techniques, this study is based on cross-sectional data. However, we document that our results

are consistent with estimates obtained with the standard panel data approach. Second, we extend the traditional set of factors underlying current account, i.e. income, general government balance, initial international investment position, dependency ratio and fuel balance, with national price level. The relationship between the national price level and the current account proves to be of a non-linear nature. The effect of national price level on current account is substantial at low levels of economic development and it dies out at high levels of economic development.

Moreover, we calculate structural current accounts and compare them with actual current accounts for the EU countries. This leads us to the conclusion that after the crisis, large current account deficits have been significantly corrected, with current accounts moving towards structural levels, while large current account surpluses persist, standing above the structural levels. In particular, we show that in 2016 the number of the EU countries with positive deviations from structural current account substantially exceeded the number of countries with negative deviations.

Last, for the subset of the EU Member States, we decompose the changes (since 1995) in structural current accounts. This decomposition indicates that in most of them the changes in structural current account were mainly due to the changes in income and the changes in general government balance. Other factors that contributed significantly to the changes in structural current account were the changes in national price level (Czechia, Poland, Slovakia and Romania) and the changes in dependency ratio (Denmark, France, Germany, Italy and the Netherlands).

The remainder of this paper is structured as follows. Section 2 provides a short overview of the literature on the current account determinants. Section 3 focuses on the description of the data and econometric methodology. Section 4 discusses the results and section 5 provides sensitivity analysis. Section 6 presents structural current accounts and their decompositions for the EU countries. The last section concludes.

2. Literature overview

The determinants of the current account are the important area of both theoretical and empirical research in open-economy macroeconomics. The baseline theoretical model of the current account refers to the intertemporal approach which originated with Sachs (1981) and was extended by Obstfeld and Rogoff (1994). The intertemporal approach, which extends the absorption approach to the current account (see Alexander, 1952), views the current account balance as the outcome of forward-looking saving and investment decisions, i.e. decisions determined by calculations based on expectations of future variables. The survey of intertemporal optimizing models of current account balance is provided by Singh (2007). According to the intertemporal approach, unbalanced current account is not necessarily an adverse phenomenon as intertemporal trade makes possible smoother (than in the autarky) time profile of consumption (Obstfeld and Rogoff, 1996). Unbalanced current account reflects the transfer of consumption opportunities across time, rather than indicating an economic disequilibrium as perceived in non-optimizing models.

According to the 'stages of development' hypothesis for the balance of payments, the relationship between the stage of development and the current account balance is quadratic (U-shaped). As a country moves from a low to an intermediate stage of economic development, its investment needs exceed domestic savings and are financed through external borrowing and such a country runs a current account deficit. As it develops, its current account deficit and external borrowing needs gradually decrease. Finally, as it achieves an advanced level of economic development, it should be able to run a current account surplus, initially repaying the accumulated external liabilities and subsequently lending capital to less advanced economies. Hence, as a country develops it evolves from a net foreign borrower to a net foreign lender. Small current account deficits at a very low level of economic development could be due to liquidity constraints (Debelle and Faruqee, 1996).

According to the Ricardian equivalence, countries recording lower public saving experience higher private saving, fiscal balance having no impact on current account balance. In the absence of a complete Ricardian offset from private savings, an increase in the fiscal balance can lead to an increase in national savings. Most empirical studies have found a positive relationship between relative fiscal balance and current account balance, in line with the "twin-deficits" hypothesis (see e.g. Phillips et al., 2013).

According to the life-cycle theory, economic agents try to maximize lifetime utility. Thus, agents save in the period of economic activity in order to shift part of the consumption to the retirement period, when income typically becomes lower (consumption smoothing mechanism). Hence, the demographic structure of a society is a crucial determinant of its saving rate. In particular, societies with a high share of the population in the high saving, preretirement age tend to have a high saving rate, while societies with a high share of the retired tend to have a low saving rate (Williamson, 1994). Demographic factors have an impact on investment rate as well. Rapid population growth, especially a fast increase in the number of young households, tends to increase the need for investment (Williamson, 1994). Lee et al. (2008) found negative association between both relative old-age dependency ratio and relative population growth rate and the current account. In addition, the effect of the age structure on current account may differ across countries depending on the pension system and financial development.

The level of international investment position (IIP) directly affects primary income balance and hence current account balance. In particular, economies characterized by highly negative IIP record negative primary income balance, which weighs negatively on their current account balance. In line with this argument, Lee et al.

(2008), Ca' Zorzi et al. (2012), as well as Phillips et al. (2013) report positive relationship between initial / lagged IIP and current account balance.[1]

There is a positive association between a country's oil balance and its current account balance (see e.g. Lee et al., 2008). From the saving ratio perspective, countries that are well-endowed with fuels record current account surpluses as they save part of their revenues from production/distribution of fuels. These savings are higher the lower proven resources are.

Last, economic data sets used in empirical studies on current account come in a variety of types. Brissimis et al. (2010) use time-series data to explore factors underlying current account and link them to the issue of external sustainability (in Greece). In turn, Debelle and Faruqee (1996) and Chinn and Prasad (2003) use cross-section regressions to explain the cross-country variation in, averaged over time, current account positions and panel regressions to combine an explanation of the cross-country variation and an explanation of the time series variation. Finally, the majority of studies on drivers of the current account (e.g. Lee et al., 2008; Ca' Zorzi et al., 2012; Phillips et al., 2013 and Coutinho et al., 2018) is strictly based on panel econometric techniques, i.e. focus on the short- and medium-term determinants of current account.

[1] On the other hand, economies characterized by highly negative IIP can be expected to increase their current account balance to preserve long-term external sustainability.

3. Data and econometric methodology

The cross-section regressions are run on the data for 94 countries averaged over the period 2008-2016 (see Appendix 1 for the list of the countries). By using cross-sectional data, we abstract from factors that are cyclical or temporary. We assume that time averaging let us capture the equilibrium relation between the current account and its medium- and long-term fundamentals. There are two reasons for choosing this particular period of averaging. First, for averaging, we wanted to choose the period that would broadly encompass the entire business cycle. Second, extending the period of averaging would have decreased the number of countries in the sample. The only variable that is not averaged over time is net international investment position, percent of GDP. The initial IIP, i.e. IIP in 2007 is used in the regressions to avoid capturing a reverse link from the current account balance to IIP (see Lee et al., 2008). As regards outliers, we exclude all countries with average (over 2008-2016) current account to GDP ratio higher than 10% (i.e. KWT, NOR, SAU, SGP) or lower than -15% (i.e. MOZ, NER) as well as countries with initial international investment position to GDP ratio higher than 100% (i.e. BWA, CHE, HKG, KIR, SGP).

The dependent variable is the current account to GDP ratio (See Appendix 1 for variables' description). Most of the explanatory variables are expressed in relative terms. To do so, for each year, we calculate deviations (differences) of these variables from the GDP-weighted (see Phillips et al., 2013) sample averages (excluding the country concerned).[2] Then, we calculate the averages of the deviations over the period 2008-2016. To illustrate the rationale behind the relativization, a change in e.g. general government balance is expected to have an impact on the current account only to the extent that other countries' general government balances do not move by the same amount. For brevity, we refer to such a variable simply as the general

[2] The relativization does not apply to the variables that by their nature are already measured "relative" to other countries (i.e. net international investment position and fuel balance).

government balance, remembering that it is actually the average of the deviations described above.

The regression specification is modified step by step by adding regressors (one by one), in line with bottom-up or specific-to-general modelling approach. To begin with, the model is estimated in parsimonious form, encompassing only income (Table 1). Next, the model is gradually augmented with general government balance and initial IIP. Subsequently, national price level is added. Then, the set of explanatory variables is extended with measures of demographic structure. The following three variables are included: dependency ratio, dependency ratio, old and dependency ratio, young. Needs to be stressed that dependency ratios reflect merely the age composition of a population, not economic dependency. The share of non-working people in working age population and effective retirement age differ significantly across countries, which make demographic composition only a crude approximation of economic dependency. Finally, we control for fuel balance. In order to check the robustness of the results to additional variables, the model is augmented with economic growth, general government gross debt, population growth and interaction of general government balance with general government gross debt (Appendix 2).

Furthermore, we address the issue of potential nonlinearities (Table 2). To begin with, we include income in quadratic form (income squared) in current account regression to capture potential U-shaped relationship between current account and income. Next, national price level is included in quadratic form and in interaction with income in the regression. This way, we check whether the elasticity of current account with respect to national price level changes with national price level and income, respectively.

Referring to the estimation technique, an equilibrium relationship between current account and a set of macroeconomic and demographic characteristics is estimated using ordinary least-squares linear regression with robust standard errors. Based on

this relationship, structural current accounts are computed as a function of long-run paths of explanatory variables, obtained by decomposing the raw data into cyclical component and the long term trend of economic series by using Hodrick-Prescott filter.[3]

In order to provide broad coverage, data from various sources are used (see Appendix 1). In general, we use the data from the IMF (the World Economic Outlook Database and the Balance of Payments and International Investment Position Statistics), the World Bank (the World Development Indicators) and the World Trade Organization.

[3] In particular, we set the smoothing parameters for the HP filter at 6.25.

4. Results

First, current account regressions in linear form are discussed (Table 1). The level of economic development proxied by real GDP per capita (PPP) is the most important factor in explaining levels of current account position across countries. This single variable accounts for approximately half of the total variation of the dependent variable explained by the models considered. The estimated coefficients on income are positive and strongly statistically significant, implying that countries recording higher income run higher current account balance.

In turn, the coefficients on general government balance imply that a country whose general government balance is higher by 1 per cent of GDP point has an average current account that is higher by 0.5-0.6 per cent of GDP, *ceteris paribus*. Hence, the twin-deficits hypothesis holds, i.e. countries which run wider fiscal deficits record wider current account deficits. We also check whether the relationship between the current account and general government balance changes according to the general government gross debt level (see Nickel and Vanteenkiste, 2008). The coefficient on the interaction term proves to be not statistically significant (see Appendix 2).

Next, positive conditional correlation between current account and initial IIP implies that countries with higher (lower) initial IIP benefit from higher (lower) net foreign income flows (net primary income balance). The coefficient on initial IIP in the range of 0.03 to 0.04 indicates that countries whose international investment position in 2007 was higher by 10 percentage points tended to run current account higher by 0.3 to 0.4 percentage points, *ceteris paribus*, on average over the period 2008–2016. This result is broadly consistent with the estimates of Debelle and Faruqee (1996), which in cross-section regressions ranged between 0.04 and 0.05.

Table 1. Current account regressions in linear form

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
income	2.555***	2.591***	2.451***	3.142***	5.316***	5.042***	3.083***	5.244***	4.418***
	(0.391)	(0.390)	(0.354)	(0.588)	(0.911)	(0.984)	(0.636)	(0.998)	(1.007)
general government balance		0.507***	0.501***	0.526***	0.599***	0.576***	0.526***	0.599***	0.536***
		(0.169)	(0.147)	(0.135)	(0.124)	(0.137)	(0.134)	(0.123)	(0.133)
initial IIP			0.039***	0.039***	0.035***	0.034***	0.040***	0.036***	0.030***
			(0.010)	(0.010)	(0.010)	(0.011)	(0.009)	(0.010)	(0.010)
national price level				-2.049	-4.831***	-3.393**	-2.143	-4.953***	-3.410*
				(1.479)	(1.575)	(1.462)	(1.586)	(1.586)	(1.761)
dependency ratio					0.125***				0.102**
					(0.042)				(0.041)
dependency ratio, young						0.088**		0.126***	
						(0.037)		(0.042)	
dependency ratio, old							0.014	0.143**	
							(0.061)	(0.061)	
fuel balance									0.147**
									(0.062)
Constant	-0.893*	-1.395***	-0.244	-0.426	-0.629	-0.639	-0.415	-0.615	-0.377
	(0.498)	(0.483)	(0.587)	(0.564)	(0.548)	(0.586)	(0.558)	(0.546)	(0.514)
Observations	94	94	94	94	94	94	94	94	94
R-squared	0.278	0.344	0.432	0.444	0.506	0.486	0.444	0.507	0.536
adjusted R2	0.270	0.329	0.413	0.419	0.478	0.457	0.413	0.473	0.504

*Robust standard errors in parentheses. Asterisks ***, **, * denote the 1%, 5%, 10% significance levels, respectively.*

In addition, we explore the relationship between national price level, which can be associated with long- and medium-term level of price-cost competitiveness, and current account. The estimated coefficients on national price level, when introduced in linear form, are not always statistically significant. We further elaborate on the relationship between current account and national price level when discussing current account regressions in non-linear form below.

Then, against expectations, there is positive association between dependency ratio and current account. One possible explanation can be the bequest motive of saving, according to which the old save in order to leave their heirs a bequest. The other can be the precautionary motive of saving, according to which the old save due to the uncertainty about for example the time of death or the returns on their private retirement accounts. This observation can be used to explain the anomaly that older people tend to have positive saving, rather than depleting their wealth. It is puzzling that while the coefficient on dependency ratio is statistically significant at 5% level (and positive) and the coefficients on dependency ratio, young and dependency ratio, old introduced together are as well statistically significant at 5% level (and

positive), when dependency ratio, young and dependency ratio, old are introduced separately only the coefficient on dependency ratio, young is statistically significant at conventional level.

Finally, we control for fuel balance. The coefficient on fuel balance is equal to 0.1, implying that a country whose fuel balance is higher (mainly as a result of the volume of trade in fuels, assuming that the price of exported/imported fuels is broadly the same across countries) by 1 percentage point has an average current account that is higher by 0.1 percentage point, ceteris paribus. From the saving ratio perspective, countries that are well-endowed with fuels could have high saving rate and run current account surplus. Still, the propensity to save may differ according to the energy endowments and awareness of the exhaustibility of the resources.

Second, current account regressions in non-linear form are discussed (Table 2). We verify potential U-shaped relationship between income and current account. The coefficient on the linear term is statistically significant at 1% level and the one on quadratic term is statistically significant at 10% level, both of them positive.

Table 2. Current account regressions in nonlinear form

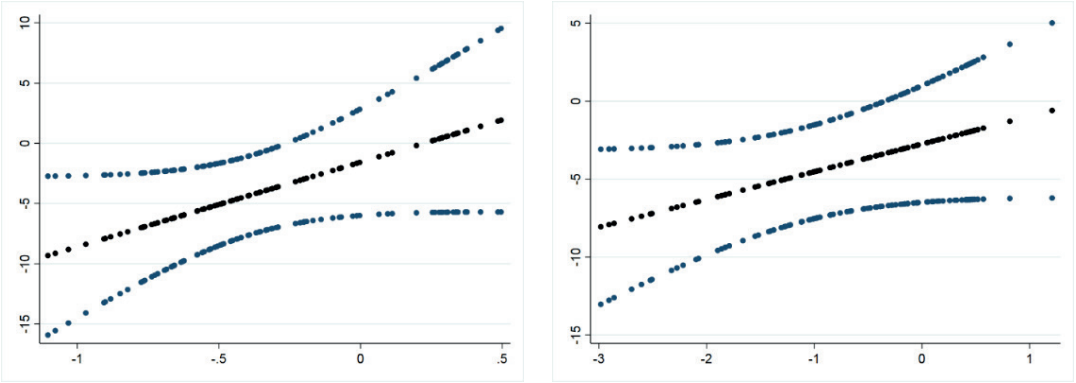
VARIABLES	(1)	(2)	(3)	(4)	(5)
income	3.670***	3.298***	4.315***	4.464***	5.026***
	(0.856)	(0.585)	(1.001)	(0.571)	(0.808)
income squared	0.580*				
	(0.335)				
general government balance		0.585***	0.573***	0.590***	0.569***
		(0.126)	(0.124)	(0.128)	(0.126)
initial IIP		0.036***	0.027***	0.035***	0.027***
		(0.010)	(0.010)	(0.010)	(0.010)
national price level		-0.013	-1.569	-1.809	-2.748
		(1.697)	(2.258)	(1.408)	(1.909)
national price level squared		4.610**	3.513*		
		(1.825)	(2.009)		
income*national price level				2.414**	1.780*
				(0.920)	(1.061)
dependency ratio			0.090**		0.082*
			(0.044)		(0.046)
fuel balance			0.150**		0.156**
			(0.062)		(0.063)
Constant	-0.944*	-1.112*	-0.876	-0.939	-0.711
	(0.489)	(0.624)	(0.546)	(0.607)	(0.532)
Observations	94	94	94	94	94
R-squared	0.294	0.470	0.550	0.474	0.550
adjusted R2	0.279	0.440	0.514	0.444	0.514

*Robust standard errors in parentheses. Asterisks ***, **, * denote the 1%, 5%, 10% significance levels, respectively.*

Moreover, we estimate equations that allow for nonlinearities in the relationship between national price level and current account. Two observations can be made. First, the negative elasticity of current account on national price level decreases in absolute terms with the national price level (Figure 1). Second, the elasticity of current account on national price level changes with income, i.e. at low levels of economic development, the effects of price-cost competitiveness on current account are large whereas at high levels of economic development, price-cost effectiveness ceases to be important. This suggests that in the long-run, country cannot see its exports growing because of a continuous decrease in relative prices (Amable and Verspagen, 1995). At higher levels of economic development the importance of non-

price/non-cost factors in explaining trade goes up, in line with the Kaldor paradox (1978).

Figure 1. The elasticity of current account with respect to national price level for different national price levels (left panel) and the elasticity of current account with respect to national price level for different levels of income (right panel)



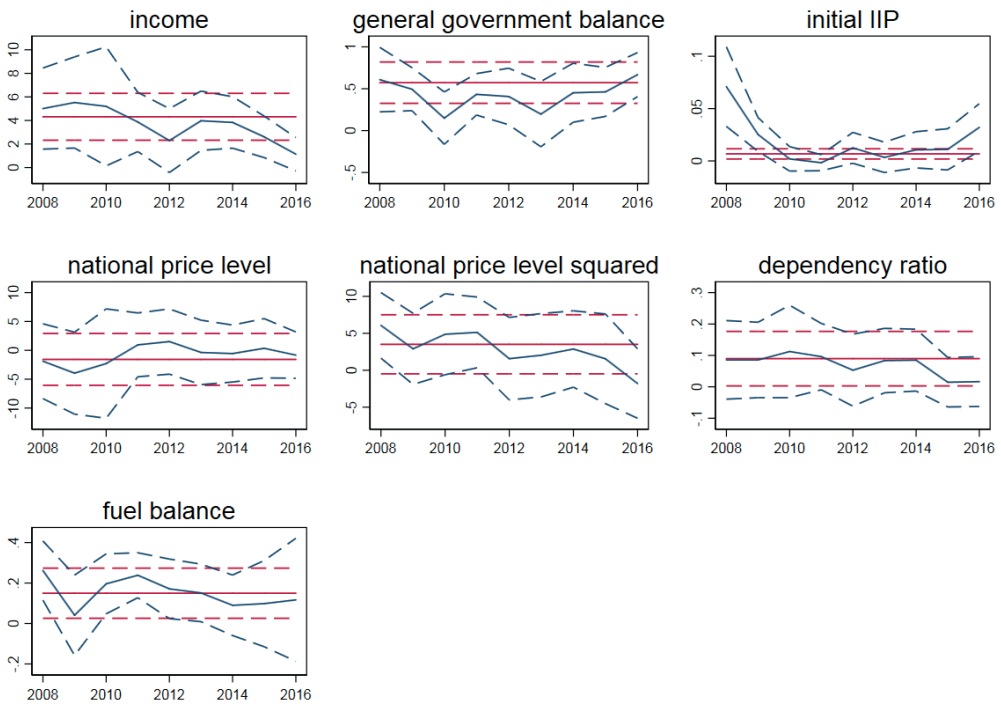
Left panel: Current account is regressed on income, general government balance, initial IIP, national price level, both in linear and quadratic form, dependency ratio and fuel balance (equation 3 in Table 2). Right panel: Current account is regressed on income, general government balance, initial IIP, national price level, interaction of income and national price level, dependency ratio and fuel balance (equation 5 in Table 2).

5. Sensitivity analysis

In order to test the robustness of the results to time aggregation (by running regressions on the data averaged over the period 2008-2016), we recompute the estimated parameters using the underlying annual data. For most years, yearly rolling estimation does not distort the main findings (Figure 2). Parameter estimates for the initial IIP obtained from between estimation represent elasticities of current account (on average, over the period 2008-2016) with respect to IIP in 2007, while the parameter estimates from rolling estimation reflect the elasticities of current account with respect to 1-year lagged IIP. Between 2008 and 2009 the elasticities of current account with respect to lagged IIP obtained from rolling estimations were higher than in the period 2010-2016. After 2009 the parameter estimates converged to the medium- to long- term estimates obtained from between estimation.

As a next robustness check, we consider a panel data estimation. Namely, we use the pooled regression for (i) annual data, (ii) 4-year non-overlapping averages, and (iii) 8-year non-overlapping averages. In all above cases the generalized least squares estimator is employed to account for heteroskedasticity and, in the case of annual dataset, for a serial correlation. These results for regression in both linear and non-linear form are delegated to Table 3-Table 5. In general, the estimates obtained for panel data confirm our previous findings. Current account is positively related with income, general government balance and initial IIP. In addition, there is convincing evidence in favour of non-linear relationship between the current account and national price level or income.

Figure 2. Estimates from between and rolling estimations



Current account is regressed on income, general government balance, initial IIP, national price level, both in linear and quadratic form, dependency ratio and fuel balance (equation 3 in Table 2).

Table 3. Pooled, GLS accounting for serial correlation and heteroskedasticity

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
income	1.715***	1.752***	1.658***	2.369***	4.100***	4.013***	2.410***	4.223***	3.095***	2.709***	2.116***	2.238***	4.189***	4.077***
	(0.072)	(0.077)	(0.096)	(0.149)	(0.234)	(0.233)	(0.164)	(0.244)	(0.245)	(0.164)	(0.145)	(0.244)	(0.192)	(0.238)
general government balance		0.286***	0.286***	0.286***	0.274***	0.265***	0.287***	0.270***	0.235***		0.310***	0.261***	0.301***	0.249***
		(0.024)	(0.028)	(0.027)	(0.027)	(0.027)	(0.027)	(0.027)	(0.027)		(0.026)	(0.027)	(0.026)	(0.026)
initial IIP			0.021***	0.021***	0.018***	0.018***	0.021***	0.017***	0.015***		0.022***	0.015***	0.022***	0.015***
			(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)		(0.002)	(0.002)	(0.002)	(0.002)
national price level				-2.118***	-3.379***	-2.688***	-2.054***	-3.292***	-2.551***		1.815***	2.212***	-0.971***	-0.448
				(0.298)	(0.331)	(0.303)	(0.307)	(0.335)	(0.344)		(0.393)	(0.460)	(0.284)	(0.357)
dependency ratio					0.101***				0.076***			0.042***		0.031***
					(0.010)				(0.010)			(0.010)		(0.010)
dependency ratio, young							-0.011	0.080***						
							(0.015)	(0.017)						
dependency ratio, old						0.077***		0.102***						
						(0.008)		(0.010)						
fuel balance									0.249***			0.267***		0.278***
									(0.016)			(0.016)		(0.016)
income squared										0.412***				
										(0.065)				
national price level squared											4.266***	4.386***		
											(0.310)	(0.295)		
income*national price level													3.023***	2.995***
													(0.215)	(0.208)
Constant	-0.924***	-1.195***	-0.483***	-0.787***	-0.738***	-0.818***	-0.790***	-0.746***	-0.640***	-0.764***	-0.970***	-0.572***	-0.851***	-0.405***
	(0.095)	(0.100)	(0.113)	(0.116)	(0.112)	(0.113)	(0.116)	(0.112)	(0.110)	(0.094)	(0.120)	(0.115)	(0.116)	(0.114)
Observations	2,526	2,253	1,785	1,785	1,785	1,785	1,785	1,785	1,691	2,526	1,785	1,691	1,785	1,691
Countries	94	94	94	94	94	94	94	94	94	94	94	94	94	94

*Robust standard errors in parentheses. Asterisks ***, **, * denote the 1%, 5%, 10% significance levels, respectively.*

Table 4. Pooled, 4-year averages , GLS accounting for serial correlation and heteroskedasticity

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
income	1.989***	1.996***	2.005***	2.629***	4.419***	4.228***	2.714***	4.509***	2.773***	2.695***	2.338***	2.212***	3.931***	3.839***
	(0.132)	(0.140)	(0.142)	(0.167)	(0.312)	(0.296)	(0.179)	(0.312)	(0.322)	(0.336)	(0.168)	(0.342)	(0.250)	(0.342)
general government balance		0.395***	0.388***	0.394***	0.381***	0.367***	0.394***	0.380***	0.264***		0.405***	0.316***	0.362***	0.298***
		(0.051)	(0.051)	(0.048)	(0.039)	(0.038)	(0.048)	(0.038)	(0.037)		(0.037)	(0.029)	(0.046)	(0.043)
initial IIP			0.013***	0.012***	0.008**	0.010***	0.011***	0.008**	0.005		0.012***	0.004	0.012***	0.005
			(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)		(0.004)	(0.003)	(0.004)	(0.003)
national price level				-2.084***	-3.551***	-2.659***	-1.935***	-3.363***	-1.359***		2.251***	2.453***	-1.201***	-0.176
				(0.468)	(0.466)	(0.432)	(0.500)	(0.485)	(0.483)		(0.663)	(0.774)	(0.442)	(0.590)
dependency ratio					0.102***				0.072***			0.040***		0.044***
					(0.015)				(0.013)			(0.014)		(0.016)
dependency ratio, young							-0.021	0.077***						
							(0.023)	(0.026)						
dependency ratio, old						0.076***		0.103***						
						(0.012)		(0.015)						
fuel balance									0.225***			0.244***		0.257***
									(0.015)			(0.027)		(0.027)
income squared										0.313**				
										(0.139)				
national price level squared											5.289***	4.115***		
											(0.606)	(0.579)		
income*national price level													2.438***	2.557***
													(0.347)	(0.382)
Constant	-0.776***	-1.135***	-0.599***	-0.901***	-0.839***	-1.018***	-0.900***	-0.887***	-0.681***	-0.739***	-1.183***	-0.654***	-1.005***	-0.532***
	(0.176)	(0.175)	(0.200)	(0.201)	(0.188)	(0.194)	(0.205)	(0.194)	(0.179)	(0.182)	(0.199)	(0.192)	(0.196)	(0.185)
Observations	453	440	368	368	368	368	368	368	360	453	368	360	368	360
Countries	94	94	94	94	94	94	94	94	94	94	94	94	94	94

*Robust standard errors in parentheses. Asterisks ***, **, * denote the 1%, 5%, 10% significance levels, respectively.*

Table 5. Pooled, 8-year averages, GLS accounting for serial correlation and heteroskedasticity

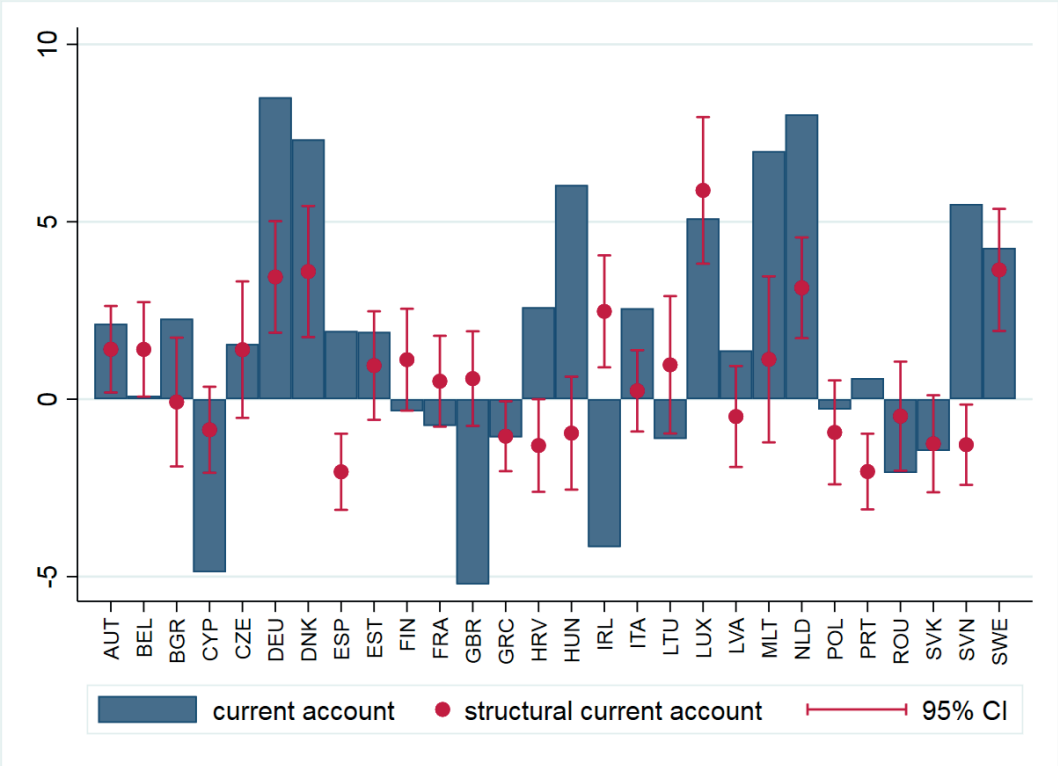
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
income	2.140***	2.215***	2.418***	3.505***	5.377***	4.268***	3.132***	5.127***	4.108***	2.894***	4.057***	4.540***	5.741***	5.914***
	(0.104)	(0.142)	(0.052)	(0.319)	(0.302)	(0.323)	(0.394)	(0.413)	(0.440)	(0.254)	(0.373)	(0.232)	(0.621)	(0.492)
general government balance		0.443***	0.610***	0.628***	0.636***	0.629***	0.621***	0.668***	0.533***		0.631***	0.484***	0.577***	0.492***
		(0.071)	(0.063)	(0.069)	(0.046)	(0.084)	(0.101)	(0.073)	(0.063)		(0.062)	(0.043)	(0.087)	(0.062)
initial IIP			-0.000	-0.003	-0.002	-0.002	0.002	0.000	-0.002		0.001	-0.001	0.001	-0.000
			(0.002)	(0.002)	(0.001)	(0.003)	(0.004)	(0.003)	(0.002)		(0.003)	(0.002)	(0.003)	(0.002)
national price level				-3.068***	-5.308***	-3.428***	-3.452***	-5.423***	-3.383***		-0.516	-1.471**	-3.746***	-3.690***
				(0.642)	(0.542)	(0.558)	(0.776)	(0.580)	(0.718)		(0.939)	(0.693)	(0.781)	(0.663)
dependency ratio					0.112***				0.091***			0.089***		0.092***
					(0.011)				(0.015)			(0.013)		(0.016)
dependency ratio, young							0.062**	0.163***						
							(0.027)	(0.022)						
dependency ratio, old						0.050***		0.113***						
						(0.009)		(0.014)						
fuel balance									0.173***			0.167***		0.185***
									(0.019)			(0.018)		(0.023)
income squared										0.426***				
										(0.105)				
national price level squared											5.878***	4.483***		
											(1.063)	(0.820)		
income*national price level													2.803***	2.578***
													(0.691)	(0.649)
Constant	-0.592***	-0.961***	-0.777***	-1.221***	-1.368***	-1.253***	-1.084***	-1.350***	-0.881***	-0.771***	-1.465***	-1.046***	-1.202***	-0.936***
	(0.134)	(0.205)	(0.143)	(0.206)	(0.148)	(0.207)	(0.253)	(0.202)	(0.185)	(0.163)	(0.265)	(0.149)	(0.273)	(0.206)
Observations	211	208	117	117	117	117	117	117	117	211	117	117	117	117
Countries	94	94	72	72	72	72	72	72	72	94	72	72	72	72

*Robust standard errors in parentheses. Asterisks ***, **, * denote the 1%, 5%, 10% significance levels, respectively.*

6. Structural current accounts and their decompositions for the EU countries

Based on the regression results presented in section 5, we calculate structural current accounts for the EU countries. To this end, we use the estimated parameters (equation 3 in Table 2) and HP filtered values of explanatory variables. Structural current accounts for 2016 were likely to be positive for Austria, Belgium, Czechia, Germany, Denmark, Estonia, Finland, France, the Great Britain, Ireland, Italy, Lithuania, Luxembourg, Malta, the Netherlands and Sweden. For the rest of the EU countries they were equal to zero or slightly negative (Figure 3).

Figure 3. Current account, structural current account and 95% confidence intervals in 2016

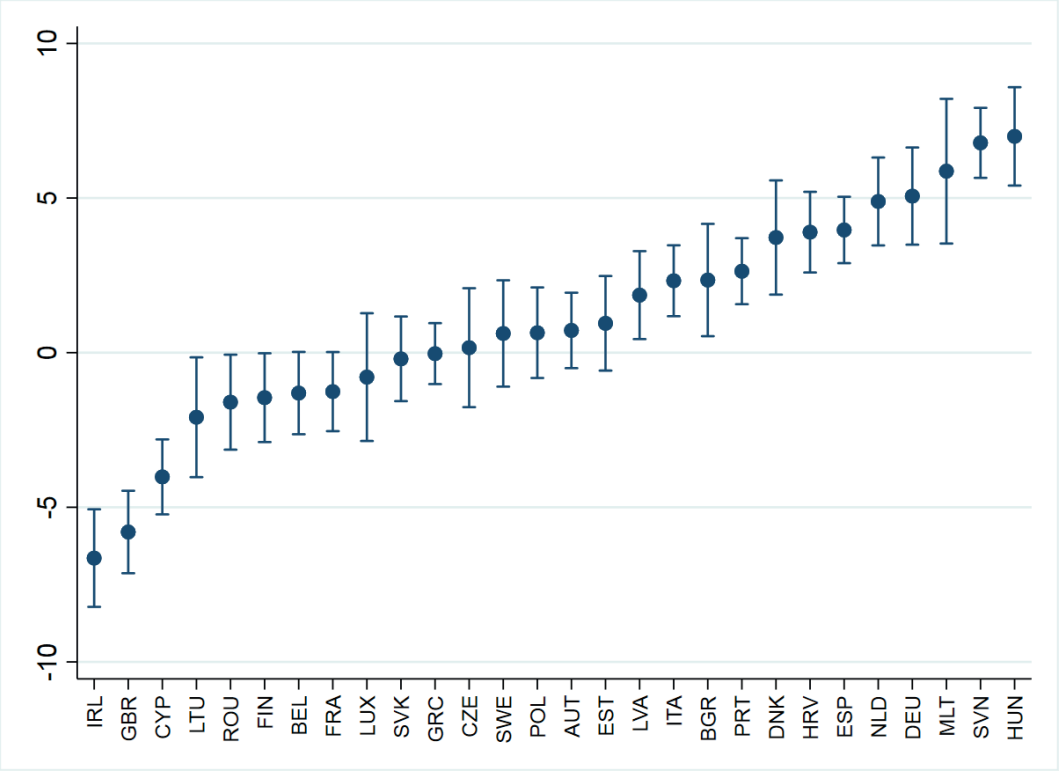


Current account is regressed on income, general government balance, initial IIP, national price level, both in linear and quadratic form, dependency ratio and fuel balance (equation 3 in Table 2).

The highest structural current account deficit (-2%) was likely to be recorded in Portugal and Spain. Moreover, we find that the current accounts in Belgium, Cyprus, Finland, France, the Great Britain, Greece, Ireland, Lithuania, Luxembourg, Romania

and Slovakia were lower than can be explained by medium-to long-term fundamentals. In the rest of the EU countries the current accounts were higher than predicted by the model. The highest deviations of the current account from its structural level were likely to be found in Hungary (positive) and Ireland (negative; Figure 4). The number of the EU countries with positive deviations from structural current account was higher than the number of countries with negative deviations.

Figure 4. Deviation of current account from structural current account and its 95% confidence intervals



Current account is regressed on income, general government balance, initial IIP, national price level, both in linear and quadratic form, dependency ratio and fuel balance (equation 3 in Table 2).

Next, in order to gauge the evolution of current accounts in the EU over the longer horizon we compare the actual current account developments with the evolution of structural current accounts (and their bounds) over the period 1995–2017 (Appendix 4). This is helpful in assessing to what extent current account developments can be considered consistent with the structural current account trajectory.

According to our estimates, current account deficits recorded before 2008 were significantly larger than can be explained by medium- and long-term fundamentals in the Baltics, Bulgaria, Cyprus, Greece, Portugal, Romania and Spain.[4] The financial market turbulence, which exacerbated in September 2008, entailed current account adjustment. The current account increase in small economies with pegged (to the euro) exchange rates, i.e. Bulgaria, Estonia, Latvia and Lithuania was more abrupt than in Greece, Portugal and Spain. In Spain, in 2010 the current account converged to the structural current account and from then on exceeded it.

In Czechia, Poland and Slovakia the current account deficits recorded before the crisis in most years were close to or higher than the structural current account deficits. In the wake of the crisis, an increase of current account balance was recorded, together with structural current account balance. In turn, between 1996 and 2008 Hungary run protracted current account deficits, which permanently remained higher than what the model indicates on the basis of medium- and long-term fundamentals. In the aftermath of the crisis, Hungary witnessed a remarkable correction of its current account deficit and in 2010 its current account became positive, exceeding the structural current account level.

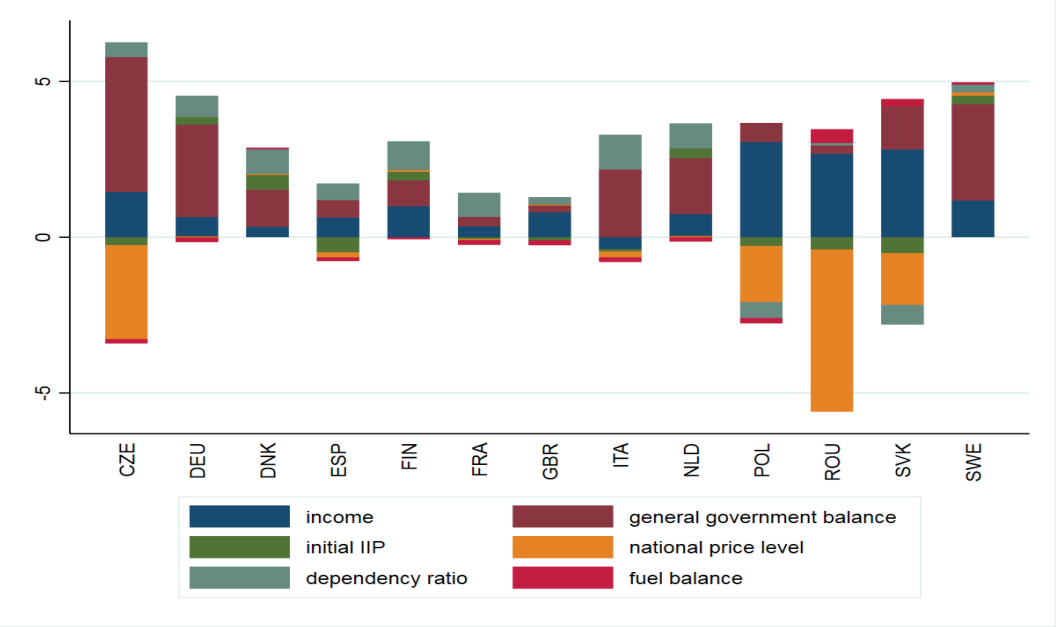
Finally, calculated structural current accounts were for the long period above the actual current accounts in Germany and the Netherlands. In Germany current account swung from a deficit of around 1% of GDP in the mid-1990s into the surplus of 2% of GDP in 2002 and since then this surplus has consistently exceeded the structural current account level. The Netherlands between 1995 and 2017 persistently recorded current account surpluses, which most of the time stood above the structural current account levels, with the divergence the most evident in 2012. Similarly, Danish current account mostly remained positive and since 2010 was not

[4] In 2007 current account deficit to GDP ratio reached 24% in Bulgaria, 21% in Latvia, 15% in Estonia, Greece and Lithuania, 13% in Romania, 11% in Cyprus and 10% in Portugal and Spain.

aligned with medium- and long-term fundamentals, standing above the structural current account levels.

Then, for 13 EU countries, for which appropriate time series were available, we decompose the changes in structural current account since 1995 into contribution of changes in explanatory variables (Figure 5 and Appendix 4). This decomposition indicates that in most of them the changes in structural current account (since 1995) were largely driven by income and general government balance. Moreover, the national price level was the important factor that stood behind the structural current account evolution in Czechia, Poland, Slovakia and Romania, still while the negative contribution of this factor was increasing towards the crisis (due to *inter alia* nominal exchange rate appreciation), it was decelerating or stabilising afterwards. What is more, roughly from the mid- 1990s the increasing positive contribution of changes in dependency ratio to the changes in structural current account was documented in Denmark, France, Germany, Italy and the Netherlands.

Figure 5. Decomposition of changes, cumulated between 1995 and 2016, in structural current account



Current account is regressed on income, general government balance, initial IIP, national price level, both in linear and quadratic form, dependency ratio and fuel balance (equation 3 in Table 2).

7. Concluding remarks

This paper aims at identifying medium- to long- term factors that determine current account balance and estimating fundamentally determined current account outcomes. To this end, we run cross-section regressions on data for 94 economies averaged over the period 2008-2016 and, based on the regressions' results, computed structural current accounts as a function of long-run paths of explanatory variables.

According to our estimates, the current account positively depends on income, general government balance, initial international investment position, dependency ratio and fuel balance. The relationship between the national price level and the current account balance proves to be of a non-linear nature. While the effect of national price level on current account is substantial at low levels of economic development, it dies out at high levels of economic development.

The comparison of the actual current accounts with the structural current accounts indicates that progress in addressing current account imbalances has been unequal in the EU countries. In the wake of the crisis, on the one hand, large current account deficits have been considerably corrected, with current accounts moving towards the levels that can be reconciled with the medium- to long-term fundamentals (e.g. Greece, Portugal, the Baltics). On the other hand, large current account surpluses persist and the adjustment process is needed to bring the current account closer to the structural level (e.g. Germany, the Netherlands).

The decomposition of structural current account changes, conducted for 13 EU countries, indicates that in most of them the changes in structural current account (cumulated since 1995) were mainly due to the changes in income and general government balance. Moreover, the national price level was the crucial factor that stood behind the structural current account developments in Czechia, Poland, Slovakia and Romania. Finally, since around mid- 1990s the increasing positive contribution of changes in dependency ratio to the changes in structural current account was recorded in Denmark, France, Germany, Italy and the Netherlands.

Appendix 1. Data description

The list of countries:

Albania (ALB), Argentina (ARG), Armenia (ARM), Australia (AUS), Austria (AUT), Bahrain (BHR), Bangladesh (BGD), Belarus (BLR), Belgium (BEL), Bolivia (BOL), Bosnia and Herzegovina (BIH), Brazil (BRA), Bulgaria (BGR), Burkina Faso (BFA), Cambodia (KHM), Canada (CAN), Chile (CHL), China (CHN), Colombia (COL), Costa Rica (CRI), Croatia (HRV), Cyprus (CYP), Czechia (CZE), Denmark (DNK), Dominican Republic (DOM), Ecuador (ECU), Egypt (EGY), El Salvador (SLV), Estonia (EST), Fiji (FJI), Finland (FIN), France (FRA), Georgia (GEO), Germany (DEU), Ghana (GHA), Greece (GRC), Guatemala (GTM), Honduras (HND), Hungary (HUN), Iceland (ISL), India (IND), Indonesia (IDN), Ireland (IRL), Israel (ISR), Italy (ITA), Jamaica (JAM), Japan (JPN), Jordan (JOR), Kazakhstan (KAZ), Korea (KOR), Kyrgyz Republic (KGZ), Latvia (LVA), Lithuania (LTU), Luxembourg (LUX), Madagascar (MDG), Malaysia (MYS), Maldives (MDV), Mali (MLI), Malta (MLT), Mauritius (MUS), Mexico (MEX), Moldova (MDA), Morocco (MAR), Namibia (NAM), Netherlands (NLD), New Zealand (NZL), Nicaragua (NIC), Nigeria (NGA), Pakistan (PAK), Panama (PAN), Paraguay (PRY), Peru (PER), Philippines (PHL), Poland (POL), Portugal (PRT), Romania (ROU), Russia (RUS), Senegal (SEN), Slovak Republic (SVK), Slovenia (SVN), Solomon Islands (SLB), South Africa (ZAF), Spain (ESP), Sweden (SWE), Tanzania (TZA), Thailand (THA), Tunisia (TUN), Turkey (TUR), Uganda (UGA), Ukraine (UKR), United Kingdom (GBR), United States (USA), Uruguay (URY), Zambia (ZMB).

Table A1. Variables' definitions and data sources

VARIABLES	RELATIVISATION	SOURCE	DESCRIPTION
Current account	No	WEO*	Current account balance, percent of GDP
General government balance	Yes	WEO	General government net lending/borrowing, percent of GDP
General government gross debt	Yes	WEO	General government gross debt, percent of GDP
Economic growth	Yes	WEO	Gross domestic product, constant prices, percent change
IIP	No	BOP/IIP, WDI	Net international investment position (with Fund record), percent of GDP
Income	Yes	WDI	GDP per capita, PPP, constant 2011 international $ (natural logarithm)
National price level	Yes	WDI	Price level ratio of PPP conversion factor (GDP) to market exchange rate (natural logarithm)**
Dependency ratio	Yes	WDI	Age dependency ratio, percent of working-age population
Dependency ratio, young	Yes	WDI	Age dependency ratio, young, percent of working-age population
Dependency ratio, old	Yes	WDI	Age dependency ratio, old, percent of working-age population
Fuel balance	No	WTO, WDI	Exports minus imports of fuels, percent of GDP
Country-specific weights		WEO	Gross domestic product current prices (U.S. dollars, billions) is used to construct the GDP weights matrix.

**Missing data for HND and URY were extrapolated using WEO and WDI data.*

***The ratio allows for comparison of the cost of the bundle of goods that make up GDP across countries and informs how many dollars are needed to buy a dollar's worth of goods in the country as compared to the United States.*

WEO is October 2018 version of IMF World Economic Outlook Database; BOP/IIP refers to November 2018 version of IMF Balance of Payments and International Investment Position Statistics; WDI is November 2018 version of World Bank World Development Indicators and WTO refers to World Trade Organization data updated in October 2018.

Appendix 2. Current account regressions, extended specification

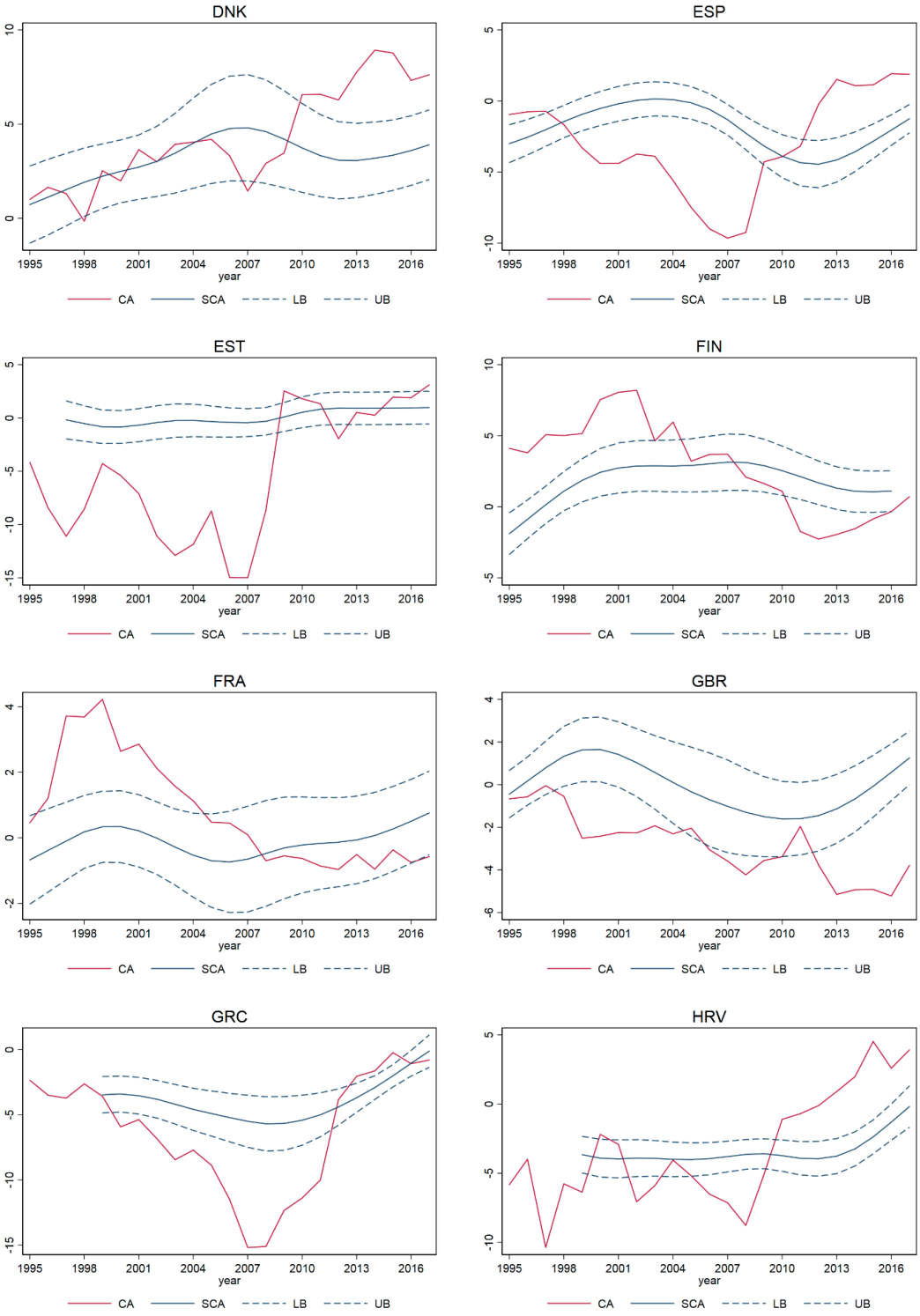
Table A2. Current account regressions, extended specifications

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
income	3.298***	4.315***	4.293***	4.306***	4.320***	4.321***
	(0.585)	(1.001)	(1.009)	(1.020)	(1.028)	(1.035)
general government balance	0.585***	0.573***	0.565***	0.563***	0.634***	0.644***
	(0.126)	(0.124)	(0.128)	(0.127)	(0.179)	(0.223)
general government gross debt					0.010	0.010
					(0.012)	(0.013)
general government balance*general government gross debt						0.000
						(0.004)
initial IIP	0.036***	0.027***	0.028***	0.028***	0.027**	0.027**
	(0.010)	(0.010)	(0.010)	(0.011)	(0.010)	(0.010)
national price level	-0.013	-1.569	-1.560	-1.536	-1.855	-1.853
	(1.697)	(2.258)	(2.248)	(2.262)	(2.362)	(2.374)
national price level squared	4.610**	3.513*	3.584*	3.587*	3.404	3.408
	(1.825)	(2.009)	(2.012)	(2.021)	(2.053)	(2.070)
dependency ratio		0.090**	0.097**	0.097**	0.096**	0.096**
		(0.044)	(0.043)	(0.043)	(0.044)	(0.044)
fuel balance		0.150**	0.154**	0.154**	0.159**	0.160**
		(0.062)	(0.062)	(0.063)	(0.065)	(0.065)
population growth			-0.171	-0.186	-0.141	-0.143
			(0.353)	(0.417)	(0.423)	(0.430)
economic growth				0.017	0.053	0.056
				(0.264)	(0.282)	(0.286)
Constant	-1.112*	-0.876	-0.841	-0.834	-0.698	-0.679
	(0.624)	(0.546)	(0.550)	(0.569)	(0.596)	(0.706)
Observations	94	94	94	94	94	94
R-squared	0.470	0.550	0.551	0.551	0.553	0.553
adjusted R2	0.440	0.514	0.509	0.503	0.499	0.493

*Robust standard errors in parentheses. Asterisks ***, **, * denote the 1%, 5%, 10% significance levels, respectively.*

Appendix 3. Current account, structural current account and 95% confidence intervals[5]

[5] Current account is regressed on income, general government balance, initial IIP, national price level, both in linear and quadratic form, dependency ratio and fuel balance (equation 3 in Table 2).


DNK
ESP
EST
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year
CA
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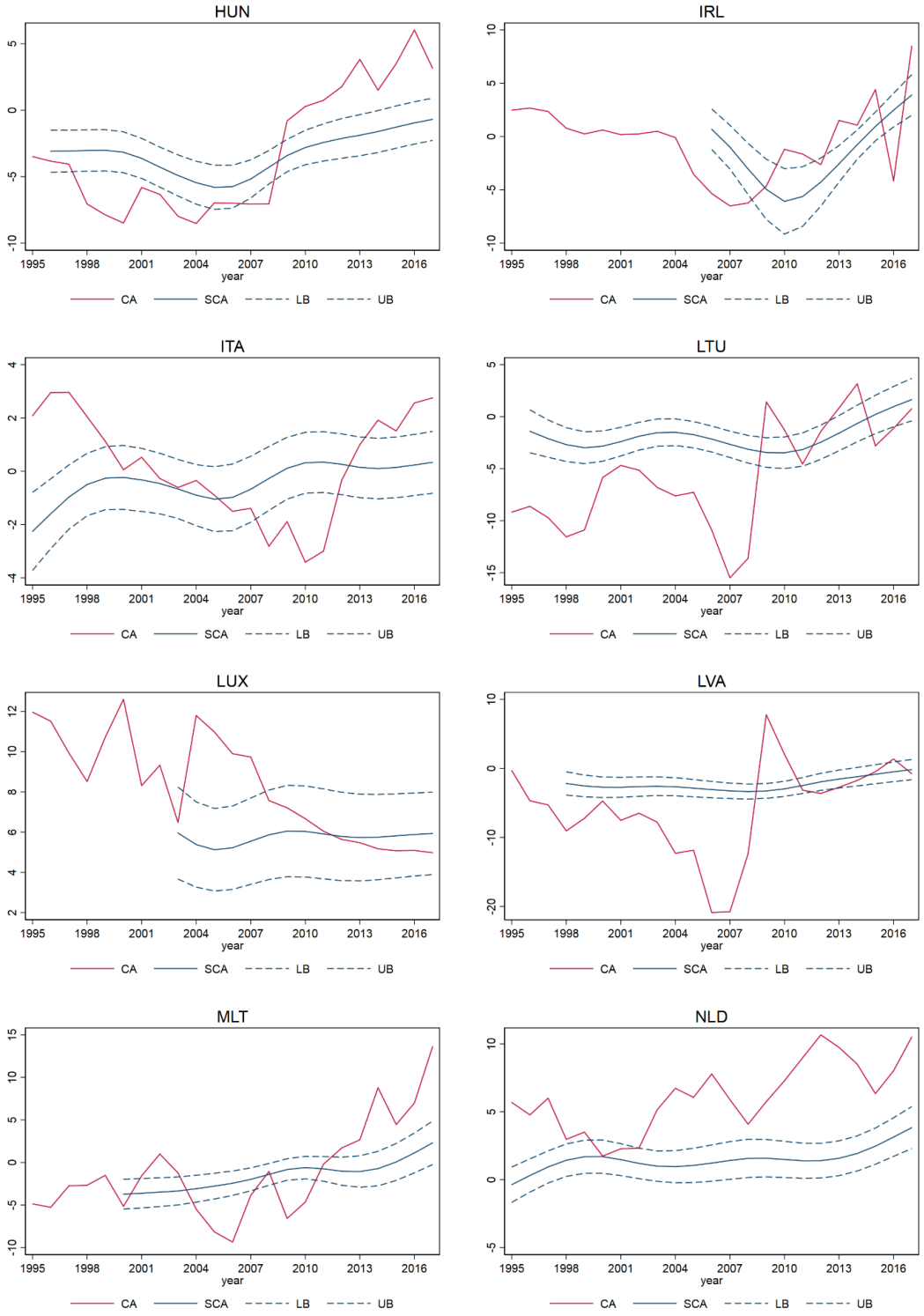
HUN
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LUX
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NLD
year
CA
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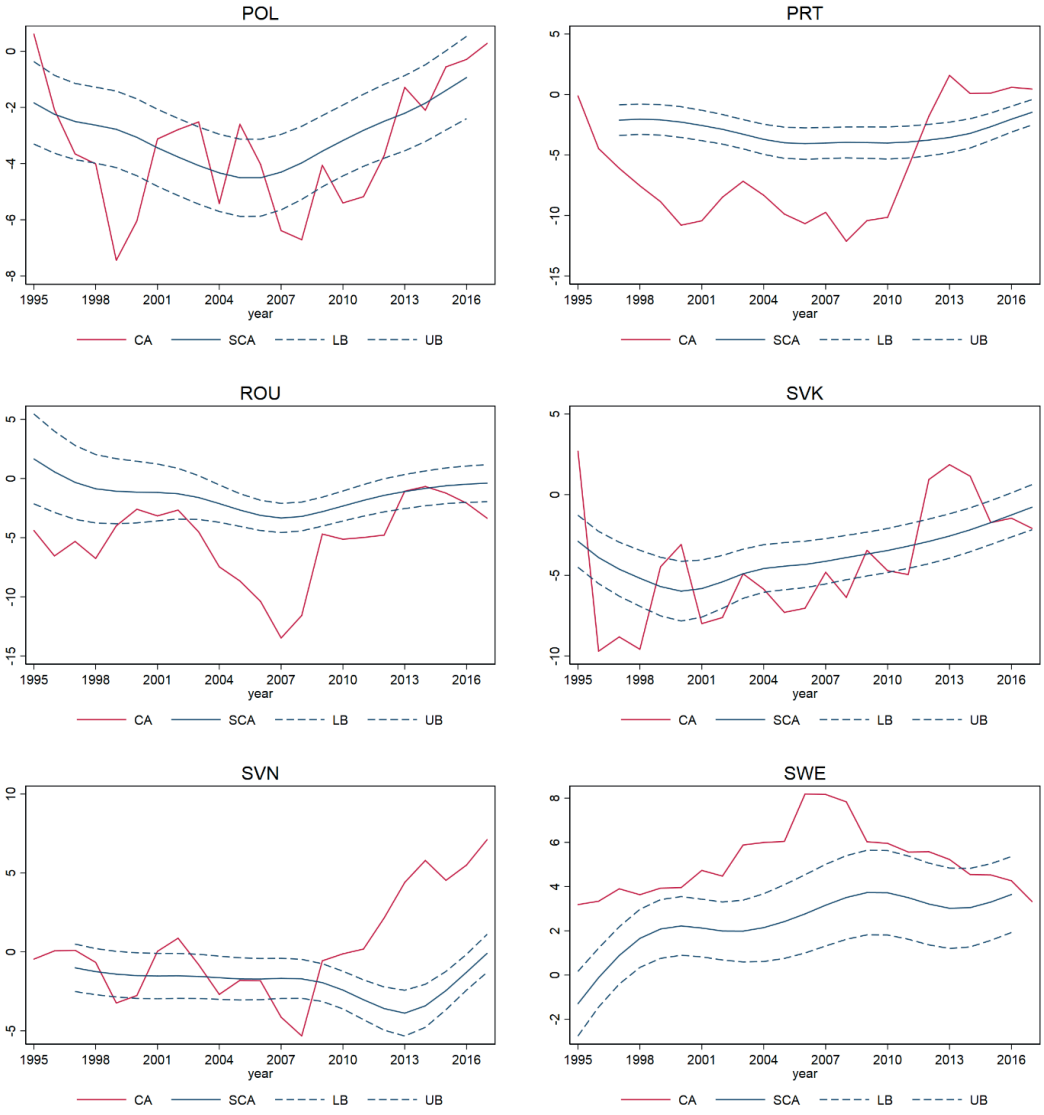
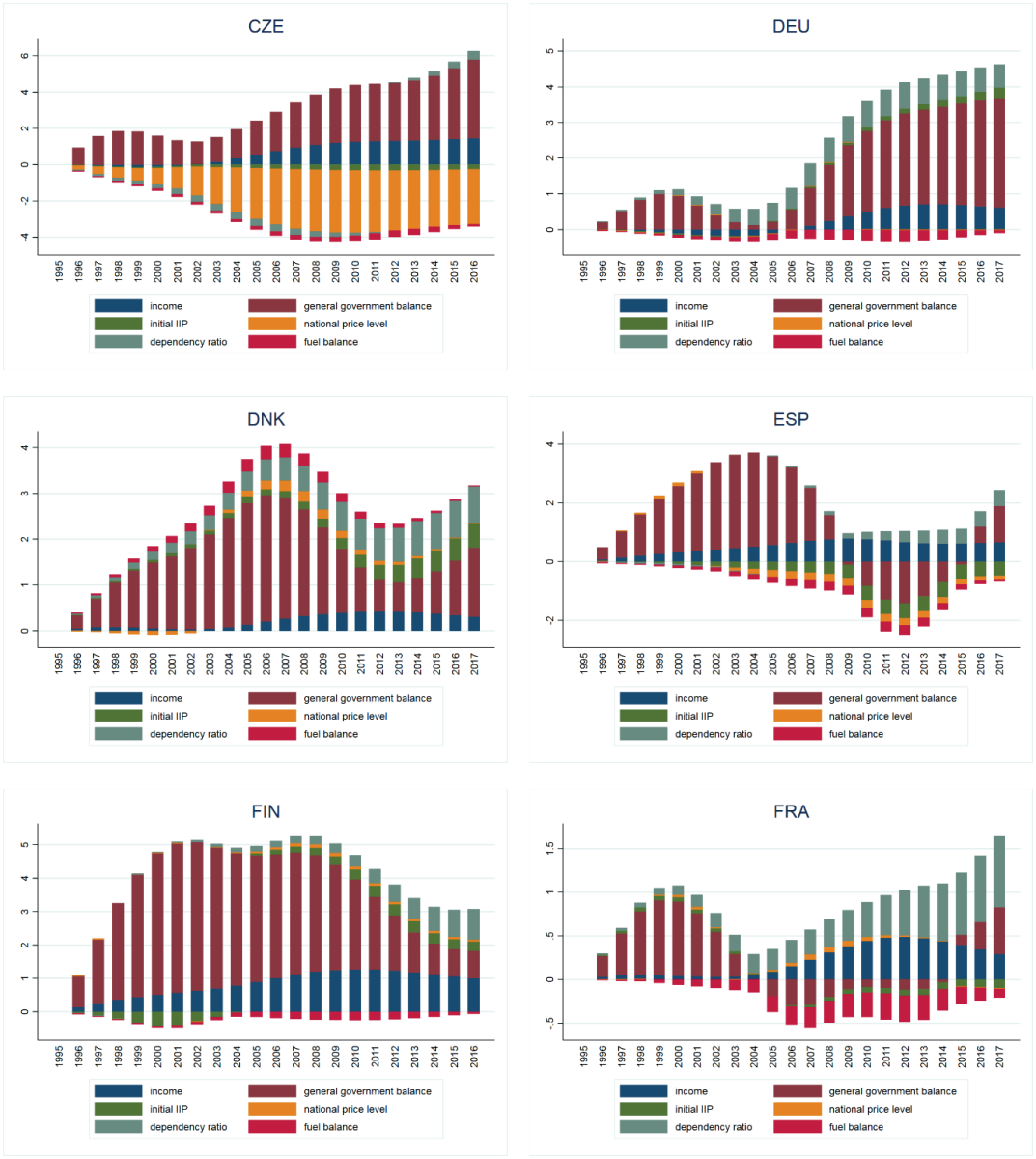
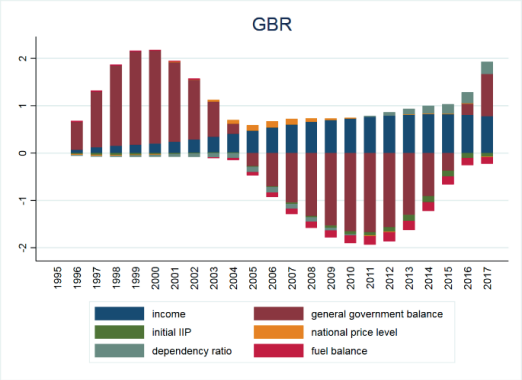
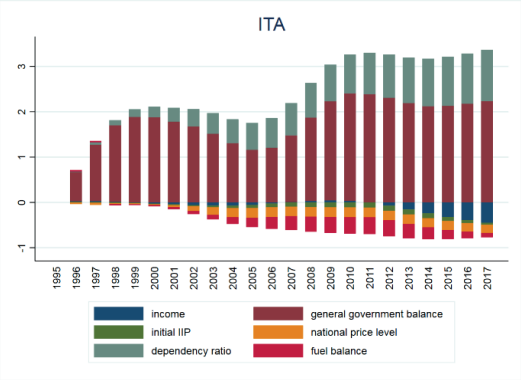

POL
PRT
ROU
SVK
SVN
SWE
year
CA
SCA
LB
UB

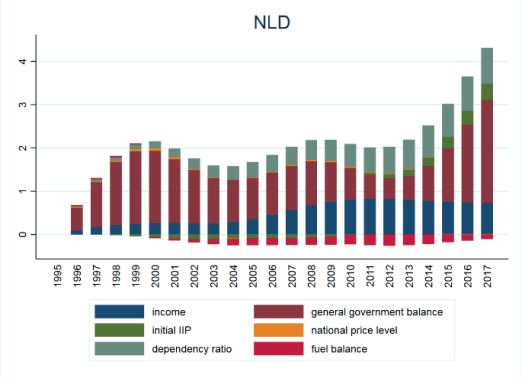
Appendix 4. Structural current account decomposition changes, cumulated since 1995[6]

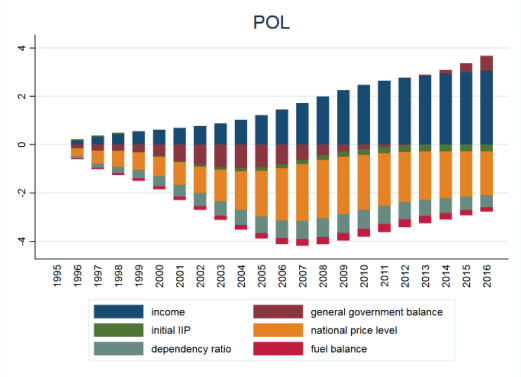


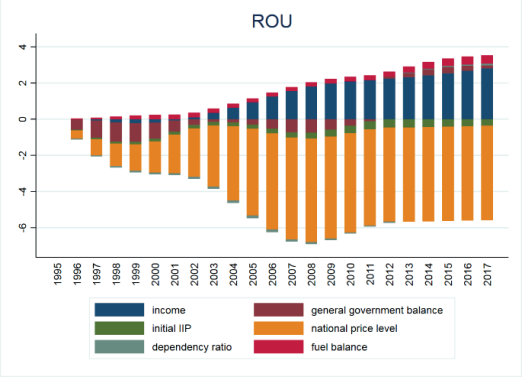
[6] Current account is regressed on income, general government balance, initial IIP, national price level, both in linear and quadratic form, dependency ratio and fuel balance (equation 3 in Table 2).

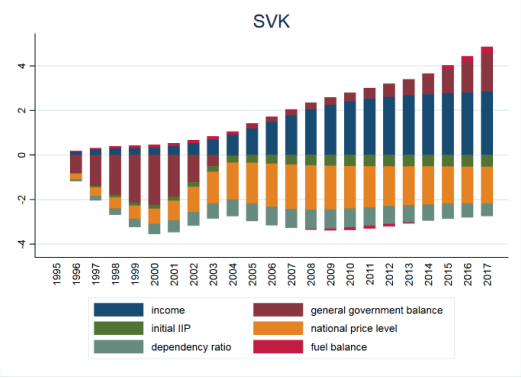

GBR
income
general government balance
initial IIP
national price level
dependency ratio
fuel balance

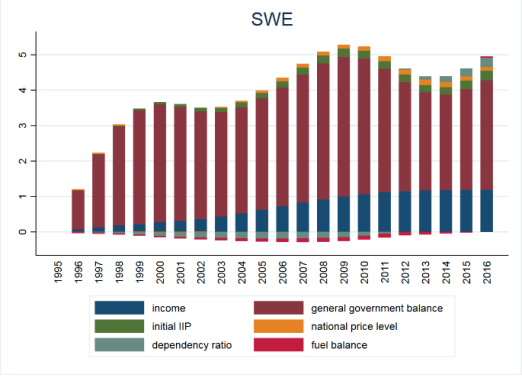

ITA
income
general government balance
initial IIP
national price level
dependency ratio
fuel balance


NLD
income
general government balance
initial IIP
national price level
dependency ratio
fuel balance


POL
income
general government balance
initial IIP
national price level
dependency ratio
fuel balance


ROU
income
general government balance
initial IIP
national price level
dependency ratio
fuel balance


SVK
income
general government balance
initial IIP
national price level
dependency ratio
fuel balance


SWE
income
general government balance
initial IIP
national price level
dependency ratio
fuel balance

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