**REM WORKING PAPER SERIES**

# A new assessment of the Troika´s economic policy for Portugal in 2012 following an Input-Output approach

**José Carlos Coelho**

**REM Working Paper 0121-2020**

March 2020

**REM – Research in Economics and Mathematics**
Rua Miguel Lúpi 20,
1249-078 Lisboa,
Portugal

ISSN 2184-108X

# A new assessment of the Troika´s economic policy for Portugal in 2012 following an Input-Output approach

*March 2020*

**José Carlos Coelho**

ISEG, Lisbon School of Economics & Management – Universidade de Lisboa

jcarlosmcoelho@phd.iseg.ulisboa.pt

**Abstract**: This article proposes a new evaluation of the economic and financial adjustment programme negotiated between Portugal and the Troika (European Commission, European Central Bank and International Monetary Fund) for the year 2012, in an Input-Output framework. As in Amaral and Lopes (2017), a comparison is made between the unemployment rate forecast for 2012 and that which would result from obtaining the implicit *target* for the external deficit, concluding that the unemployment rate was underestimated by almost two percentage points. We also concluded that the achievement of the implicit *target* for the external deficit in 2012 would only be compatible with the establishment of a lower budget deficit and a lower of weight of budget deficit on GDP for that year. Such an objective would require a smaller amount of transfers made by the Government to households and would result in greater contractions in private consumption and GDP and would result in a higher unemployment rate than that expected by the Troika for 2012.

**Keywords**: unemployment, external deficit, budget deficit, Troika, Portugal

***JEL* codes**: C67, D57, E61

**Acknowledgments**: I thank Professor João Ferreira do Amaral and Ricardo Silva for reading the manuscript and their support in the final revision of this paper.

## 1. Introduction

In May 2011, following the redemption request made in April of that year, Portugal agreed with the European Commission, the European Central Bank and the International Monetary Fund (the Troika) to implement an Economic and Financial Assistance Programme, during the period 2011-2014. This programme had three main objectives, namely: the consolidation of public accounts, the implementation of structural reforms and the stabilization of the financial system. In particular, the first objective of the programme was to ensure the sustainability of public finances in Portugal. This objective materialized in the setting of *targets* for reducing the weight of the budget deficit in GDP over the years in which it was in force. Nevertheless, the reduction of the external deficit also appeared to be a relevant objective, given the high weight of external debt on GDP of the Portuguese economy in 2011.

The evaluation of macroeconomic policies is generally carried out by comparing the values that the policy object variables effectively assume with the *targets* set for these variables at the time of the programme formulation or with the expected values for these variables in a prospective analysis scenario. However, the conclusions of these macroeconomic policy evaluation exercises depend crucially on the assumptions made and on the integration in the analysis of all relevant information about the behaviour of economic activity.

The evaluation exercise that we proceed in this article, following Amaral and Lopes (2017), constitutes a different exercise. In particular, a comparison is made between the economic policy implicit in the adjustment programme under assessment, with regard to the macroeconomic forecasts and the assumed *targets*, with the possible results to predict, if some basic assumptions about the sectoral (productive) structure of the economy and some equilibrium conditions observed when formulating the policy were considered.

This empirical analysis is based on the existence of a trade-off relationship between the unemployment rate and the external deficit (trade deficit, *stricto sensu*) and a relationship between the budget balance and the external deficit that emerge in the context of the formalization of the economy structure through the Leontief model (Input-Output system) and the definition of sectoral employment coefficients (which correspond to the inverse of sectoral labour productivity). The perspective of analysis considered is keynesian, in which the values of external demand (exports) and the labour force are fixed, the unemployment rate is determined by (endogenous) levels of domestic demand, in which

private consumption appears dependent on budgetary options, and imports are compatible with a given (planned) value of the external deficit.

The aim of this study is to make an *ex ante* and *ex post* evaluation of the economic policy defined in the Economic and Financial Adjustment Programme, as Amaral and Lopes (2017) carried out, not to ascertain whether the policy objectives set in the programme were achieved, through its comparison with the values actually observed. The year under analysis is 2012 and the values of the relevant macroeconomic and fiscal policy variables are taken from the Relatório do Orçamento de Estado 2012 (ROE 2012), a state budget report, prepared by the Portuguese Government in 2011.

In this analysis, we adopted the concepts of *ex ante* and *ex post* evaluation as proposed by Amaral and Lopes (2017). According to the authors, the *ex ante* evaluation consists of determining the relative value of the objectives from the perspective of the economic policy maker. The *ex post* evaluation, in turn, translates into examining whether the values of the objectives defined in the economic policy programme are consistent with the productive (sectorial) structure of the economy and the predictions of exogenous variables that reflect the national and international context in that the policy will be applied. *Additionally, ex ante and ex post refer to the moment before and after the moment when the policy was defined, respectively, and not to the moment before and after the implementation of the policy.*

This study has two fundamental differences compared to Amaral and Lopes (2017). The first difference is that we work with an augmented trade-off equation unemployment rate/external deficit. More specifically, while the authors mentioned explicit the external deficit and the level of employment as functions of domestic demand and exports, we write them as functions of the various components of domestic demand (private consumption, public consumption and investment) and also of exports. Therefore, the trade-off equation we derived contains more information and it is more detailed than the trade-off equation that Amaral and Lopes (2017) derived. The second difference from these authors is the assumption that the external deficit is an indirect function of the budget balance, through private consumption. That is, we assume that private consumption is determined endogenously and it is dependent on budgetary options. The linkage mechanism between the budget balance and the external balance translates into the fact that the Government budgetary options in terms of transfers made to households are assumed to be one of the determinants of disposable income of private, which, in turn,

affects the level of private consumption. Part of private consumption is carried out using imports, which contributes to the existence (or worsening) of the external deficit. The theoretical support of this assumption is based in the well-known Twin Deficits Hypothesis, developed in the Mundell-Fleming Model (Mundell, 1960; Fleming, 1962) and also present in the Keynesian Absorption Theory. For Portugal, empirical evidence of the Twin Deficit Hypothesis is found in the studies of Daly and Siddiki (2009), Afonso *et al.* (2013), Trachanas and Katrakilidis (2013), and, more recently, in Coelho (2020).

Within the scope of the *ex post* analysis, and in a first phase, we proceed to the evaluation of the trade-off between the unemployment rate and the external deficit, with the objective of assessing the consistence between the fixed values for these variables, such as in Amaral and Lopes (2017). In a second phase, we determine the value of the budget balance compatible with the objective set for the external deficit, proving to be possible to ascertain the consistence between the fixed values for the three variables (budget balance, external deficit and unemployment rate). As one of the objectives of the adjustment programme was to ensure the sustainability of public finances, by setting *targets* for reducing the weight of the budget deficit in GDP during the period of validity, the budget balance proved to be a primary objective of economic policy. Consequently, it is crucial to examine whether the *target* set for this variable would be compatible with the values set for the external deficit and the unemployment rate.

The article is organized as follows. In Section 2, we present the theoretical and methodological framework underlying the assessment of macroeconomic policies and the augmented trade-off equation unemployment rate/external deficit. In Section 3, we explain the basic assumptions and basic macroeconomic relationships when the economy is modellized in an Input-Output system. In Section 4, the relationship between the budget balance and the external deficit appears in an IO context. In Section 5, the augmented trade-off equation between the unemployment rate and the external deficit is derived. In Section 6, the new study of the Troika's economic policy for Portugal in 2012 is carried out through an *ex post* and *ex ante* evaluation. Section 7 presents the final conclusions of the article.

## 2. The assessment of economic policies and the augmented trade-off equation between the unemployment rate and the external deficit

The evaluation of economic policies requires the determination of a trade-off equation that establishes the linkage between two (or more) economic policy objectives. A trade-

off equation obtained according to the Leontief system is an equation that incorporates the structural relationships deduced in the framework of an Input-Output (IO) model and relates them to the objective variables and the relevant exogenous variables.

Amaral and Lopes (2017) propose the existence of a trade-off relationship between the unemployment rate and the external deficit, considering both as objective variables of economic policy. The authors define four exogenous variables (exports, labour force and two employment coefficients related to domestic demand and exports) and two parameters related to the value added coefficients of domestic demand and exports. Then, the trade-off equations between the unemployment rate and the external deficit and between the unemployment rate and the weight of the external deficit on output are derived.

Instead, in this paper, we identified eight relevant exogenous variables (public consumption, investment, exports, labour force and four employment coefficients related to private consumption, public consumption, investment and exports) and four parameters related to the value added coefficients of private consumption, public consumption, investment and exports. Additionally, we admit that private consumption is endogenous to the functioning of economic activity and depends on budgetary options. Like the mentioned authors, we also define the external deficit and the unemployment rate as objective variables of economic policy, with the difference that we assume the existence of a relationship between the budget balance and the external deficit. In this context, it is established that private consumption is the linkage between the budget balance and the external deficit, through transfers made by the Government to households. Therefore, our trade-off equation appears to be augmented compared to the trade-off equation derived by Amaral and Lopes (2017).

The equation that describes the unemployment rate/external deficit trade-off curve can be written as:

$$F(G, I, E, N, l_C, l_G, l_I, l_E, H(B), u) = 0, \quad (1)$$

where: $G$ is the public consumption; $I$, investment; $E$, exports; $N$, labour force; and $l_C$, $l_G$, $l_I$ e $l_E$ are the employment coefficients related to private consumption, public consumption, investment and exports, respectively. $H(B)$ is the external deficit, depending on the budget balance, $B$; and $u$ is the unemployment rate.

For values of $G$, $I$, $E$, $N$, $l_C$, $l_G$, $l_I$ e $l_E$, the above equation shows that the two objectives are not independent. That is, by setting a *target* for one of the objective variables, the other is automatically determined.

According to Amaral and Lopes (2017), a trade-off equation can be used to evaluate economic policies in three different ways: *ex ante*, *ex post* and evaluation of structural policies. The *ex ante* and *ex post* evaluations are detailed below. The evaluation of structural policies, in turn, is carried out by studying the impact of changes in parameters, namely domestic technical coefficients, in the trade-off equation.

*Ex ante assessment*

As Amaral and Lopes (2017) defined, the starting point of this analysis consists in choosing the economic policy objectives for the following year, year *t*, the moment the choice is made, year *t-1*. For this, a forecast is made for exogenous variables, $G^*$, $I^*$, $E^*$, $N^*$, $l_C^*$, $l_G^*$, $l_I^*$ e $l_E^*$, and the equation is obtained:

$$F(G^*, I^*, E^*, N^*, l_C^*, l_G^*, l_I^*, l_E^*, H(B), u) = 0 \quad (2)$$

Given the pair chosen in *t-1* for *t*, $(H(B)_t, u_t) = (H(B)^*, u^*)$, and the forecast for exogenous variables is made *a priori*, it is expected that the trade-off equation will be annul in this pair: $F^*(G^*, I^*, E^*, N^*, l_C^*, l_G^*, l_I^*, l_E^*, H(B)^*, u^*) = 0$. Once a relationship is established between the budget balance and the external deficit, when choosing the objective value of the external deficit, $H^T$, the value of the budget balance compatible with the *target* set for the external deficit, $B^T$, is implicitly chosen.

Let be $U(H(B), u)$ the function of economic policy preferences. $U$ is decreasing for each of the variables: $\partial U/\partial H(B) < 0$ and $\partial U/\partial u < 0$.

The optimal choice of objectives $H(B)$ e $u$ results from the following maximization problem:

Max U($H(B)$, $u$)

Subject to: $F(G^*, I^*, E^*, N^*, l_C^*, l_G^*, l_I^*, l_E^*, H(B), u) = 0$

and the restrictions defined *a priori* for the objectives: $H(B) \leq a$ and $0 \leq u \leq c$.

Given the choice for the objectives, $H(B)^* = d \leq a$ and $0 \leq u^* = e \leq c$, and assuming that the trade-off equation is respected in the pair $(H(B)^*, u^*) = (d, e)$: $F(G^*, I^*, E^*, N^*, l_C^*,$

$l_G$*, $l_I$*, $l_E$*, *H(B)** = *d*, *u** = *e) = 0*, the function of implicit economic policy preferences are maximized in that pair: *U*(H(B)*, u*) = U*(d, e)*.

To calculate the relative value of the *H(B)* and *u* that the economic policy maker defined when he chosen *H(B)** = *d* and *u** = *e*, we have to determine the first derivatives in the values *G**, *I**, *E**, *N**, *H(B)** e *u**, known the value of the second member of equality:

$$(\partial U / \partial H(B)) / (\partial U / \partial u) = (\partial F / \partial H(B)) / (\partial F / \partial u) \quad (3)$$

Given another pair chosen for objectives *H(B)* and *u* and that verifies the trade-off equation and the restrictions defined *a priori* for the objectives, it is possible to compare its relative value with that of the first chosen pair. In this context, and since the function of economic policy preferences is unknown, the *ex ante* evaluation can be made by comparing different revealed preference alternatives (Amaral and Lopes, 2017).

If the trade-off equation is written as $u = f(G, I, E, N, l_C, l_G, l_I, l_E, H(B))$, the previous expression looks like this:

$$(\partial U / \partial H(B)) / (\partial U / \partial u) = (\partial F / \partial H(B)) / (\partial F / \partial u) = -\mathrm{d}u / \mathrm{d}H(B) \quad (4)$$

Thus, it is expected that: $\mathrm{d}u / \mathrm{d}H(B) < 0$.

*Ex post assessment*

The trade-off equation can assess *ex post* how economic policy was formulated. In this case, using the values of the exogenous variables predicted for year *t*, when in year *t-1* the policy for year *t* was defined, we can obtain the trade-off relation for year *t*, namely:

$$F({}_{t-1}G_t, {}_{t-1}I_t, {}_{t-1}E_t, {}_{t-1}N_t, {}_{t-1}l_{Ct}, {}_{t-1}l_{Gt}, {}_{t-1}l_{It}, {}_{t-1}l_{Et}, H(B), u) = 0, \quad (5)$$

where: ${}_{t-1}G_t$, ${}_{t-1}I_t$, ${}_{t-1}E_t$, ${}_{t-1}N_t$, ${}_{t-1}l_{Ct}$, ${}_{t-1}l_{Gt}$, ${}_{t-1}l_{It}$, ${}_{t-1}l_{Et}$ are the values of public consumption, investment, exports, the labour force and employment coefficients for private consumption, public consumption, investment and exports foreseen in year *t-1* for year *t*, respectively.

If the values foreseen in year *t-1* for year *t* of *H(B)* and *u*, ${}_{t-1}H(B)_t$ and ${}_{t-1}u_t$, verify the trade-off equation, then the economic policy was well defined. In this case, *F(.)* annuls itself in the pair $({}_{t-1}H(B)_t, {}_{t-1}u_t)$: $F({}_{t-1}G_t, {}_{t-1}I_t, {}_{t-1}E_t, {}_{t-1}N_t, {}_{t-1}l_{Ct}, {}_{t-1}l_{Gt}, {}_{t-1}l_{It}, {}_{t-1}l_{Et}, {}_{t-1}H(B)_t, {}_{t-1}u_t) = 0$.

On the contrary, economic policy has been poorly defined, if ${}_{t-1}H(B)_t$ and ${}_{t-1}u_t$ are distant from the trade-off equation. In this case, taking ${}_{t-1}H(B)_t$ as a given, we can determine the unemployment rate $u_t$* that verifies the trade-off equation, using its expression in the form

$u = f(G, I, E, N, l_C, l_G, l_I, l_E, H(B))$: $u_t^* = f({}_{t-1}G_t, {}_{t-1}I_t, {}_{t-1}E_t, {}_{t-1}N_t, {}_{t-1}l_{Ct}, {}_{t-1}l_{Gt}, {}_{t-1}l_{It}, {}_{t-1}l_{Et}, {}_{t-1}H(B)_t)$.

Then, we can compare the predicted value in year *t-1* for year *t* of *u*, ${}_{t-1}u_t$, with the value $u_t^*$, calculating the difference between both: $\Delta u = {}_{t-1}u_t - u_t^*$. Positive values of $\Delta u$ mean that the unemployment rate predicted in year *t-1* for year *t* was overestimated compared to the unemployment rate obtained for year *t* that verifies the trade-off equation. Negative values of $\Delta u$ mean that the unemployment rate predicted in year *t-1* for year *t* was underestimated compared to the unemployment rate obtained for year *t* that verifies the trade-off equation. A null value of $\Delta u$ means, in turn, that economic policy has been well defined.

Within the scope of the *ex post* evaluation, it is also possible to compare the value of the budget balance compatible with the *target* set for the external deficit, $B^T$, with the value forecast in year *t-1* for year *t* of the budget balance, ${}_{t-1}B_t$.

**3. Basic assumptions and Input-Output relations**

In an economy formalized by the Leontief system (see Miller and Blair, 2009, and Amaral and Lopes, 2018, for a more detailed exposition of the model), the basic system is as follow:

$$\mathbf{X} = \mathbf{A}\,\mathbf{X} + \mathbf{Y}, \tag{6}$$

where: **X** is the (column) vector of the gross production values of *n* sectors of the economy; **Y** corresponds to the (column) vector of the final demand; and **A** is the matrix of technical coefficients.

The system solution is:

$$\mathbf{X} = \mathbf{(I - A)^{-1}}\,\mathbf{Y}, \tag{7}$$

where $\mathbf{(I - A)^{-1}}$ is the Leontief inverse matrix of production multipliers, which can be represented by **B**, whose generic element, $b_{ij}$, represents the increase in production in sector *i* resulting from an additional unit of final demand directed to sector *j*.

The final demand vector can be decomposed into four vectors, corresponding to each of the components of this variable, namely: private consumption (**C**); public consumption (**G**); investment (**I**); and exports (**E**). Then, it comes:

$$\mathbf{Y} = \mathbf{C} + \mathbf{G} + \mathbf{I} + \mathbf{E} \tag{8}$$

In this case, the solution of the Leontief system is given by:

$$\mathbf{X} = \mathbf{B}\,(\mathbf{C} + \mathbf{G} + \mathbf{I} + \mathbf{E}) \tag{9}$$

In this context, the Gross Domestic Product at market prices ($GDP_{mp}$) results from the sum of gross added value with indirect taxes less subsidies on products and it is calculated as follows:

$$GDP_{mp} = \mathbf{a^v}\,\mathbf{B}\,\mathbf{a^C}\,C + \mathbf{a^v}\,\mathbf{B}\,\mathbf{a^G}\,G + \mathbf{a^v}\,\mathbf{B}\,\mathbf{a^I}\,I + \mathbf{a^v}\,\mathbf{B}\,\mathbf{a^E}\,E + \mathbf{a^t}\,\mathbf{B}\,\mathbf{a^C}\,C + \mathbf{a^t}\,\mathbf{B}\,\mathbf{a^G}\,G + \mathbf{a^t}\,\mathbf{B}\,\mathbf{a^I}\,I + \mathbf{a^t}\,\mathbf{B}\,\mathbf{a^E}\,E + a^t_C\,C + a^t_G\,G + a^t_I\,I + a^t_E\,E = \mathbf{a^v}\,\mathbf{B}\sum(\mathbf{a^C}\,C + \mathbf{a^G}\,G + \mathbf{a^I}\,I + \mathbf{a^E}\,E) + \mathbf{a^t}\,\mathbf{B}\sum(\mathbf{a^C}\,C + \mathbf{a^G}\,G + \mathbf{a^I}\,I + \mathbf{a^E}\,E) + a^t_C\,C + a^t_G\,G + a^t_I\,I + a^t_E\,E, \tag{10}$$

where: $\mathbf{a^v}$ is the vector (line) of the value added coefficients of the $n$ sectors ($a^v_j = VA_j / X_j$); $\mathbf{a^C}$, $\mathbf{a^G}$, $\mathbf{a^I}$, $\mathbf{a^E}$ are the vertical coefficients of the components of final demand directed to the productive sectors; $\mathbf{a^t}$ is the vector (line) of the coefficients of indirect taxes less subsidies on products of intermediate consumption; $a^t_C$, $a^t_G$, $a^t_I$ e $a^t_E$ are the vertical coefficients of indirect taxes less subsidies on products directly attributed to the components of final demand; and $C$, $G$, $I$, $E$ are the values of the components of the final demand. The term $\mathbf{a^v}\,\mathbf{B}\sum(\mathbf{a^C}\,C + \mathbf{a^G}\,G + \mathbf{a^I}\,I + \mathbf{a^E}\,E)$ corresponds to gross value added and the term $\mathbf{a^t}\,\mathbf{B}\sum(\mathbf{a^C}\,C + \mathbf{a^G}\,G + \mathbf{a^I}\,I + \mathbf{a^E}\,E) + a^t_C\,C + a^t_G\,G + a^t_I\,I + a^t_E\,E$ corresponds to indirect taxes less subsidies on products.

The value added coefficients of the components of final demand are expressed as:

$$va_{FD} = \mathbf{a^v}\,\mathbf{B}\,\mathbf{a^{PF}} + \mathbf{a^t}\,\mathbf{B}\,\mathbf{a^{PF}} + a^t_{FD}, \text{ with } FD = C, G, I, E \tag{11}$$

Therefore, in an economy modellized by IO relations, $GDP_{pm}$, $Y$, is given by:

$$Y = va_C\,C + va_G\,G + va_I\,I + va_E\,E \tag{12}$$

$I$ corresponds to total investment, resulting from the sum of private investment and public investment ($I^{Priv} + I^{Pub}$).

When the economy is modellized in an IO system (according to the Leontief model) and considering the assumptions previously explained, imports, $M$, are thus obtained:

$$M = \mathbf{a^m}\,\mathbf{B}\,\mathbf{a^C}\,C + \mathbf{a^m}\,\mathbf{B}\,\mathbf{a^G}\,G + \mathbf{a^m}\,\mathbf{B}\,\mathbf{a^I}\,I + \mathbf{a^m}\,\mathbf{B}\,\mathbf{a^E}\,E + a^m_C\,C + a^m_G\,G + a^m_I\,I + a^m_E\,E = \mathbf{a^m}\,\mathbf{B}\sum(\mathbf{a^C}\,C + \mathbf{a^G}\,G + \mathbf{a^I}\,I + \mathbf{a^E}\,E) + a^m_C\,C + a^m_G\,G + a^m_I\,I + a^m_E\,E, \tag{13}$$

where: $\mathbf{a^m}$ is the vector (line) of the coefficients of the imported inputs; and $a^m_C$, $a^m_G$, $a^m_I$ e $a^m_E$ are the vertical coefficients of imports directly attributed to the components of final demand.

From this result, we can express the import coefficients of the components of final demand as well:

$$m_{PF} = \mathbf{a^m}\,\mathbf{B}\,\mathbf{a^{PF}} + a^m_{FD}, \text{ with } FD = C, G, I, E \quad (14)$$

Given the equilibrium condition of the IO matrices, $PIB_{pm} + M = C + G + I + E$, we can conclude that:

$$m_{PF} = 1 - va_{PF} \quad (15)$$

Consequently, the value of imports made in the economy can be determined as:

$$M = (1 - va_C)\,C + (1 - va_G)\,G + (1 - va_I)\,I + (1 - va_E)\,E \quad (16)$$

**4. The relationship between budget balance and external deficit**

Following Lopes and Amaral (2017), the budget balance, $B$, comes as:

$$B = tY + O - G - I^{Pub} - TR, \quad (17)$$

where: $t$ corresponds to the average tax rate ($t = T / Y$), with $T$ meaning the total amount of tax revenues (taxes and social contributions); $O$ are other net Government revenues (including public debt interest); and $TR$ are transfers made by the Government to households.

For simplification, the available income of private, $Y_d$, is equal to $Y - tY + TR$. Private consumption is a function of $Y_d$: $C = nY_d$, with $n$ representing the average propensity to consume.

With these assumptions, and considering $O^* = O - G - I^{Pub}$, $C$ is given by:

$$C = n\,(Y + O^* - B) \quad (18)$$

Using the expression (12), $Y = va_C\,C + va_G\,G + va_I\,I + va_E\,E$, and after some algebraic manipulations, it comes that:

$$Y(B) = (va_G\,G + va_I I + va_E E + nva_C\,O^*) / (1 - nva_C) - [nva_C / (1 - nva_C)]\,B \quad (19)$$

From this result, we obtain private consumption as a function of the budget balance:

$$C(B) = [n / (1 - nva_C)]\,(va_G\,G + va_I I + va_E E + O^*) - [n / (1 - nva_C)]\,B \quad (20)$$

It should be noted that, in this expression, we consider that the other net revenues of the Government, public consumption and public investment are constant. Therefore, the change in the budget balance results from the change in transfers and their impact on tax revenues. We also consider that private investment and exports are exogenous variables,

that is, their values, in the short term, are not dependent on budgetary options by the Government neither affect the budget balance.

Considering the expression (16), $M = (1 - va_C)\ C + (1 - va_G)\ G + (1 - va_I)\ I + (1 - va_E)\ E$, and assuming that private consumption is dependent on budgetary options, the value of imports made in the economy, depending on the budget balance, $M(B)$, can be written as:

$$M(B) = (1 - va_C)\ C(B) + (1 - va_G)\ G + (1 - va_I)\ I + (1 - va_E)\ E \quad (21)$$

The external deficit can be written as a function of the budget balance, $H(B)$. Then, using the previous expression, it comes:

$$H(B) = M(B) - E = (1 - va_C)\ C(B) + (1 - va_G)\ G + (1 - va_I)\ I - va_E\ E \quad (22)$$

Combining the previous expression with the expression (20), $C(B) = [n / (1 - nva_C)]\ (va_G\ G + va_I\ I + va_E\ E + O^*) - [n / (1 - nva_C)]\ B$, we have:

$$H(B) = (1 - va_C)\ \{[n / (1 - nva_C)]\ (va_G\ G + va_I\ I + va_E\ E + O^*) - [n / (1 - nva_C)]\ B\} + (1 - va_G)\ G + (1 - va_I)\ I - va_E\ E \quad (23)$$

After some algebraic manipulations, and given that $I = I^{Priv} + I^{Pub}$ and $O^* = O - G - I^{Pub}$, we obtain:

$$H(B) = [n\ (1 - va_C) / (1 - nva_C)]\ O^* + [(n - 1)\ va_G / (1 - nva_C) + 1]\ G + [(n - 1)\ va_I / (1 - nva_C) + 1]\ I + va_E\ [(n - 1) / (1 - nva_C)]\ E - [n\ (1 - va_C) / (1 - nva_C)]\ B \Leftrightarrow$$

$$\Leftrightarrow H(B) = [n\ (1 - va_C) / (1 - nva_C)]\ O + \{[(n - 1)\ (va_G - 1)] / (1 - nva_C)\}\ G + [(n - 1)\ va_I / (1 - nva_C) + 1]\ (I^{Priv} + I^{Pub}) - [n\ (1 - va_C) / (1 - nva_C)]\ I^{Pub} + va_E\ [(n - 1) / (1 - nva_C)]\ E - [n\ (1 - va_C) / (1 - nva_C)]\ B \quad (24)$$

After setting the values for the exogenous variables, this expression is a straight line with $B$ as the independent variable and negative slope. The negative slope of this line, given by: $\partial H(B)/\partial B = - [n\ (1 - va_C) / (1 - nva_C)]$, points to the existence of a negative link between the budget balance and the external deficit. Therefore, there is a positive linkage between the budget balance and the external balance, as advanced by the Twin Deficit Hypothesis. More specifically, a deterioration in the budget balance, motivated by an increase in transfers made by the Government to households, generates an increase in the disposable income of private, which translates into an increase in their consumption

expenses. Some part of this increase in consumption is satisfied by external production, which increases imports, and, consequently, deteriorates the external balance.

Assuming the implementation of a fiscal policy that aims to obtain a certain level of the budget balance using transfers, we can determine the amount of transfers compatible with the *target* set for the budget balance.

As defined above, the budget balance is: $B = tY + O^* - TR$, with $O^* = O - G - I^{Pub}$, considered endogenous.

For a given $B$, comes $TR = tY + O^* - B$. (25)

Using the previous expression and replacing the expression found for $Y$ in (19), $Y(B) = (va_G\, G + va_I\, I + va_E\, E + nva_C\, O^*) / (1 - nva_C) - [nva_C / (1 - nva_C)]\, B$, we get $TR$ as a function of $B$:

$$TR(B) = t\ (va_G\ G + va_I\ I + va_E\ E) / (1 - nva_C) + [ntva_C / (1 - nva_C) + 1]\ O^* - [ntva_C / (1 - nva_C) + 1]\ B \quad (26)$$

This expression allows the *target* of the budget balance to be determined, the amount of transfers necessary to achieve it, considering that $G$, $I$, $E$ and $O^*$ are exogenous (constant) variables.

**5. The trade-off relation of unemployment rate and external deficit**

Let be $\mathbf{a^l}$ the vector (line) of the sectoral employment coefficients, in which each element is the employment coefficient of sector $i$, given by: $a^l_i = L_i / X_i$, where $L_i$ corresponds to the employment level of sector $i$; and $X_i$, to the gross value of production in sector $i$.

The level of total employment, $L$, is given by:

$$L = \mathbf{a^l}\, \mathbf{X}, \quad (27)$$

where $\mathbf{X}$ is the (column) vector of the gross production values of $n$ sectors of the economy.

Given the expression (9), $\mathbf{X} = \mathbf{B}\ (\mathbf{C + G + I + E})$, and since $\mathbf{C} = \mathbf{a^C}\, C$, $\mathbf{G} = \boldsymbol{a^G}\, G$, $\mathbf{I} = \boldsymbol{a^I}\, I$ and $\mathbf{E} = \boldsymbol{a^E}\, E$, the previous expression can be written as:

$$L = \mathbf{a^l\, B\, a^C}\, C + \mathbf{a^l\, B}\, \boldsymbol{a^G}\, G + \mathbf{a^l\, B}\, \boldsymbol{a^I}\, I + \mathbf{a^l\, B}\, \boldsymbol{a^E}\, E \quad (28)$$

The employment coefficients of the components of final demand are expressed as:

$$l_{FD} = \mathbf{a^l\, B\, a^{PF}}, \text{ with } FD = C, G, I, E \quad (29)$$

Consequently, the level of total employment is:

$$L = l_C C + l_G G + l_I I + l_E E \quad (30)$$

Based on the expression (22), $H(B) = (1 - va_C)\, C(B) + (1 - va_G)\, G + (1 - va_I)\, I - va_E\, E$, and writing the equivalent expression in order to $C(B)$, comes:

$$C(B) = [H(B) - (1 - va_G)\, G - (1 - va_I)\, I + va_E\, E] / (1 - va_C) \quad (31)$$

Assuming $l_C$, $l_G$, $l_I$, $l_E$ as the employment coefficients of private consumption, public consumption, investment and exports, respectively, and the previous expression, the level of total employment, comes:

$$L = l_C\, C(B) + l_G\, G + l_I\, I + l_E\, E \Leftrightarrow L = l_C \{[H(B) - (1 - va_G)\, G - (1 - va_I)\, I + va_E\, E\,] / (1 - va_C)\} + l_G\, G + l_I\, I + l_E\, E \quad (32)$$

Since $N$ is the labour force and $u = 1 - L / N$ is the unemployment rate, then we can write the unemployment rate as a function of the external deficit:

$$u = \{1 - l_C\, [va_E\, E - (1 - va_G)\, G - (1 - va_I)\, I\,] / N\, (1 - va_C)] - (l_G\, G + l_I\, I + l_E\, E) / N\} - [lc / N\, (1 - va_C)]\, H(B) \quad (33)$$

This equation, after setting the values of exogenous variables, represents the analytical expression of a straight line with a negative slope, where the explanatory variable is $H(B)$. The negative slope, $- [lc / N\, (1 - va_C)]$, which corresponds to the relative value of $u$ in terms of $H(B)$, shows the existence of a trade-off relationship between the unemployment rate and the external deficit. The relative value of $H(B)$ in terms of $u$ is, in turn, higher when $N$ is higher.

The trade-off equation can be written not only in terms of the absolute value of the external deficit, but also in terms of the relative weight of the external deficit on GDP, $Y$. Therefore, considering the relative value of the external deficit vis-à-vis GDP, $h(B)$, and using the expression (22), $H(B) = (1 - va_C)\, C(B) + (1 - va_G)\, G + (1 - va_I)\, I - va_E\, E$, we can write:

$$h(B)Y = (1 - va_C)\, C(B) + (1 - va_G)\, G + (1 - va_I)\, I - va_E\, E, \text{ where } h(B) = H(B) / Y \quad (34)$$

Combining the previous expression with (12), $Y = va_C\, C + va_G\, G + va_I\, I + va_E\, E$, and eliminating $Y$, we obtain:

$$C(B) = [G + I - (h(B) + 1)\, (va_G\, G + va_I\, I + va_E\, E)] / [va_C\, (h(B) + 1) - 1] \quad (35)$$

The expression analogous to (32) is given by:

$$L = l_C\, C(B) + l_G\, G + l_I\, I + l_E\, E \Leftrightarrow L = l_C\, \{[G + I - (h(B) + 1)\, (va_G\, G + va_I\, I + va_E\, E)] / [va_C\, (h(B) + 1) - 1]\} + l_G\, G + l_I\, I + l_E\, E \quad (36)$$

Considering $N$ e $u$, the trade-off equation is:

$$u = 1 - (l_G\, G + l_I\, I + l_E\, E) / N - (l_C / N)\, \{[G + I - (h(B) + 1)\, (va_G\, G + va_I\, I + va_E\, E)] / [va_C\, (h(B) + 1) - 1]\} \quad (37)$$

From the analytical expression of this trade-off equation, we conclude that the relative value that the economic policy maker attributes to objectives $h(B)$ and $u$ when defining a given pair ($h(B)^*$, $u^*$) to achieve is not constant, and, consequently, the "price" of $h(B)$ in terms of $u$ is also not constant.

Since it is assumed that $G$, $I$, $E$, $N$, $l_C$, $l_G$, $l_I$, $l_E$ are exogenous variables, the trade-off relationship can be studied by analyzing the term:

$$[G + I - (h(B) + 1)\, (va_G\, G + va_I\, I + va_E\, E)] / [va_C\, (h(B) + 1) - 1]$$

Looking at expression (35), we see that the previous term is positive, which confirms the expected relationship that $u$ is a decreasing function of $h$. Furthermore, as $va_C\, (h(B) + 1) - 1 < 0$ (given that $0 < va_C < 1$ and $h(B) < 1$), we can conclude that $h(B) < (1 - va_C) / va_C$.

## 6. A new assessment of the Troika's economic policy for Portugal in 2012

### 6.1. *Ex post* assessment

In order to carry out an *ex post* assessment of the Troika's economic policy for 2012, we consider the following assumptions:

i) For 2012, we use the values provided by the Government in Relatório do Orçamento 2012 (ROE 2012) for the following variables, in terms of real annual growth: GDP growth, growth in private consumption, growth in public consumption, growth in investment, evolution of exports, evolution of imports and evolution of employment. Table 1, next, shows the values forecast for 2012 based on the ROE 2012 of the components of final demand and GDP.

ii) Based on the values provided by INE (the Portuguese Statistical Institute) official statistics for 2011 and the expected evolution of exports and imports in 2012, we obtained the absolute value of the external deficit implicit in the ROE 2012 forecasts.

iii) Based on the employment level in 2011, we obtained the employment level forecast for 2012, and using the unemployment rate provided for in the ROE 2012 for 2012, we obtained the value of the labour force implicit in the ROE 2012 forecasts.

iv) We considered the value added coefficients and the employment coefficients obtained by Lopes and Amaral (2017) based on the Portugal IO matrix for the year 2011, taken from the WIOD Database (World Input-Output Database), with version of 2015, shown in Tables 2 and 3, next.

v) Based on the productivity evolution implicit in ROE 2012 (obtained through the difference between the GDP growth rate and the employment growth rate), we changed the coefficients $l_C$, $l_G$, $l_I$ e $l_E$, assuming that they have the same growth rate (symmetric to the productivity growth rate).

Table 1: Forecast values for 2012 based on the ROE 2012 of the components of final demand and GDP

| Macroeconomic variables | Nominal value 2011 | Forecast real growth rate 2012* | Forecast real value 2012* |
|---|---|---|---|
| Private Consumption | 115961.1 | – 4.8% | 110394.9 |
| Public Consumption | 34983.4 | – 6.2% | 32814.4 |
| Investment | 32764.2 | – 9.5% | 29651.6 |
| Exports | 60409.9 | 4.8% | 63309.5 |
| Imports | 67951.9 | – 4.3% | 65030.0 |
| GDP | 176166.6 | – 2.8% | 171233.9 |

Notes and Sources: (a) The nominal values of the macroeconomic variables are expressed in millions of euros, at 2011 prices, and were taken from INE (2017).
(b) The real growth rates for the macroeconomic variables forecast for 2012 have been taken from ROE 2012*.
(c) The real values of the macroeconomic variables forecast for 2012 were calculated by the author.

From Table 1, we can see that the value of the external deficit implicit in the ROE 2012 forecasts for that year is $H$ = 1720.5.

The employment level in 2011 was 4740.1 (thousands of individuals). Given the expected evolution of the employment level in 2012, – 1% (see ROE 2012), the expected employment level for that year is $L$ = 4740.1*0.99 = 4692.7.

The unemployment rate forecast for 2012 is 13.4%. Based on the expected level of employment and the unemployment rate, we obtain the implicit value of the labour force in 2012: $N$ = 5418.7 (thousands of individuals).

Table 2: Value added coefficients of the components of final demand

| $va_C$ | $va_G$ | $va_I$ | $va_E$ |
|---|---|---|---|
| 0.728469 | 0.890525 | 0.648486 | 0.650422 |

Source: Lopes and Amaral (2017).

Table 3: Employment coefficients of the components of final demand

| $l_C$ | $l_G$ | $l_I$ | $l_E$ |
|---|---|---|---|
| 0.017545 | 0.025089 | 0.019234 | 0.019825 |

Source: Lopes and Amaral (2017).

Since the productivity growth rate implicit in ROE 2012 is – 1.8%, the values of the coefficients $l_C$, $l_G$, $l_I$, $l_E$ come as:

$l_C$ = 0.017545 / 0.982 = 0.017867

$l_G$ = 0.025089 / 0.982 = 0.025549

$l_I$ = 0.019234 / 0.982 = 0.019587

$l_E$ = 0.019825 / 0.982 = 0.020188

Based on the previous values, the trade-off equation unemployment rate/external deficit calibrated for 2012 comes as:

$u = 0.172394 - 0.000012H$

As the expected value implicit in the ROE 2012 of the trade deficit in 2012 is $H$ = 1720.5, the predicted unemployment rate, *ex post*, for that year is 15.2%, 1.8 percentage points higher than the unemployment rate foreseen by the Troika, 13.4%, and close to the unemployment rate actually verified in 2012, 15.5%. Amaral and Lopes (2017), in turn, found a higher deviation, around three percentage points, between the unemployment rate using the trade-off equation they obtained and the unemployment rate foreseen by the Troika in 2011 for the year of 2012.

The analysis can also be done in terms of the weight of the external deficit in GDP, $h$. Based on the previous values, the trade-off equation, in this case, comes like this:

$u = 0.50223 - 0.000003*[62466.004742 - 89628.613532*(h + 1)] / [0.728469*(h + 1) - 1] \Leftrightarrow u = [0.661384*(h + 1)] / [0.728469*(h + 1) - 1]$.

For the implicit $h$ value foreseen in ROE 2012, $h = 1720.5 / 171233.9 = 0.010047$, we obtain the predicted value for the unemployment rate found above, $u = 15.2\%$. This result shows again that the Troika underestimated the unemployment rate for 2012 by almost two percentage points.

***The budget balance compatible with the implicit target for the external deficit***

In order to determine the value of the budget balance compatible with the *target* set for the external deficit in 2012, we will use the expression (24), $H(B) = [n\ (1 - va_C) / (1 - nva_C)]\ O^* + [(n - 1)\ va_G / (1 - nva_C) + 1]\ G + [(n - 1)\ va_I / (1 - nva_C) + 1]\ I + va_E\ [(n - 1) / (1 - nva_C)]\ E - [n\ (1 - va_C) / (1 - nva_C)]\ B$.

The value of the external deficit set by the Troika for Portugal in 2012 is implicit in the macroeconomic forecasts contained in the ROE 2012 and corresponds to $H^T = 1720.5$. We consider the forecast real values of public consumption, investment and exports of Table 1 and the value added coefficients of Table 2. We still have to estimate the values of $n$ and $O^*$.

To estimate the real value of $n$, the average propensity to consume, obtained through the ratio between private consumption and the disposable income of private, $Y_d$, we will consider private consumption and the implicit disposable income of private, both in real terms, with based on forecasts and budgetary policy options in ROE 2012.

Real $Y_d$ is obtained as: Real $Y_d$ = Nominal $Y_d$ nominal / (1 + Variation rate of Consumer Price Index). Nominal $Y_d$ is calculated as follows: Nominal $Y_d$ = Nominal $Y - T + TR$. Nominal $Y$ results from the product of real $Y$ with the rate of change of the GDP deflator. Thus, and since the rate of change of the GDP deflator provided by ROE 2012 is 1.7%, nominal $Y = 171233.9*(1 + 1.7\%) = 174144.9$. Given $T = 61480.5$ and $TR = 35641.3$, the amounts of taxes and social contributions and transfers, respectively, provided by ROE 2012, nominal $Y_d = 174144.9 - 61480.5 + 35641.3 = 148305.7$. Finally, and given the rate of change of the Consumer Price Index provided by ROE 2012, real $Y_d = 148305.7 / (1 + 3.1\%) = 143846.5$. Therefore, $n = 110394.9 / 143846.5 = 0.7674$.

Assuming that the predicted real $B$ corresponds to the predicted nominal $B$, adjusted by the GDP deflator, its value is given by: $B = - 7556.9 / (1 + 1.7\%) = - 7430.6$. The real

predicted transfers made by the Government to households is $TR$ = 35641.3 / (1 + 1.7%) = 35045.5.

Since private consumption can be written as: $C = n\ (Y + O^* - B)$ (see expression (18)), knowing the values of $C$, $n$, $Y$ and $B$, we can obtain the value of $O^*$. Considering the forecast real values of $C$ and $Y$ in ROE 2012 and the real values of $n$ and $B$ estimated above, it follows that: $O^* = -34818$.

The value of the budget balance compatible with the objective set for the external deficit in 2012 is, using the expression (24), given by: $B^T = -6313.8$, a value approximately 15% above the budget balance predicted in real terms, $B = -7430.6$.

Based on expression (26), $TR(B) = t\ (va_G\ G + va_I\ I + va_E\ E) / (1 - nva_C) + [ntva_C / (1 - nva_C) + 1]\ O^* - [ntva_C / (1 - nva_C) + 1]\ B$, it is possible to determine the real amount of transfers made by the Government to households necessary to reach the budget balance compatible with the objective set for the external deficit. Its value corresponds to $TR^T$ = 30495, a value approximately 13% lower than the amount of transfers made by the Government to the households predicted in real terms, $TR$ = 35045.5.

Using expressions (22) and (12), $H(B) = (1 - va_C)\ C(B) + (1 - va_G)\ G + (1 - va_I)\ I - va_E\ E$ and $Y = va_C\ C + va_G\ G + va_I\ I + va_E\ E$, we can determine the values of private consumption and GDP compatible with the implicit objective set for the external deficit, $C(B)^T$ e $Y^T$, respectively. Thus, their values are: $C(B)^T$ = 106371.2 and $Y^T$ = 167116.7, which are lower than the private consumption and GDP forecast values provided by ROE 2012, namely: 110394.9 and 171233.9 (millions of euros), respectively.

The weight of budget balance on output compatible with the implicit objective set for the external deficit is given by: $b^T = -6313.8 / 167116.7 = -3.8\%$, a lower budget deficit than expected in real terms for 2012, $b = -4.3\%$.

These results allow us to advance that the achievement of the implicit *target* for the external deficit in 2012, $H^T$ = 1720.5, would only be compatible with the establishment of a lower budget deficit and a lower weight of budget deficit on GDP for that year. Such an objective would require a smaller amount of transfers made by the Government to households and would result in greater contractions in private consumption and GDP and result in a higher unemployment rate than that expected by the Troika for 2012.

### 6.2. *Ex ante* assessment

Based on the determined trade-off equation $u = f(h(B))$, we obtain the general expression that allows us to calculate the relative value that the economic policy maker assigns to objectives $h(B)$ and $u$ when making the choice, $h(B) = h(B)^*$ e $u = u^*$:

$$-\mathrm{d}u / \mathrm{d}h(B) = 0.145486 / [0.728469^*(1 + h) - 1]^2$$

For the value of $h$ predicted in ROE 2012, $h = 0.010047$, and assuming that the chosen policy verifies the trade-off equation:

$$-\mathrm{d}u / \mathrm{d}h(B)\ (h(B) = 0.010047) = 2.105037$$

This result allows us to conclude that the "price" of $h(B)$ in terms of $u$ is about $1 / 2.105037 = 0.475051$.

## 7. Conclusions

The assessment of adjustment programmes is usually carried out by comparing the results achieved with the results expected at the beginning of their implementation. In this regard, Amaral and Lopes (2017) suggest that there is a significant under-estimation in relation to the effects that the measures to be implemented have on GDP and employment and, consequently, on public finances, the opposite occurs with regard to resolution external imbalances.

Following the approach of these authors, a different exercise was carried out, which consists in comparing the value of the unemployment rate forecast for Portugal in 2012 with the value that it would be possible to anticipate at the time of formulating the programme, if the productive (sectoral) structure of economy and the expected value of the trade deficit had been taken into account.

One of the differences in our approach compared to the approach of Amaral and Lopes (2017) lies in the fact that we work with an augmented trade-off equation unemployment rate/external deficit, expliciting the components of final demand individually. In the context of the *ex post* analysis of economic policy evaluation, this analytical expression makes it possible to assess the consistency between the values set for the external deficit and the unemployment rate.

Thus, in the first step of *ex post* analysis, we used our trade-off equation calibrated for Portugal in 2012, and we estimate that, for that year, the level of the unemployment rate would be 15.2%, not 13.4%, as foreseen in the Relatório do Orçamento de Estado 2012,

which represents a deviation of 1.8 percentage points. A deviation of almost two percentage points is significant, and, given the macroeconomic variable in question, reflects a serious forecast error present in the Troika programme. The availability and use of contemporary IO matrices could have made it possible to anticipate and avoid this forecasting error. As a result, the economic and social costs resulting from the implementation of the austerity fiscal policy in 2012 could have been mitigated and reduced.

The second difference in our approach consists in considering that the external deficit is an indirect function of the budget balance, through private consumption. Thus, private consumption is determined endogenously and it is dependent on budgetary options, namely the amount of transfers made by the Government to households. Imports, as defined in an Input-Output framework, depend on the components of final demand, namely private consumption. In this context, the level of imports indirectly reflects the level of the budget balance and directly affects the level of the external deficit.

In a second step of *ex post* analysis, with the objective of assessing the consistence between the values set for the budget balance, the external deficit and the unemployment rate for Portugal, in 2012, we determined the value of the budget balance compatible with the value set for the external deficit (trade deficit, *stricto sensu*). The estimated value is approximately 15% above than the budget balance predicted in real terms for that year. In turn, the real amount of transfers made by the Government to households necessary to reach the budget balance compatible with the objective set for the external deficit is approximately 13% less than its predicted value.

Finally, a complementary analysis that could be carried out consists of investigating the possibility of obtaining two or three economic policy objectives for the variables under study (budget balance, external deficit and unemployment rate), through the joint use of the fiscal policy instrument-variables available, namely, public consumption, public investment and transfers.

**References**

Afonso, A., C. Rault and C. Estay (2013), "Budgetary and external imbalances relationship: a panel data diagnostic", *Journal of Quantitative Economics,* Vol. 11, Issues 1-2, pp. 84-110.

Amaral, J. F. and J. C. Lopes (2017), "Forescating errors by the Troika in the economic adjustment programme for Portugal", *Cambridge Journal of Economics*, Vol. 41, Issue 4, pp. 1021-1041.

Amaral, J. F. and J. C. Lopes (2018), "Análise Input-Output: Teoria e Aplicações", Edições Almedina, Coimbra.

Coelho, J.C. (2020), "The relationship between budget deficit and external deficit: the case of Portugal", REM Working Paper 0116-2020, REM Working Paper Series, February 2020.

Daly, V. and J. U. Siddiki (2009), "The twin deficits in OECD countries: cointegration analysis with regime shifts", *Applied Economic Letters*, Vol. 16, Issue 11, pp. 1155-1164.

Fleming, J. M. (1962), "Domestic Financial Policies under Fixed and under Floating Exchange Rates", *Staff Papers - International Monetary Fund*, Vol. 9, November 1962, pp. 369-379.

Lopes, J. C. and J. F. Amaral (2017), "Self-defeating austerity? Assessing the impact of a fiscal consolidation on unemployment", *The Economic and Labour Relations Review*, Vol. 28, Issue 1, pp. 77-90.

Miller, R. E. and P. D. Blair (2009), "Input-Output Analysis: Foundations and Analysis", Second Edition, Cambridge University Press, New York.

Ministério das Finanças (2011), "Orçamento de Estado para 2012 – Relatório", Ministério das Finanças do Governo de Portugal, Lisboa.
Available at: http://www.min-financas.pt.

Mundell, R. A. (1960), "The Monetary Dynamics of International Adjustment under Fixed and Flexible Exchange Rates", *Quarterly Journal of Economics*, Vol. 74, May 1960, pp. 227-257.

Trachanas, E. and C. Katrakilidis (2013), "The dynamic linkages of fiscal and current account deficits: New evidence from five highly indebted European countries accounting for regime shifts and asymmetries", *Economic Modelling*, Vol. 31, Issue 1, pp. 502-510.