European Journal of Government and Economics

ISSN: 2254-7088

Determinants of bilateral current account balance between the Eurozone and the United States

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Abstract. Long- and short-run current account balance (CAB) determinants of the nineteen Eurozone (EZ) member states vis-a-vis the United States (US) are examined. Particularly, the competitiveness of the EZ vs the US, the relationship between the current account deficit and the budget deficit (twin deficit), and other factors determining the current account balance are studied. Quarterly data was used in a sample of the nineteen EZ member states with the US as a trading partner over the period 2008 - 2018. It is found that the CAB in the long run has a positive relationship with the real interest rate, real exchange rate, Gross Domestic Product (GDP) per capita, and exchange rate volatility, but a negative relationship with the fiscal balance. In the short run, it is notable that only the real exchange rate affects the current account balance. Finally, policy implications are discussed regarding the determinants of the current account.

Keywords. current account determinants, economic policy, PMG method, Eurozone, USA
JEL Codes. F30, F32, F40, F41
DOI. https://doi.org/10.17979/ejge.2022.11.2.8925

1. Introduction

Recognizing the current account determinants is a matter of great significance in exercising economic policy, as marked by a plethora of papers in the relevant literature. This work examines the current account determinants in the bilateral trade relations between the Eurozone (EZ) countries and the United States (US). The economic/trading relationship between the US and the EZ in terms of trade volume is the greatest in the world and has grown more complicated over the years, encompassing an expanding quantity and variety of trade and financial operations that weave the economies into an increasingly interdependent partnership. The EZ-US trade relations are affecting the gross domestic product (GDP) of both the US and the EZ economies and, therefore, are in the spotlight of policymakers on both sides. Apart from the bilateral trade relations, the EZ member states and the US are leading members of the World Trade Organization (WTO), the International Monetary Fund (IMF), and the Organization for Economic Cooperation and Development (OECD). They both play crucial roles in establishing and implementing the goals of these institutions.

The US and the EZ are the largest economies in the world in terms of the GDP and volume of bilateral trade. Their combined population in 2020 approached 800 million people, generating a

GDP that accounted for more than 40% of the global GDP. The combined EZ-US world trade accounts for roughly 47% of total global trade, Eurostat (2021). Furthermore, they both have nearly identical levels of economic development and are among the most advanced in the world. They have the world's wealthiest and most educated populations. With a few exceptions, the US, and the EZ are significant producers of innovative technology and services. As a result, most of the trade between the US and the EU is intra-industry (Stöllinger 2020); that is, trade in similar commodities.

From the above short description of the importance of the EZ-US trade relations, it is evident that studying their determinants provides useful tools for exercising trade policy. Identifying the determinants of the bilateral current account, in both the short and long run, provides the essential tools for forecasting real exchange rate policy, evaluating the effects of regime action on the open macro-economy, and determining the sustainability of current policies and the wealth of the two economies.

In the present work, the bilateral relationship between the EZ and the US and the determinants which affect their CAB are examined. This work is novel because bilateral current account studies are scarce in the literature. There are numerous studies on the determinants of the trade balance of a country, vis a vis the rest of the world and the bilateral trade balance between individual countries. However, there are very few studies of the determinants of the bilateral CAB mainly due to data unavailability in the trade in services and the other balances that form the current account, apart from the trade balance; some rare examples of bilateral current account studies are Dettmann et al. (2012) and Iqbal et al. (2017). Disaggregate bilateral data for all balances formulating CAB was made available only recently by a combination of sources (Eurostat (2020), the OECD (2020), and the European Central Bank (ECB) (2020)).

Using quarterly panel data analysis, the effect of factors recognized in the literature as the primary determinants of the CAB is examined in the trade between the 19 EZ member states and the US from 2008 to 2018. These factors are real exchange rate, governmental fiscal balance, real interest rate, per capita GDP, and exchange rate volatility. The model was estimated using a panel Autoregressive Distributed Lags (ARDL) method, the Pooled Mean Group (PMG).

The article is arranged as follows: section 2 examines the literature on current account determinants; section 3 describes the empirical methodology and the data used, section 4 provides the results and section 5 summarizes the findings and lists policy implications.

2. Literature review

There is a growing literature on current account balance determinants since the 80s. Some empirical studies examine the determinants of the current account to determine the extent of the current account that may be considered ‘normal’ for a country based on a set of structural and macroeconomic attributes. Variables such as GDP per capita, demographics, fiscal balance, and initial net foreign assets are examples of economic essentials. The primary research on short-term current account variations is based on the concept that current account functions as a buffer against transient income shocks, smoothing consumption, and maximizing welfare. Ghosh and Ostry (1995), Glick and Rogoff (1995), Kraay and Ventura (2000), and Nason and Rogers (2006), completed the most significant of this early research in this field.

The existence of various approaches with diverging estimates and variable selection to comprehend which aspects have a suitable role for determining CAB led the topic to a multidimensional foundation. In theory, in equilibrium, the CAB ought to be zero; however, when it comes to the real world, this is doubtful. In the case where a surplus or a deficit occurs in the current account, this signals something regarding the situation where the economy is in, both on its own and in comparison with the trading country.

The imbalances in the current account, in the framework of income convergence, were studied by Herrman and Winker (2008) for the emerging economies in Europe and Asia. The authors stated that the progression of the financial market and financial integration were important factors in determining the current account balance. In the same notion, a more advanced financial market and financial integration might result in bigger deficits and lower surpluses. This scenario is possible because, as the convergence process progresses, countries with developed financial markets and integration may borrow more freely from abroad, resulting in higher domestic consumption and savings. Yet, several financial integration and development indicators are insufficient to fully explain the diverse models of current account and real convergence in Europe and Asia's growing countries.

In the spirit of empirical application, the methodology used in the current work falls on a class currently comprised of many analyses that employ well-established econometric methodologies that examine the relationship between a wide range of macroeconomic factors and the CAB, such as Debelle and Faruquee (1996); Blanchard and Giavazzi (2002); Chinn and Prasad (2003); Herrmann and Jochem (2005); Ca'Zorzi et al. (2009); Nieminen (2015); Das (2016); Yoshida and Zhai (2020).

The difference between this study to the above literature is that the empirical studies above examine the current account determinants of a country with respect to the rest of the world or a group of countries and not bilaterally, while in the present study, the determinants of the CA are examined in the bilateral trade of the two largest economies in the world, the EZ and the US. This work comprises a selection of some key determinants that affect the CAB in the bilateral relationship between the Eurozone and the United States. The first determinant identified in the literature as a key factor for the current account flows is the real exchange rate (RER).

The net export component of the current account is commonly shown as a function of competitiveness, RER, and certain other external factors. Fluctuations in the currency rate influence the balance of the current account. A currency depreciation, for example, is anticipated to rise the current account and lower the deficit. Previously, if the exchange rate falls, the foreign price of this country's net exports will fall. This phenomenon will give the impression that the nation is more competitive and subsequently, an upsurge in the number of exports will occur. Depreciation causes an upsurge in the current account deficit, which increases the value of exports since export demand is relatively elastic. (Kandil, 2009; Purwono et al., 2018). A depreciation in the exchange rate, alternatively, will raise the cost of purchasing imported products. Therefore, there will be less demand for imported goods, which will assist to minimize the current account deficit. Hence, as the theory suggests, a depreciation in the exchange rate increases CAB and vice versa[1].

Calderon et al. (2007) conducted empirical research regarding the current account in emerging countries. The authors identified a negative association between the current deficit, a decline in terms of trade, and an appreciation of the RER. Furthermore, Prat et al. (2010), while assessing the current account balance for emerging countries as well, came across that the budget balance has a significant impact on the current account, and that this is enhanced by an increase in net foreign assets.

Falk (2008) concluded that a depreciation of the real effective exchange rate indicates that the trade balance is enchanted; in nations with a large positive net foreign investment holding and a negative trade balance, the trade balance is less responsive to fluctuations in the real effective exchange rate.

The second determinant of the current account included in the model is the budget deficit. A budget deficit or fiscal deficit emerges as soon as a nation's expenditure surpasses its revenues. Almost every year, the United States has been running fiscal deficits for decades past. Naturally, a fiscal deficit does not seem like a pleasant situation for governments. But then again, arguments from the economists who support the Keynesian view propose that deficits are not always damaging to an economy. Nonetheless, deficit spending can be a favorite instrument for kickstarting a non-productive economy.

In the literature, the link between the budget deficit and the current account deficit is one of the most controversial issues. The conclusions drawn from this relationship guide policymakers in regulating the preferred policy and the economic policy to be implemented.

There are two approaches to analyzing the link between budget deficit and current account deficit:

1) The *Keynesian view*, in which the budget deficit influences the deficit of the current account. In further depth, a causal link exists between the budget deficit and the current account deficit. If this relationship is positive, the twin deficit hypothesis can be used to explain it.

2) The *Ricardian Equivalence*, which asserts that the two deficits are uncorrelated. Under the rational expectations hypothesis, an upsurge in public expenditure funded by issuing bonds induces a rise in savings to pay for future tax increases to repay the current increase in borrowing.

In Osoro's et al. (2014) study, an investigation into the twin deficit hypothesis has been done, as well as a statistical analysis of the link between the budget and current account balances, as well as major macroeconomic variables for the republic of Kenya for 196 years. The budget deficit and the current account deficit have a positive and substantial connection, according to empirical findings. The cointegrating slope coefficient's sign indicates a positive link between interest rates

[1] This holds under the Bickerdike-Robinson-Metzler condition of Trade Balance improvements after a currency depreciation. Import-export demand and supply elasticities, as well as initial volume of trade, are said to affect changes in the foreign currency value of the trade balance.

and the current account deficit, as well as a negative relationship between GDP and the money supply. This indicates that, in the long run, the current account deficit, combined with increases in the budget deficit, GDP, and interest rates, will increase the money supply.

In their research, Aloryito et al. (2016) inspected the twin deficit hypothesis considering countries in Sub-Saharan Africa countries (SSA). The authors discovered that the deficit appeared to spread over the past decade in contrast with the positive output development. In this work data from 41 countries were examined for the era between 2000 and 2012, with the use of the Generalized Method of Moments (GMM) estimation method, the foremost discovers specify that government deficits tend to enhance the current account and vice versa, in doing so the null hypothesis was rejected in favor of the twin hypothesis.

A further determinant of the CAB is exchange rate volatility (ERV). It affects actual inflation as well as prospects about imminent price volatility (Baharumshah, 2001). Movements in the exchange rate tend to have an impact on the domestic prices of imported goods and services directly. ERV, on the contrary, can have a similar impact on a country's CAB through the impact it has on foreign trade.

The unexpected movements in the exchange rate are known as exchange rate volatility. ERV is the source of exchange rate risk and has repercussions for the volume of trade balance and, as a result, on the current account. Increased exchange-rate volatility leads to higher costs for risk-averse traders and reduces foreign trade. If exchange rate fluctuations become unexpected, it generates uncertainty about potential earnings and, as a result, lowers the advantages of international trade. According to (De Grauwe, 1988), the impact of exchange-rate uncertainty on exports should be proportional to the degree of risk aversion. That is, if exporters are risk averse, an increase in ERV enhances the expected marginal utility of export revenue, motivating them to increase exports.

Using panel data analysis and the fuzzy approach[2], Nuroglu and Kunst (2012) studied the influence of ERV on the trade balance. Using the gravity model of international economics, the authors examined the bilateral trade between the EU-15 nations. The estimated coefficient was proved to be negative, indicating that ERV has a negative effect on bilateral trade flows.

Generally, the literature on the association between ERV and CAB is lacking. The research on the current account is limited, but at the same time, it is vast concerning the link between ERV and trade balance. A recent study by Purwono et al. (2018) analyzed the impact of ERV on the current account deficit. The authors used data from 2005 to 2011, and for the empirical part, they used a simultaneous model of Indonesia's current account deficit. Depreciation, according to the simulation results, increases the surplus to the current account deficit. Other than oil and gas, the decrease in export manufactured goods was higher than the increase in imports.

Furthermore, in literature, the relationship between interest rates and the current account argues that a rise in real interest rate reduces investment and increases savings, and as a result, the CAB is improved. But the findings do not conclude that such a relationship exists. The

[2] The method is particularly suited for ill-defined systems in which there is substantial ambiguity regarding the type and range of important input variables as well as the model’s underlying connections.

intertemporal model by Obstfeld and Rogoff (1995) inspects the bond between the current account and interest rates; they discovered that fluctuations occurring in the current account are related negatively to interest rates if transaction costs are present, under the assumption of perfect capital mobility. Bergin and Sheffrin (2000) and Bernhardsen (2000) found a positive slope coefficient between the current account and interest rates, indicating that an increase in the real interest rate caused a surge in the CAB. Additionally, Anoruo and Elike (2008) employed data from India, Korea, Thailand, and the Philippines to survey the asymmetric bond between interest rates and current accounts, with the use of cointegration analysis and nonlinear unit root test. The outcomes of their study showed that positive shocks in the interest rates have a positive impact on the fluctuations of the current account for Korea, the Philippines, and India. But then again, interest rates for the case of Thailand display a negative slope coefficient for the current account.

The final, variable included in the model is the per capita income. The latter is not a determinant of the current account directly but is a key determinant of the trade balance, which constitutes the larger sub-balance of the current account. Thus, the theory predicts that as GDP per capita increases, the purchasing power of the domestic agents increases as well. As a result, the domestic agents are now capable of purchasing domestic and imported goods more easily, which deteriorates the trade balance through the increase in the value of imports.

Falk (2008) conducted a study that focused on data from 32 developing and developed economies from 1990 to 2007. In his analysis, the author used linear mixed models and fixed effects in a panel data background to demonstrate that the trading partners' real foreign GDP per capita positively affects the balance of trade. The analysis also indicated that real domestic GDP per capita had a negative influence on the balance of trade.

Iyke and Ho (2017) tested the outcome of fluctuations in the real exchange rate towards Ghana's trade balance by handling quarterly data for the era between 1986 and 2016 with the use of linear and non-linear specifications methods. This research found proof of an asymmetric influence of the exchange rate on the trade balance. At last, this research found the support of a J-curve effect and later disclosed that the per capita GDP and the per capita GDP of the partner country play a major roll-on Ghana's trade balance.

3. Methodology and data

3.1 Model description

The model developed for examining the CAB determinants in the bilateral relationship between the EZ and the US employs variables recognized in the literature as the main determinants of the CAB. These are the real exchange rate (RER), the budget deficit (BUD), the real interest rate (RIR), GDP per capita in PPPs (GDP), and exchange rate volatility (ERV). Since our data is quarterly and seasonally unadjusted, three dummy variables for capturing seasonality (S1, S2, S3) were included. Finally, another dummy variable was included demonstrating the year of the entrance of each country in the Eurozone (Entry), this variable was included since each country was obligated to change its national currency to enter the Eurozone and this might have a structural break effect on its current account

Panel data analysis has been employed for the estimation of the model

$$CAB_{i,t} = f(RER_{i,t-s}, BUD_{i,t-u}, RIR_{i,t-v}, GDP_{i,t-w}, ERV_{i,t-x}), \quad [1]$$

where *i* denotes country *i* and *t* denote time (quarterly data have been used for the period 2008:Q1-2018:Q4); CAB is the current account balance of country i at time t as the ratio of US to Eurozone; and the subscripts s*, u, v, w,* and *x* are the optimum time-lags for the regressors. *RER* is a measure of the Eurozone's economic competitiveness in comparison to the United States. *BUD* is defined as each Eurozone country's budget deficit/surplus expressed as a percentage of GDP. *RIR* stands for real interest rate, and it is computed as the nominal interest rate minus inflation of the US over that of the EZ. *GDP per capita* is a measure of the purchasing power of domestic agents in constant prices and purchasing power parities (PPPs) and it is constructed as the ratio of the US per capita GDP over that of the EZ. Furthermore, the *ERV* variable measures the volatility of the exchange rate. It is calculated using a standard deviation of the moving average of the logarithm of the real exchange rate as a measure of time-varying exchange rate volatility[3].

3.2 Data description and variable specification

Table 1 provides a detailed list of the data used, frequency, source, and variable construction. The dataset includes the nineteen Eurozone countries with the United States as a trading partner, and the CAB data were obtained on a quarterly frequency to meet the time-frequency of the regressors. Data for the CAB involving the EZ member states with the US as a trading partner was available from the OECD and Eurostat databases from 2008 until 2018 on a quarterly frequency (OECD 2020, Eurostat 2020). Real exchange rate statistics were computed by quarterly nominal exchange rates, available from the ECB (European central bank 2020), and the consumer price index (CPI) of the 19 EZ countries with the US as a trading partner from the Eurostat database from the first quarter of 2008 until the last quarter of 2018, (Eurostat 2020). GDP per capita in constant 2015 prices and PPPs was available from the OECD database as well (OECD 2020) for both the EZ and the US. Real interest rate (RIR) data was constructed by quarterly nominal interest rates (OECD 2020) and the CPI indexes also from the OECD database (OECD 2020). Budget deficit (BUD) data were available from the Eurostat database for the 19 Eurozone countries (Eurostat 2020). Finally, ERV was calculated using the logarithmic moving average formula and the data for RER. Regarding the US variables, the (OECD, 2020) and the (Eurostat, 2020) databases have been used to draw our data on a quarterly frequency. The US

[3] Section 3.2 and table 1 provide a detailed analysis for the ERV variable construction.

variables are used in the model to create the ratio of US to EZ in the estimation, except for the budget deficit variable.

As the nominal exchange rate rises, the Euro currency appreciates against the US dollar, reducing the competitiveness of Eurozone countries. As a result, an increase in RER is expected to increase agents' real disposable income for goods and services, improving competitiveness and eventually improving the current account. The formula used to create the RER variable can be found in table 1 denoted by equation [2].

$$\frac{\partial CAB}{\partial RER} > 0, \qquad since\ \frac{\partial X}{\partial RER} > 0, \frac{\partial M}{\partial RER}, < 0$$

In this part we should mention that 4 out of the 19 EZ member states joined the EZ in the period analyzed in this paper; Estonia joined in 2011, Latvia in 2014, Lithuania in 2015, and Slovakia in 2009. Each country was obligated to change its national currency to enter the Eurozone. Before joining, the exchange rates for these counties were different from those of the EZ. Data regarding this issue is available from the ECB database through the nominal exchange rate.

Table 1. Data sources and construction of the variables.

Data description	***Frequency***	***Source***	***Variable***
Nominal exchange rate	*quarterly; end of the period*	*ECB (European central bank) (2020)*	*RER*$RER_{i,t}$*: Real exchange rate in 2015 prices* $RER_{i,t}= \frac{CPI^{US}_{i,t}}{CPI^{EZ}_{i,t}} e_{i,t}$ [2] $e_{i,t}$*: nominal exchange rate*
Consumer price index, EZ	*quarterly; base year 2015*	*Eurostat (2020)*	
Consumer price index, US	*quarterly; base year 2015*	*Eurostat (2020)*	
Consumer price index, EZ	*quarterly; base year 2015*	*Eurostat (2020)*	$RIR_{i,t}$*: Real interest rate* $RIR^{US}_{i,t} = i_{i,t} - CPI^{US}_{i,t}$ $RIR^{EZ}_{i,t} = i_{i,t} - CPI^{EZ}_{i,t}$ $RIR_{i,t} = \frac{RIR^{US}_{i,t}}{RIR^{EZ}_{i,t}}$ $i_{i,t}$*: nominal interest rate*
Consumer price index, US	*quarterly; base year 2015*	*Eurostat (2020)*	
Nominal interest rate	*quarterly; three-month money market rate*	*ECB (European central bank) (2020)*	
Budget deficit of the EZ countries	*quarterly; percent of GDP*	*Eurostat (2020)*	$BUD_{i,t}$*: Budget deficit of the EZ countries* $BUD_{i,t}$ *is used without manipulation*
Gross domestic product, EZ	*quarterly; constant prices (base year 2015), PPPs*	*OECD (2020)*	$GDP_{i,t}$*: Gross domestic product in constant prices and PPPs* $GDP_{i,t} = \frac{GDP^{US}_{i,t}}{GDP^{EZ}_{i,t}}$
Gross domestic product, US	*quarterly; constant prices (base year 2015), PPPs*	*OECD (2020)*	
Exchange rate volatility	*quarterly; moving average*	*Author's calculations*	$ERV_{i,t}$*: Exchange rate volatility* $V_{i,t+m} = \left(\frac{1}{m}\sum_{i=1}^{m}(R_{t+i-1} - R_{t+i-2})^2\right)^{1/2}$ [3] *V: volatility of the exchange rate* *R: logarithm of the exchange rate* *m: number of periods*

Relating to the CAB definition, the real interest rate (RIR) is anticipated to have a positive relationship with the CAB. The expected positive sign is explained by theory since an increase in real interest rates decreases investment while increasing savings, resulting in an improvement in the CAB due to the difference between savings and investment. Therefore,

$$RIR = \frac{RIR^{US}}{RIR^{EZ}}, \frac{\partial CAB}{\partial RIR} > 0.$$

The budget deficit (BUD) of the 19 Eurozone member states as a percent of GDP has been used. A decrease in the value of the CAB variable means an increase in the current account deficit. Consequently, decreases in the CAB variable are anticipated to be positively related to an increase in the budget deficit:

$$\frac{\partial CAB}{\partial BUD} < 0.$$

As noted in the literature review section, domestic agents' disposable income has a positive effect on the demand for goods and services. The model incorporates the agents' GDP per capita in constant prices and purchasing power parities (PPPs) as a degree of the domestic agents' income. The estimated coefficient is anticipated to have a positive sign since agents’ income influences the demand for goods and services positively, i.e., a rise in the per capita GDP in the EZ raises Eurozone imports (M) from the US while a rise in the US per capita GDP has a positive effect on exports to the US (X).

$$\mathrm{GDP} = \frac{\mathrm{GDP^{US}}}{\mathrm{GDP^{EZ}}}, \frac{\partial \mathrm{X}}{\partial \mathrm{GDP^{US}}} > 0, \frac{\partial \mathrm{M}}{\partial \mathrm{GDP^{EZ}}} > 0 \text{ therefore,} \frac{\partial \mathrm{CA}B}{\partial \mathrm{GDP}} > 0.$$

In this work, an attempt was made to fill the gap in the literature on the relationship between CAB and ERV by employing an ERV measure proposed by Serenis and Tsounis (2012, 2015). Since ERV is not directly observable, there is no clear, correct, or wrong way to measure it. Nonetheless, several researchers over the years attempted to devise various methods of measuring it. In our approach, we employed a moving average formula of the logarithm of the exchange rate, the formula can be found in Table 1 signified by equation (3). V is the volatility of the exchange rate, R stands for the logarithm of the real exchange rate, and m is the number of periods, in our case, 4 quarters have been used as a lag to observe the low and high peak values. This is an ad-hoc hypothesis based on adaptive expectations (see Serenis and Tsounis 2012, 2015). Generally, ERV negatively affects the CAB because it raises uncertainty about import and export prices of goods and services when agents are risk averse. However, it may have a positive effect on trade flows if agents are risk-loving (Agiomirgianakis et al. 2017). Assumptions regarding the sign of the coefficient cannot be drawn ex-ante, this will be empirically estimated. If the ERV coefficient displays a positive sign, this indicates that the Eurozone countries’ exporters are more risk lovers than those of the United States and the opposite is if the sign of ERV is negative. Therefore, either $\frac{\partial CAB}{\partial ERV} > 0$ or $\frac{\partial CAB}{\partial ERV} < 0$.

3.3 Methodology

A panel data cointegration analysis was performed to investigate the long-run relationship between the CAB and its determinants. Cointegration analysis examines the presence of a cointegrated mixture of the series to evaluate whether there is a statistically significant relationship among the variables. If the order of integration of this combination is low, it implies an equilibrium relationship among the initial series, which is known as cointegration. When applied to non-stationary time series, it is essential to employ cointegration analysis rather than standard linear regression techniques, as the latter would yield spurious results.

An empirical model that investigates both the short- and long-run relationship between the CAB and its determinants in the bilateral relationship between the US and EZ member states was created. This is especially crucial when the econometric model is used to make policy-implementation inferences with time lags. Both short- and long-term effects were assessed on the CAB and its determinants, making use of a dataset comprised of the 19 Eurozone member states with the US as a trading partner, rather than averaging the data for each state. The PMG method was used, which can be thought of as a panel Error Correction (EC) model, in which short- and long-term effects are estimated mutually using an ARDL model (Pesaran and Shin, 1999) where the short-run effects are permitted to differ among cross-sections with common long-run coefficients.

Country heterogeneity is especially important in short-run relations, but long-run relations among CAB are expected to be more homogenous among nations in the long run. The PMG technique also produces reliable estimates of the parameters in the long-run relation among stationary and integrated variables. When both I(0) and I(1) variables are incorporated in this manner, the model can be estimated, whereas other techniques need only I(0) or I(1) variables.

However, the PMG approach still demands the regressors to be entirely exogenous. This is ensured if the dynamic specification of the model is sufficiently improved such that the regressors are strictly exogenous. Increasing the number of regressors randomly, on the other hand, reduces the degrees of freedom. The residuals must also be serially uncorrelated. Likewise, it is essential to ensure that the variables are not I(2) since the PMG technique would provide spurious results. Thus, before advancing with model estimation, the order of integration of the regressors must be tested. This issue has been validated by applying the Im, Pesaran, and Shin (IPS) unit root test for panel data, as well as the Levin, Lin, and Chu (LLC) unit root test.

The first step for the PMG method is to conduct panel unit root tests on the dependent and independent variables of interest. Time-series unit root tests have given rise to panel unit root tests. This arose since the combining of the asymptotic properties of the time-series dimension T and the cross-sectional dimension N.

Im et al. (2003) developed the IPS unit root test to capture dataset heterogeneity under the alternative hypothesis. The null hypothesis assumes that all series are non-stationary, whereas the alternative assumes that a portion of the series is stationary. Table 2 shows the results of the IPS panel unit root test.

Table 2. Im, Pesaran & Shin unit root test.

Variables	*I (0)*	*I (1)*
CAB	*-5.508*	*-28.217**
RER	*-2.958**	*-16.817**
BUD	*-10.419**	*-32.075**
GDP	*2.071*	*-12.817**
ERV	*-2.958**	*-16.817*
RIR	*-15.575**	*-29.912**

Source. Author's estimation / The * designates significance at least at the 5% level. IPS test was performed utilizing the 5% significant level.

H_0 was rejected at the 5% statistically significant level for all variables except per capita GDP, which was discovered to be non-stationary in all panels. As a result, the variables CAB, RER, BUD, RIR, and ERV are I(0), whereas GDP is I(1).

Levin et al. (2002) created the second unit root test employed, which proposes hypotheses for assessing stationarity in panel data. The LLC test demonstrates that each time series has a unit root under the null hypothesis, but each time series is stationary under the alternative hypothesis. The LLC, like other unit root tests, assumes that each cross-separate section's operations are self-contained.

From Table 3, H_0 was rejected at the 5% statistically significant level for CAB, BUD, and RIR but not for RER, GDP, and ERV, which, for all panels, were discovered to be non-stationary at their level. As a result, the variables CAB, BUD, and RIR are I(0), whereas GDP, RER, and ERV are I(1).

Table 3. Levin, Lin & Chu unit root results.

Variables	*I (0)*	*I (1)*
CAB	*-4.907*	*-24.034**
RER	*-0.935*	*-20.610**
BUD	*-7.700**	*-26.088**
GDP	*-1.034*	*-6.762**
ERV	*-0.935*	*-20.610**
RIR	*-15.362**	*-28.865**

Source. Author's estimation / The * designates significance at least at the 5% level. LLC test was performed using the 5% significant level.

As can be seen from Tables 2 and 3, the model contains both I(0) and I(1) regressors but not I(2), indicating that the variables are either stationary at their level or their first difference and that the PMG method can be applied. The sensitivity of the cointegrated variables to any deviation from the long-run equilibrium is a key feature. The PMG method is used on an error correction model to estimate the speed of adjustment to the long-run relationship while allowing for unrestricted cross-section heterogeneity in adjustment dynamics and fixed effects.

Following Perasan et al. (1999), the PMG-restricted version of (1) is estimated on pooled data as

$$\Delta CAB_{i,t} = \varphi_i\left(CAB_{i,t-1} - \sum_{k=1}^{\mu} \vartheta_{k,i} G_{k,i,t}\right) + \sum_{j=1}^{p-1} \lambda_{ij} \Delta CAB_{i,t-j} + \sum_{\kappa=1}^{\mu} \sum_{j=0}^{q-1} \beta_{k,i,t-j} G_{k,i,t} + \sum_{z=1}^{3} \gamma_z season_{z,t} + \delta entry_t + v_i + \varepsilon_{i,t} \quad [4]$$

where I = 1, …,19 indicates countries and t = 1, ..., 44 and indicates time; Δ is the operator of the first difference; $CAB_{i,t}$ denotes the CAB of Eurozone country i vis-à-vis the USA at time t; μ=6 and indicates the number of explanatory variables; G=(RER, ERV, BUD, RIR, GDP) is the vector containing the regressors. Also, in (4) the variable *season* represents three dummy variables accounting for seasonality and the variable *entry* represents a dummy variable for the entrant year of each country to the Eurozone. Note that the dataset is formed by panel data where each of the variables contained in the G vector has 19 time series, one for each country and, each time series has 44 time periods.

The parameter φ_i represents the error-correcting speed of adjustment based on the long-run relationship, φ_i is significant since it indicates if the variables are cointegrated and is anticipated to be statistically significant and negative under the hypothesis that the variables exhibit a return to long-run equilibrium. Furthermore, the estimated coefficients for ϑ_k, indicate the long-run relationship between the variables, whereas the $\beta_{k,i}$ the determinant variables' short-run coefficients, v_i indicates the country-specific fixed-effect, ε is a time-varying disturbance term, μ=6 is the number of the determinants and q, and p is the number of lags.

The following steps provide a brief explanation of the PMG method. It is necessary to identify the ARDL order of the model denoted by [1] first. Also, the value of q for each regressor must be calculated. Thus, for each country, equation [1] was re-estimated, and the lagged ARDL order was established using the Schwarz Bayesian Criterion (SBC). The lag order of the ARDL model for each cross-section is determined using a maximum of 6 lags in equation [1].

At that point, the most common lag order across cross-sections for each variable has been used, yielding the final form of equation (1) for estimation:

$$CABi,t = \varphi_i\left(CAB_{i,t-1} - \sum_{k=1}^{\mu} \vartheta_{k,i} G_{k,i,t}\right) + \lambda_i \Delta CAB_{i,t-1} + \beta_{1,i,0} \Delta RER_{i,t} + \beta_{1,i,1} \Delta RER_{i,t-1} + \beta_{1,i,2} \Delta RER_{i,t-2} + \beta_{1,i,3} \Delta RER_{i,t-3} + \beta_{1,i,4} \Delta RER_{i,t-4} + \beta_{2,i,0} \Delta RIR_{i,t} + \beta_{2,i,1} \Delta RIR_{i,t-1} + \beta_{2,i,2} \Delta RIR_{i,t-2} + \beta_{2,i,3} \Delta RIR_{i,t-3} + \beta_{3,i,0} \Delta BUD_{i,t} + \beta_{3,i,1} \Delta BUD_{i,t-1} + \beta_{3,i,2} \Delta BUD_{i,t-2} + \beta_{3,i,3} \Delta BUD_{i,t-3} + \beta_{4,i,0} \Delta GDP_{i,t} + \beta_{4,i,1} \Delta GDP_{i,t-1} + \beta_{4,i,2} \Delta GDP_{i,t-2} + \beta_{5,i,0} \Delta ERV_{i,t} + \beta_{5,i,1} \Delta ERV_{i,t-1} + \beta_{5,i,2} \Delta ERV_{i,t-2} + \beta_{5,i,3} \Delta ERV_{i,t-3} + \gamma_1 S1 + \gamma_2 S2 + \gamma_3 S3 + \delta entry_t + v_i + \varepsilon_{i,t} \quad [5]$$

Second, the maximum likelihood was used to estimate the long-run coefficients $\vartheta_{k,i}$s across cross-sections. The final step involves estimating the short-run coefficients λ_is and $\beta_{k,i,j}$s, the speed of adjustment φ_i the country-specific intercepts v_i, and the country-specific error variances on a country-by-country basis, again employing the maximum likelihood method and the estimations of the long-run coefficients attained earlier.

The PMG has been tested for the following specifications: The model's dynamic stability has been investigated; for our model to be dynamically stable, the coefficient of the error correction term must be negative and not lower than -2, i.e., inside the unit circle. Its values were -0.417 and are statistically significant from zero at a significance level of less than 1%. As a result, the condition for dynamic stability is met.

Another requirement is to see if a cointegrated relationship exists, i.e., a statistically significant long-run relationship among the CAB and its determinants. The coefficient of the error correction term φ_i must be negative and statistically significant to indicate cointegration. The percentage change in any disequilibrium between the dependent and the independent variables that are corrected during one period (in our case, one quarter) is represented by the value of this coefficient. Its value indicates the rate at which the economy is adjusting to the long-run equilibrium. Regarding our situation, the value of φ_i equals -0.417, indicating that the variables are cointegrated and that 41.7 percent of any disequilibrium between the dependent and the regressors is corrected within one quarter.

In the end, the long-run elasticities must be identical across cross-sections for the PMG estimator to be applied. This pooling across cross-sections gives consistent and efficient estimates when the applied are correct, i.e., the long-run coefficients are the same across cross-sections. The PMG estimations will be inconsistent if the slope parameter in the original model is heterogeneous. A Hausman test is used to assess the homogeneity hypothesis. This Hausman test is founded on a comparison of the Mean Group (MG) and the PMG estimators. The Hausman test statistic was 3.91, with a 0.56 level of statistical significance (p). Consequently, the null hypothesis that the difference in coefficients is not systematic cannot be rejected, and the model's slope parameters across cross-sections are proved to be homogenous.

4. Results

The dynamic specification of the model was found using the methods outlined above (see section 3.1 and eq. [5]) and is: ARDL (1,5,4,4,3,4); each number in order represents the distributed lags for the variables *CAB*, *RER*, *RIR*, *BUD*, *GDP*, and *ERV*, respectively. Table 4 presents the long and short-run coefficients of the CAB determinants of the Eurozone members vis-à-vis the United States.

The values of the long-run coefficients in table 4 above illustrate the effect of the explanatory on the dependent variable. The long-run coefficients proved to be statistically significant at levels less than 1%. All of them are shown to have the anticipated signs: the US per capita income ratio over the EZ per capita income influences the CAB positively since a rise in the GDP per capita in the EZ raises Eurozone imports from the United States while an upsurge in the GDP per capita of the US has a positive impact on exports to the United States (0.033). Nevertheless, the long-run coefficient value is smaller than one, indicating that when the US per capita income increases by one PPP unit over the EZ per capita income, the CAB improves by 0.033. Moreover, the increase in competitiveness stemming from a real depreciation of the real exchange rate (RER) (2.518) positively affects the balance of the current account. Also, the real interest rate (RIR) variable has the anticipated sign and positively affects CAB (0.486) in the long run; an upsurge in real interest rates reduces expenditure (investment & consumption) by increasing savings, and as a result, current account deficit decreases or current account surplus increases. Additionally, the variable representing the budget deficit (BUD) negatively affects the CAB (-0.348) since an increase in budget deficit decreases the CAB variable through an increase in government expenditures. Finally, the effect of ERV on the CAB is positive (7.551) for the Eurozone countries, indicating that ERV affects the actions of the domestic agents i.e., exporters in the Eurozone are more risk-loving than importers and they see ERV as an opportunity for speculated profit.

By examining the short-run coefficients, the GDP variable does not affect the CAB in any of the time lags, meaning that domestic agents have no intention to spend on goods and services among quarters until they gather a surplus on their income. At the fifth time lag, the short-run coefficients for the real exchange rate (RER) become statistically significant, indicating that the price difference between EZ member states and the US has an impact on the CAB after 5 quarters. Moreover, the real interest rate (RIR) in the short run does not affect the CAB since it cannot reduce investment and increase savings and eventually cannot lead to a CAB improvement. The variable of budget deficit (BUD) also has no impact on the balance of the current account in the short run, indicating that the results adopt the Ricardian Equivalence hypothesis in the short run, in which the current account deficit and the budget deficit are uncorrelated. At the same time, this is a contradiction according to the theory because classical economists have studied the long-run equilibrium and not the short-run. Besides, the ERV does not affect the CAB, thus inference of whether the exports are risk lovers or risk averters cannot be drawn. This can also indicate that the exporters/importers are not showing their true risk intentions in the short run.

To assure the robustness of the results, robustness analysis has been performed and it can be found in the Appendix. By changing the dynamic specification of the model in all cases,[4] the signs and the level of statistical significance of the long-run coefficients for all regressors were the same as in the original model. On the other hand, the short-run coefficients proved to be non-statistically significant (along with the Hausman test) in all cases except for the specification, ARDL (1,5,4,4,3,3), where the estimated coefficient for real exchange rate is statistically significant in the fifth time lag, as it is in the original model. Furthermore, the value of coefficients does not deviate significantly from those shown in table 4 during the robustness tests. Ultimately, for reasons of completeness, a Ramsey REST test has been performed, accounting for omitted variable bias and functional misspecification. In the RESET test, the null hypothesis that omitted variable bias and misspecifications exist was rejected (table 4 and the Appendix).

[4] The model originally used for the estimation is an ARDL(1,5,4,4,3,4) and its results are presented in table 4. In the appendix robustness checks can be found were the specification of the ARDL model has changed to ARDL(1,4,4,4,3,4), ARDL(1,5,4,4,2,4), and ARDL(1,5,4,4,3,3).

Table 4. Long-run and short-run coefficients of the current account balance determinants.

Series	*Coefficient*	*St. error*	*p-value*
Long-run coefficients			
RER	2.518***	0.899	0.000
RIR	0.486***	0.035	0.000
BUD	-0.348***	0.004	0.000
GDP	0.033***	0.001	0.000
ERV	7.551***	0.405	0.000
Hausman test	3.91		0.562
Error correction coef. (φ)	-0.417***	0.161	0.010
Short-run coefficients			
ΔCAB_{t-1}	-0.222**	0.100	0.028
ΔRER_{t}	0.787	1.860	0.672
ΔRER_{t-1}	-1.195	2.166	0.581
ΔRER_{t-2}	-1.067	2.220	0.628
ΔRER_{t-3}	-0.758	2.411	0.753
ΔRER_{t-4}	-0.199	1.566	0.899
ΔRER_{t-5}	2.459*	1.226	0.045
ΔRIR_{t}	0.008	0.100	0.979
ΔRIR_{t-1}	-0.008	0.169	0.600
ΔRIR_{t-2}	0.104	0.192	0.588
ΔRIR_{t-3}	-0.014	0.162	0.370
ΔRIR_{t-4}	-0.013	0.145	0.365
ΔBUD_{t}	-0.051	0.515	0.320
ΔBUD_{t-1}	-0.039	0.291	0.179
ΔBUD_{t-2}	-0.574	0.038	0.140
ΔBUD_{t-3}	-0.036	0.031	0.248
ΔBUD_{t-4}	-0.017	0.027	0.520
ΔGDP_{t}	1.673	4.023	0.677
ΔGDP_{t-1}	5.505	3.445	0.110
ΔGDP_{t-2}	0.940	2.155	0.662
ΔGDP_{t-3}	-1.218	2.289	0.595
ΔERV_{t}	-9.740	9.251	0.292
ΔERV_{t-1}	-1.555	12.010	0.897
ΔERV_{t-2}	11.256	10.54	0.286
ΔERV_{t-3}	9.567	13.838	0.489
ΔERV_{t-4}	-1.095	6.946	0.875
S1	0.436	0.253	0.085
S2	0.349	0.355	0.325
S3	0.483**	0.221	0.029
Intercept	-0.586***	0.203	0.004
Entry	0.281	0.201	0.302
Model misspecification test	Ramsey RESET test	F-statistic	0.329
Dynamic Specification	*ARDL (1,5,4,4,3,4)*		
Estimation Method	*Pooled Mean Group (PMG) adjusting for country-fixed effects and seasonality*		
Number of countries	*19*		
Time Period	*2008: Q1-2018: Q4 (44 periods)*		
Observations	*836*		

Source. Author's estimation / ***, **, *: denote statistical significance at 1%, 5% and 10%, correspondingly.

5. Conclusion and policy implications

This work studies the current account balance of the 19 Eurozone member states in the bilateral relationship between them and the United States. The countries studied are considered to be the most prominent trading partners in the world. Quarterly bilateral current account data have been used to provide an effective governmental policy implication. The novelty of this work lies in the fact that bilateral current account studies are scarce in literature and, to the best of our knowledge, do not exist for the current account balance of the EZ member states vis-a-vis the US.

The determinants of the current account balance in this bilateral relationship are tested over the period 2008 -2018 using quarterly data (2008:Q1-2018:Q4). It is found that the real bilateral exchange rate, the bilateral real interest rate, the budget deficit of the Eurozone countries as a percent of GDP, the income of the domestic agents, and the exchange rate volatility are determinants of the bilateral current account balance of the EZ vis-à-vis the US in the long run. Moreover, since our data are seasonally unadjusted, three seasonality variables and a dummy variable maned *entry,* which represents the year of the entrance of each Eurozone country have been included. In terms of empirical approach, our study is based on the theory of cointegrated panel data and error correction techniques for cointegrated variables utilizing the PMG method to cointegration.

Empirical findings indicate that all the long-run coefficients proved to be statistically significant meaning that the current account exhibits a cointegrated relationship along with its determinants and they can be used for policy implementation. In detail, the current account has a positive long-run relationship with the real exchange rate, the real interest rate, the exchange rate volatility, the GDP per capita, and a negative relationship with the budget deficit. Then again, in the short run, only the real exchange rate is seen to be statistically significant, suggesting that the difference in prices can be used as a valid instrument for exercising economic policy for short periods.

Our conclusion on the current account balance suggests some beneficial policy implications regarding both counties. The policymakers in both the Eurozone and the United States can evaluate the impact of the determinants of their policy implementation, i.e., by choosing the right determinants, they can prevent the current account from running long-lasting deficits.

The PMG method used in this paper allows us to draw inferences on policy implications by evaluating the long-run and short-run coefficients. In the long run, all the determinants can be used as instruments for economic policy. More specifically, the value of the estimated long-run coefficients indicates that the current account balance is very sensitive to RER. EZ policymakers may use this result for boosting growth: RER is a measure of EZ competitiveness and depends on nominal ER and the ratio of the price levels of EZ and the US. Nominal exchange rates, in a flexible ER regime, in the long run, are determined by the fundaments of the two economies. On the other hand, price levels can be affected by economic policy. By keeping the level of prices in the EZ at a lower level than that in the US i.e. by adopting anti-inflationary policies EZ competitiveness increases and that will boost CAB as, according to the estimated coefficients, a unit increase in competitiveness will improve CAB by approximately 2.5 units, *ceteris paribus*.

Additionally, the estimated coefficient of the real interest rate variable shows that in the case where EZ policymakers increase interest rates to bring down inflation, this action will make the price of exports relatively competitive, and as a result, exports will increase. Even though an increase in interest rates by the EZ leads to an appreciation of the Euro currency as demand for the Euro increases compared to the US dollar, the price of exports also increases resulting in a relatively small value of the estimated long-run coefficient (0.48).

Moreover, the decision to increase government expenditure by policymakers, most of the time, results in budget deficits. Government expenditures are increased in recession periods since they are subject to countercyclical policy. As a result, the EZ should increase borrowing for the US, which will have a negative effect on the current account. Therefore, a budget deficit can lead to a current account deficit, in the long run, often known as a twin deficit. GDP is a tool used by policymakers to help assess the economy’s well-being and to make informed decisions or examine whether the economy is experiencing a recession. GDP can also be used as an indicator of trade surplus or deficit. Finally, if policymakers do not fully anticipate exchange rate fluctuations, an increase in exchange rate volatility, which increases risk, may lead risk-averse agents to curtail import or export activity and reallocate production to the domestic market. This circumstance creates uncertainty in the market, which has a negative effect on the trade balance and eventually on the current account. Thus, unexpected movements in the exchange rate should be monitored and regulated on a regular basis by policymakers.

In the short run, the empirical results indicated that only real exchange rates could be used as a valid instrument for exercising economic policy. In the short run, the exchange rates are determined by forces of supply and demand. EZ policymakers can regulate supply and demand through investments, loans, exchanges in the foreign market, and consumer decisions that affect the value of their economy’s currency to the US. Note that the methodology employed in this work may be of use to assess other economic policies as well.

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Appendix

The appendix contains the robustness check for the panel ARDL model. Robustness checks are necessary to improve the credibility of the results presented. By changing the dynamic specification of the model, statistical significance in the long run and the expected results were obtained. Along with the robustness check, a Ramsey RESET was employed, accounting for omitted variable bias and misspecification in the model. The results can be found in the tables below.

Table 5. Long-run and Short-run coefficients of the Current Account Balance determinants, ARDL (1,4,4,4,3,4).

Series	*Coefficient*	*St. error*	*p-value*
Long-run coefficients			
RER	*3.060****	*0.149*	*0.000*
RIR	*0.050****	*0.005*	*0.000*
BUD	*-0.059****	*0.005*	*0.000*
GDP	*0.004****	*0.001*	*0.002*
ERV	*9.251****	*0.772*	*0.000*
Hausman test		*2.35*	*0.306*
Error correction coef. (φ)	*-0.222****	*0.094*	*0.019*
Short-run coefficients			
ΔCAB_{t-1}	*-0.324****	*0.094*	*0.001*
ΔRER_{t}	*2.123*	*2.170*	*0.328*
ΔRER_{t-1}	*-2.484*	*1.875*	*0.185*
ΔRER_{t-2}	*-0.683*	*1.990*	*0.731*
ΔRER_{t-3}	*-1.689*	*2.436*	*0.488*
ΔRER_{t-4}	*-0.018*	*1.402*	*0.990*
ΔRIR_{t}	*-0.002*	*0.007*	*0.715*
ΔRIR_{t-1}	*0.001*	*0.019*	*0.931*
ΔRIR_{t-2}	*0.002*	*0.016*	*0.875*
ΔRIR_{t-3}	*-0.013*	*0.016*	*0.403*
ΔRIR_{t-4}	*0.003*	*0.009*	*0.732*
ΔBUD_{t}	*-0.032*	*0.042*	*0.446*
ΔBUD_{t-1}	*-0.008*	*0.018*	*0.631*
ΔBUD_{t-2}	*-0.031*	*0.023*	*0.188*
ΔBUD_{t-3}	*-0.012*	*0.027*	*0.633*
ΔBUD_{t-4}	*-0.016*	*0.023*	*0.479*
ΔGDP_{t}	*1.455*	*2.026*	*0.473*
ΔGDP_{t-1}	*3.444*	*2.495*	*0.168*
ΔGDP_{t-2}	*-1.137*	*2.994*	*0.704*
ΔGDP_{t-3}	*0.598*	*2.242*	*0.790*
ΔERV_{t}	*0.493*	*7.850*	*0.950*
ΔERV_{t-1}	*-14.640*	*10.679*	*0.170*
ΔERV_{t-2}	*10.668*	*9.103*	*0.241*
ΔERV_{t-3}	*5.762*	*13.189*	*0.662*
ΔERV_{t-4}	*-3.686*	*10.697*	*0.730*
S1	*0.250*	*0.184*	*0.175*
S2	*0.325*	*0.265*	*0.221*
S3	*0.358*	*0.178*	*0.045*
Intercept	*-0.613****	*0.193*	*0.001*
Entry	*0.138*	*0.155*	*0.373*
Model specification test	Ramsey RESET test	F-statistic	*0.296*
Dynamic Specification	*ARDL (1,4,4,4,3,4)*		
Estimation Method	*Pooled Mean Group (PMG) adjusting for country-fixed effects and seasonality*		
Number of countries	*19*		
Time Period	*2008: Q1-2018: Q4 (44 periods)*		
Observations	*836*		

Table 6. Long-run and Short-run coefficients of the Current Account Balance determinants, ARDL (1,5,4,4,2,4).

Series	*Coefficient*	*St. error*	*p-value*
Long-run coefficients			
RER	*2.531****	*0.075*	*0.000*
RIR	*0.050****	*0.003*	*0.000*
BUD	*-0.033****	*0.004*	*0.000*
GDP	*0.002****	*0.0003*	*0.000*
ERV	*7.626****	*0.359*	*0.000*
Hausman test	*6.011*		*0.761*
Error correction coef. (φ)	*-0.236***	*0.119*	*0.048*
Short-run coefficients			
ΔCAB_{t-1}	*-0.207***	*0.108*	*0.046*
ΔRER_{t}	*0.426*	*1.818*	*0.815*
ΔRER_{t-1}	*-2.114*	*2.552*	*0.408*
ΔRER_{t-2}	*-0.094*	*1.910*	*0.960*
ΔRER_{t-3}	*-1.586*	*1.969*	*0.420*
ΔRER_{t-4}	*-0.498*	*1.567*	*0.750*
ΔRER_{t-5}	*1.508*	*0.991*	*0.128*
ΔRIR_{t}	*0.008*	*0.011*	*0.471*
ΔRIR_{t-1}	*-0.008*	*0.018*	*0.640*
ΔRIR_{t-2}	*0.005*	*0.018*	*0.764*
ΔRIR_{t-3}	*0.004*	*0.012*	*0.718*
ΔRIR_{t-4}	*-0.024*	*0.026*	*0.358*
ΔBUD_{t}	*-0.041*	*0.052*	*0.436*
ΔBUD_{t-1}	*-0.017*	*0.023*	*0.453*
ΔBUD_{t-2}	*-0.056*	*0.039*	*0.153*
ΔBUD_{t-3}	*-0.033*	*0.028*	*0.232*
ΔBUD_{t-4}	*-0.024*	*0.027*	*0.366*
ΔGDP_{t}	*0.235*	*4.431*	*0.958*
ΔGDP_{t-1}	*4.119*	*4.372*	*0.346*
ΔGDP_{t-2}	*1.248*	*2.337*	*0.593*
ΔERV_{t}	*-10.406*	*9.073*	*0.251*
ΔERV_{t-1}	*-11.451*	*12.431*	*0.357*
ΔERV_{t-2}	*13.174*	*11.920*	*0.269*
ΔERV_{t-3}	*-1.614*	*10.104*	*0.873*
ΔERV_{t-4}	*1.724*	*8.800*	*0.845*
S1	*0.445*	*0.247*	*0.072*
S2	*0.398*	*0.376*	*0.290*
S3	*0.353*	*0.269*	*0.189*
Intercept	*-0.582***	*0.233*	*0.013*
Entry	*0.112*	*0.102*	*0.273*
Model specification test	Ramsey RESET test	F-statistic	*0.148*
Dynamic Specification	*ARDL (1,5,4,4,2,4)*		
Estimation Method	*Pooled Mean Group (PMG) adjusting for country-fixed effects and seasonality*		
Number of countries	*19*		
Time Period	*2008: Q1-2018: Q4 (44 periods)*		
Observations	*836*		

Table 7. Long-run and Short-run coefficients of the Current Account Balance determinants, ARDL (1,5,4,4,3,3).

Series	***Coefficient***	***St. error***	***p-value***
Long-run coefficients			
RER	*2.033****	*0.098*	*0.000*
RIR	*0.042****	*0.003*	*0.000*
BUD	*-0.011***	*0.006*	*0.031*
GDP	*0.002****	*0.0006*	*0.000*
ERV	*5.824****	*0.454*	*0.000*
Hausman test	1.790		0.597
Error correction coef. (φ)	-0.268***	0.126	0.034
Short-run coefficients			
ΔCAB_{t-1}	-0.213**	0.107	0.048
ΔRER_{t}	0.382	1.850	0.836
ΔRER_{t-1}	-1.658	2.160	0.443
ΔRER_{t-2}	-0.456	2.160	0.833
ΔRER_{t-3}	-0.874	2.287	0.702
ΔRER_{t-4}	-0.526	1.401	0.707
ΔRER_{t-5}	2.465**	1.128	0.029
ΔRIR_{t}	0.001	0.011	0.926
ΔRIR_{t-1}	-0.004	0.017	0.780
ΔRIR_{t-2}	0.011	0.018	0.520
ΔRIR_{t-3}	-0.011	0.014	0.432
ΔRIR_{t-4}	-0.008	0.014	0.541
ΔBUD_{t}	-0.052	0.050	0.299
ΔBUD_{t-1}	-0.033	0.029	0.245
ΔBUD_{t-2}	-0.052	0.036	0.157
ΔBUD_{t-3}	-0.036	0.031	0.240
ΔBUD_{t-4}	-0.023	0.026	0.364
ΔGDP_{t}	-0.326	3.771	0.931
ΔGDP_{t-1}	4.906	3.236	0.130
ΔGDP_{t-2}	2.360	2.048	0.249
ΔGDP_{t-3}	-1.544	2.335	0.508
ΔERV_{t}	-10.518	7.381	0.154
ΔERV_{t-1}	-3.627	11.346	0.749
ΔERV_{t-2}	10.374	9.804	0.290
ΔERV_{t-3}	8.432	12.461	0.499
S1	0.508**	0.241	0.035
S2	0.342	0.334	0.305
S3	0.422	0.235	0.072
Intercept	-0.500**	0.195	0.011
Entry	0.212	0.200	0.291
Model specification test	Ramsey RESET test	F-statistic	0.862
Dynamic Specification	*ARDL (1,5,4,4,3,3*		
Estimation Method	*Pooled Mean Group (PMG) adjusting for country-fixed effects and seasonality*		
Number of countries	*19*		
Time Period	*2008: Q1-2018: Q4 (44 periods)*		
Observations	*836*		