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# Impact of trade openness on the budget balance in WAEMU

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## Abstract

The objective of this paper is to highlight the effect of trade openness on the fiscal balance in the case of WAEMU countries. To this end, a panel error correction model, namely the Pool Mean Group (PMG) estimator, was used. The results show that natural openness and openness policy have a positive long-term effect on the fiscal balance. This study shows that the conclusions drawn by Combes and Saadi-Sedik (2006) in their study, particularly with respect to the negative and significant effect of natural openness on the budget balance, are not verified in the case of WAEMU member countries.

# 1  INTRODUCTION

In an economic context characterized by high vulnerability to exogenous shocks, in particular the sharp deterioration in the terms of trade from 1978 to 1983, the recurrence of climatic hazards (drought in the Sahel between 1982 and 1984), the sharp rise in interest rates on international capital markets, which led to the unsustainability of public debt, and the implementation of Structural Adjustment Programs (SAPs), the WAEMU countries (Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal and Togo) have opened their markets (Homegnon, 2018).

At the regional level, they signed an integration agreement that gave rise to the West African Economic and Monetary Union (WAEMU) on January 10, 1994, one of the main objectives of which is to ensure the construction of a harmonized and integrated economic area within which the free movement of persons, capital, goods and services is guaranteed[1]. From an international perspective, these countries have ratified the General Agreement on Tariffs and Trade (GATT), whose main objective is to prevent the return of protectionism that was at the root of the crisis of the 1930s, by reducing barriers to world trade.

More than two decades after the implementation of these various measures, WAEMU member countries have become among the most open in Africa. Indeed, UNCTAD[2] statistics indicate that in 2019, the degree of trade openness measured by the ratio of total foreign trade to twice the GDP is 27.2% in the WAEMU while the average for Africa is 23.7%. For other country groupings, notably Sub-Saharan Africa and West Africa, the degree of trade openness was 22.9% and 19.7% respectively for the same year. However, BCEAO statistics show that the budget deficit increased by 1 percentage point of GDP to 5.1% of GDP over the 2015-2019 period, compared with 4.1% of GDP between 2000 and 2004.

Indeed, the implementation of all these trade liberalization measures, particularly the objectives set at the creation of WAEMU in 1994 and the ratification of the GATT, should, beyond strengthening the presence of WAEMU member countries in world trade, have significant effects on the budget balance of this economic zone. According to Houetohossou (2005), trade liberalization generally leads to a reduction in customs duties and taxes on imports. The reduction in customs duties should affect tax revenues and ultimately the fiscal balance. Initially, the reduction in tariffs and taxes will lead to a reduction in tax revenues. Then, it will lead to an increase in the volume of imports in line with the increase in disposable income and ultimately to an increase in tax revenues. On the other hand, according to the compensation theory, greater trade openness should lead to an increase in public spending (Rodrik, 1998). Changes in tax revenues and government spending will drive changes in the fiscal balance.

From the point of view of the empirical literature, the various studies that have investigated the impact of trade openness on the fiscal balance have produced mixed results (Jalles *et al.,* (2020), Mihóková *et al.,* (2019), Combes and Saadi-Sedik (2006), Alesina *et al.,* (1999), Edwards and Tabellini (1990)). Edwards and Tabellini (1990) arrived at positive and negative effects of trade openness on the budget deficit, while Alesina *et al.,* (1999) were unable to highlight a significant effect of trade openness on the budget balance. In particular, in the work of Combes and Saadi-Sedik (2006), who looked at the case of developing countries, their analysis was carried out over the period 1973-1998, during which developing economies, particularly WAEMU members, experienced several exogenous shocks that had an impact on their socioeconomic environment. These are mainly the terms of trade shocks, drought and SAPs mentioned above. Thus, the results obtained at the end of their work could depend on the analysis period selected.

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[1] From the WAEMU Commission website http://www.uemoa.int/fr/presentation-de-l-uemoa
[2] The statistics shown are calculated from data available on the UNCTAD website:
https://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx?sCS_ChosenLang=fr

This summary of the literature highlights the fact that the issue of the effect of trade openness on the fiscal balance is not completely clear-cut, particularly in the case of WAEMU countries that have taken various individual and community measures to liberalize trade.

In view of the above, the question arises: does trade openness have a significant effect on the budget deficit of WAEMU countries?

This paper contributes to the growing literature in the area of the study by emphasizing on the case of the WAEMU zone. More specifically, the aim is to verify whether the conclusions of Combes and Saadi-Sedik (2006) are valid in the case of WAEMU countries after the 1980s. Moreover, the WAEMU zone is unique in terms of trade liberalization in that its harmonized trade policy suggests that it pursues two objectives, the attainment of one of which can sometimes lead to difficulties for the other. These are the GATT agreement, which advocates trade liberalization by all its member countries, and the WAEMU zone's trade policy, which aims to intensify intra-community trade with the establishment of the customs union in January 2000. Finally, measuring the impact will make it possible to highlight the role of trade policy in the zone's budget deficit.

This document is divided into three sections. The first will focus on the relationship between trade openness and fiscal balance in the economic literature. The second section will focus on the methodology and the third section will present the results.

# 2  Economic literature on the effects of trade openness on the fiscal balance

## 2.1.  Measures of trade openness in the literature

According to Harrison (1996) the concept of openness, as applied to trade policy, could be synonymous with the idea of neutrality, that is to say, that the incentives are neutral between saving a unit of foreign exchange through import substitution and obtaining a unit of foreign exchange through exports. He points out, however, that a highly export-oriented economy may not be neutral in this sense, especially if the incentives for export production are realized through instruments such as export subsidies. Thus, he emphasizes that a good measure of trade policy would be to capture the differences between neutral, inward-looking, and export-favoring regimes. For Yanikkaya (2003), the term "openness" can be equated with the notion of "free trade", that is to say a trading system in which all trade distortions are eliminated. However, as Winters (2004) points out, it is difficult to find an accurate measure of trade openness. Measures of trade openness can be categorized into several dimensions, drawing on Gräbner *et al.,* (2020) and Yanikkaya (2003).

The first dimension of openness is the use of the trade share, that is to say, exports plus imports divided by GDP. This approach is the most popular and is used in several studies (Hossain *et al.,* (2020), Ashraf *et al.,* (2017), Chowdhury *et al.,* (2016), Frankel and Rose (2002), and Irwin and Tervio (2002)).

The other category includes indicators for measuring trade barriers that include export taxes, total taxes on international trade, and indices of non-tariff barriers. These indicators are based on the assumption that higher trade barriers distort aggregate supply and demand curves. Conversely, an easing of trade barriers reduces the level of trade distortions and increases the volume of trade (Niyongabo, 2007). Jaumotte *et al.,* (2013) used a variant of these indicators, namely the tariff rate, in their work on the relationship between the rapid pace of trade, financial globalization and rising income inequality.

## 2.2.  Trade openness and budget balance in the economic literature

The economic literature on the effect of trade openness on the budget deficit is not abundant as in the case of trade openness and economic growth. In general, the effect of trade openness on

the fiscal balance could be mediated through the taxes collected by the government. A trade policy that increases tax revenues should improve the budget balance, whereas an unfavorable policy would lead to a drop in revenues and ultimately a deterioration of the budget balance. Moreover, the effects of trade openness on the budget deficit could also be channeled through government spending.

The main economic theories that have addressed the issue of the fiscal balance are Barro's (1979) theory of fiscal smoothing, permanent income and compensation. The fiscal smoothing theory argues that the government seeks to smooth taxes over time. In this context, revenues and expenditures should serve this purpose. This theory is in line with the Ricardian theory which argues that the budget deficit has no real effect and that mitigating the deficit for the present period through tax cuts is nothing more than increasing taxes for the future generation (Mawejje and Odhiambo, 2020). For the permanent income hypothesis, it admits that income is used to smooth consumption. Thus, as Combes and Saadi-Sedik (2006) point out, the fiscal smoothing and permanent income theories emphasize that the optimal fiscal policy is countercyclical and that in the long run the government budget is balanced. This suggests that trade policy has no effect on the budget balance. According to the compensation theory, trade openness could lead to a deterioration in the budget deficit. Indeed, this theory emphasizes that trade openness leads to an increase in public spending. Rodrik (1998), who supports the compensation hypothesis, justifies the increase in public spending in this case by the need for social insurance against an additional external risk. Under these conditions, the increase in public spending linked to trade openness will have a negative impact on the budget balance.

Ades and Di Tella (1999), in their work on wages, competition and corruption, have pointed out that less competition implies higher revenues for firms, and in this case tax collectors have an incentive to engage in more corruption. Thus, when there is less openness, that is to say, little competition, malicious behavior by tax collectors could affect government revenues and ultimately the budget balance. Similarly, in the case of greater openness, the competition induced in the product market could reduce the income of firms. In this case, Combes and Saadi-Sedik (2006) argue that there will be less corruption and therefore the government's ability to collect revenue will increase: the budget balance could then improve.

The various empirical studies that have addressed the question of the effect of trade openness on the fiscal balance have produced divergent results.

Edwards and Tabellini (1990) found a positive effect of trade openness on the budget deficit in some cases and a negative effect in others. For Mihóková *et al.,* (2019) trade openness has a negative effect on the fiscal balance. However, Jalles *et al.,* (2020) using the sum of imports and exports relative to GDP as a measure of trade openness found that it has a positive and significant effect on the fiscal balance in the case of both advanced and developing economies. For Angelo and Sousa (2009), they showed that trade openness tends to amplify the volatility of the fiscal deficit, with these effects being particularly strong for small countries.

In contrast, Alesina *et al.,* (1999) did not find a significant effect of trade openness in their work on the impact of institutions on fiscal performance in Latin America.

Combes and Saadi-Sedik (2006) pointed out that the studies that have produced mixed results on the effect of trade openness on the fiscal balance have not considered the distinction between the natural openness of an economy and the policy of openness. They figured out that natural openness is based on the structural determinants of trade openness, while open policy refers to trade policy. They also revealed that the use of natural openness or openness policy in a regression may lead to divergent results. Moreover, after emphasizing the partial nature of some indicators used in the literature to distinguish between natural openness and open policy (the

average level of tariffs, the level of export taxes, the percentage of imports subject to non-tariff restrictions), they propose an approach for determining indicators of these two measures. This approach consists of regressing the degree of trade openness measured by the ratio (Exports of goods and services + Imports of goods and services)/GDP on a set of structural determinants of trade openness (the size of the country, its level of development, its natural resources, and its geographical characteristics). From this regression, the values estimated by the equation for the degree of openness would be the natural openness and the residual would be considered as the measure of the openness policy. According to Combes and Saadi-Sedik (2006), this measure of natural openness and trade policy allows trade policy to be understood through results rather than just instruments and avoids the use of subjective weights. In their work, they were able to show that trade openness increases a country's exposure to the outside world, which reinforces the negative effect of terms-of-trade instability on fiscal balances, regardless of whether trade openness is due to natural openness or to policy-induced openness. Moreover, they were able to highlight that natural trade openness worsens the fiscal balance, while trade policy-induced openness improves it.

# 3 Methodological approach

## 3.1. The different steps of the estimation and the data sources

To analyze the effect of trade openness on the budget deficit, an approach similar to that of Combes and Saadi-Sedik (2006) was employed. In this respect, we will first estimate trade openness [(Exports of goods and services + Imports of goods and services)/GDP] as a function of variables characteristic of each WAEMU economy, notably the size of the economy measured by population and GDP per capita. In addition to these factors, other factors relating to trade openness will be added, notably the cost of transport, which will be approximated by the index of relative distance between two countries. This index, inspired by the work of Wei (1996), shows that proximity in terms of distance alone does not determine the extent of trade between two countries. It is calculated from the following expression:

$$R_i = \left( \sum_k [Y_k / D_{ik}] \right)^{-1} \tag{1}$$

Where $Y_k$ is the GDP of country k and $D_{ik}$ is the distance between countries i and k.

The equation for trade openness by country is estimated using the Ordinary Least Squares (OLS) method. Following the estimation of the equation, the estimated value of trade openness will be considered as the natural openness and the residual as the openness policy according to the approach used by Combes and Saadi-Sedik (2006).

The second step of the methodological approach will be to estimate the non-grant budget balance as a function of trade openness variables (natural openness, trade policy) and other control variables, notably the unemployment rate, the urbanization rate and the level of indebtedness identified in the economic literature. GDP per capita was removed from the explanatory variables to overcome the problems of collinearity that could arise if natural openness and this variable were considered simultaneously as explanatory factors in the same equation (natural openness was determined from a linear equation containing GDP per capita).

In relation to the control variables, Maltritz and Wüste (2015) used the unemployment rate as a determinant of the budget balance and concluded that an increase in the unemployment rate is a factor in the deterioration of the budget deficit. Mihóková *et al.,* (2019) reached the same conclusion as Maltritz and Wüste (2015). In the case of this study, the unemployment rate is determined according to the International Labor Office (ILO) definition of an unemployed person as anyone of working age (15 years or older) who simultaneously meets three conditions:

-   being unemployed, that is to say not having worked at least one hour during a reference week;
-   be available to take a job within 15 days;
-   to have actively looked for a job in the previous month or to have found one starting in less than three months.

Regarding the rate of urbanization, Combes and Saadi-Sedik (2006) explained that urbanization increases underground and informal activities that are difficult to tax. This could affect the level of government tax revenues and ultimately worsen the level of the budget deficit. However, the results of their work showed that the rate of urbanization has a positive impact on the budget deficit. For Edwards and Tabellini (1991), it is easier to tax the urban population than the rural population. In this context, more urbanization should lead to more tax revenue and thus an improvement in the budget deficit.

The level of debt was used in the work of Maltritz and Wüste (2015) and Tujula and Wolswijk (2007). It is found that this variable positively affects the budget balance. An increase in the debt level reduces the budget deficit. However, Tujula and Wolswijk (2007) also pointed out that a high debt ratio can lead to a deterioration of the budget deficit because it automatically causes an increase in interest payments.

The data used in this paper relate to the 8 WAEMU countries (Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal and Togo) and cover the period 1990-2018. This information comes from several sources, notably the World Bank database (GDP, exports of goods and services, imports of goods and services, population, public debt, urban population growth rate, unemployment rate), the BCEAO (budget balance excluding grants) and the *Centre d'études prospectives et d'informations internationales* (distance).

In total, two models were estimated to measure the impact of trade openness on the budget balance. The first model incorporates natural openness and openness policy as a measure of trade liberalization. In the second model used to test the robustness of the results of model 1, the ratio (Exports of goods and services + Imports of goods and services)/GDP was used as a measure of trade openness.

### 3.2. Model and choice of estimator

In general, the estimated equation considering the variables of interest (natural openness and openness policy) and the other control variables (the urbanization rate, the unemployment rate, and the debt/GDP ratio) is as follows:

$$y_{it} = \alpha_i + \gamma_i Z_{it} + \mu_{it} \qquad (2)$$

With $y_{it}$ the budget balance excluding grants, $Z_{it}$ the K x 1 matrix of explanatory variables (K=5). $\gamma_i$ represents the 1 x K matrix of coefficients of these variables if it is assumed at first that the coefficients are heterogeneous. i and t represent respectively the WAEMU countries (8 countries) and the time axis (29 observations). $\alpha_i$ is the fixed effect.

However, considering the existence of a cointegrating relationship between the explained variable and the regressors, the ARDL (Autoregressive Distributed Lag) specification was used to take into account the short- and long-term relationships.

Equation (2) is rewritten in the following form:

$$y_{it} = \mu_i + \sum_{j=1}^{p} \rho_{ij} y_{i,t-j} + \sum_{j=0}^{q} \gamma_{ij} x_{i,t-j} + \varepsilon_{it} \qquad (3)$$

Where $x_{i,t}$ (5 x 1) is the vector of explanatory variables for country i, $\mu_i$ represents the fixed effect. $\rho_{ij}$ the coefficient of the lagged explained variable is a scalar and $\gamma_{ij}$ is a (1 x 5) matrix of coefficients. p and q denote the optimal lags of the dependent variable and its regressors.

$$\Delta y_{it} = \emptyset_i y_{i,t-1} + \beta_i x_{i,t} + \sum_{j=1}^{p-1} \rho'_{ij} \Delta y_{i,t-j} + \sum_{j=0}^{q-1} \gamma'_{ij} \Delta x_{i,t-j} + \mu_i + \varepsilon_{it} \qquad (4)$$

$\emptyset_i, \rho'_{ij}$ are scalars and $\beta_i, \gamma'_{ij}$ are (1 x 5) matrices of coefficients. $\Delta x_{i,t}$ and $\Delta y_{i,t}$ denote the first differences of the variables $x_{i,t}$ and $y_{i,t}$ in t.

Equation (4) can be estimated from several approaches, notably the GMM, the Pool Mean Group (PMG) or the Mean Group (MG) method. Concerning the GMM estimator, it is not adapted to the structure of the data used in this study. Indeed, for the use of the GMM estimator, the number of groups N must be large and the number of observations for the time series (T) must be small (N very large compared to T). In the case of this study, the data used for the WAEMU countries cover the period 1990-2018, so the number of years is T=29 and the number of countries is N=8 (T>N). Thus, the choice of estimator was made between the PMG and MG methods. In this regard, the Hausman test was performed for the choice between these estimators. The results show that the null hypothesis that the two estimators are convergent cannot be rejected. However, the results of the estimation with the MG estimator show that the speed of adjustment in this case is greater than unity in absolute value. The PMG estimator was therefore chosen.

However, the use of the PMG estimator requires the verification of several fundamental hypotheses concerning the independence of the residuals with respect to individuals, time and the explanatory variables. In addition, the long-run coefficient of the explained variable should be negative and in absolute value less than unity and the regressors must not be cointegrated. To take into account of the hypothesis that the residuals are independent of the individuals, Pesaran *et al.,* (1999, page 623) proposed to introduce the cross-sectional means of the explanatory variables as regressors. In comparison with serial correlation, Pesaran *et al.,* (1999, page 625) suggested that increasing the number of lags of the depend variable and the regressors. Increasing the number of lags of the explanatory variables with the finiteness assumption of the optimal lag of the autoregressive representation of the vector of regressors corrects the endogeneity problem of the explanatory variables (Pesaran and Shin, 1997, page 15; Pesaran and al., 1999, page 624) and ensures the convergence of the long-run relationship. The optimal delay for correcting endogeneity problems is the one that minimizes the information criterion.

Thus, to ensure the verification of the hypotheses of independence of the residuals with respect to the individuals, the cross-sectional means of the explanatory variables were introduced into the estimated equation. For the optimal p and q for the ARDL model (equation 3), the Akaike information criterion allows us to retain p=2 and q=2 (Appendix Table 5). Moreover, the cointegration test between the explanatory variables (Appendix table 7) highlights the absence of cointegration.

# 4  Presentation of results

The results of the inter-individual independence test summarized in Table 2 in the appendices indicate that the budget deficit excluding grants relative to GDP, natural openness, the ratio of public debt to GDP, the growth rate of the urban population, and trade policy show inter-individual dependencies. The unemployment rate variable does not show inter-individual dependence. The first generation test on the unemployment rate indicates that it is integrated of order 1. In comparison with the second generation stationarity test (see table 3) on the other

variables, the results allow us to conclude that all the other variables except natural openness are stationary at level. The natural openness is integrated of order 1. Moreover, the results of the test shown in Table 4 in the appendix reveal the existence of a cointegrating relationship between the budget balance and the other variables. In addition, trade openness is likely to be endogenous, given that several financial supports received by WAEMU countries have been conditional on the implementation of the trade openness policies recommended by the World Trade Organization. As indicated in the previous section, the various assumptions and methods for correcting endogeneity problems were considered in the two models estimated.

**Table1: Results of modeling the effect of trade openness on the budget balance**

|  | **Model 1** | **Model 2** |
|---|---|---|
| Lag 1 (Budget balance excluding grants/GDP) | -0.965*** | -0.752*** |
| Natural opening | **0.002*** |  |
| Debt/GDP | 0.00002 | 0.0002*** |
| Unemployment rate | -0.014*** | -0.012*** |
| Urban population growth rate | -0.035*** | -0.040*** |
| Trade policy | **0.001*** |  |
| Trade openness |  | 0.001*** |

Significance 1% (***), 5% (**) and 10% (*)

**Source:** Authors

The outputs of Table 1 above highlight that the speed of adjustment of the reference model (Model 1) is significantly negative and less than unity, so the results can be interpreted. It should be recalled that the endogeneity correction method proposed by Pesaran and Shin (1997, page 15) and Pesaran *et al.,* (1999, page 624) ensures the convergence of the long-term relationship. In this respect, only the long-run results presented in Table 1 are interpreted. The detailed results of the estimates are shown in Table 8 in the Appendix.

The results show that natural openness has a positive and significant effect on the budget deficit in the long run in model 1. This result corroborates the analysis of Houetohossou (2005). He points out that trade openness can have two impacts on tax revenues. The first, which can be described as short-term, consists of a price effect that would be observed following trade opening, which consists of a reduction in tariff and non-tariff barriers to international trade. In the second phase, the reduction in tax rates will encourage imports because consumers' disposable income will increase and, as a result, demand to abroad will rise. Thus, trade liberalization would imply, in the long run, an increase in the volume of imports and therefore in government budget revenues, which would lead to an increase in the budget balance. Moreover, the results corroborate those of Jalles *et al.,* (2020) who reached the same conclusion in the case of developing countries. However, the results differ from those obtained by Combes and Saadi-Sedick (2006) who found a negative effect of natural openness. The results they obtained could be explained by the period of analysis used (1978-1998). Indeed, for most of this period (1978-1990), WAEMU countries were characterized by shocks. These included the sharp deterioration in the terms of trade from 1978 to 1983, and the recurrence of climatic hazards (drought in the Sahel between 1982 and 1984). The 1986-1990 period was characterized by the growing scale of imbalances, the introduction of Structural Adjustment Programs (SAPs) and the consequences for the economic and financial viability of WAEMU countries.

As regards trade policy, its impact on the budget deficit has been positive and significant in the long term. Thus, the open trade policy is a source of improvement in the budget deficit in

WAEMU member countries. This result confirms that of Combes and Saadi-Sedick (2006) who reached the same conclusion in the case of developing countries.

With respect to the control variables, the models show that in the long run, the effect of public debt on the budget balance is positive and insignificant in Model 1. It should be noted, the effect of debt on the fiscal balance depends on the reason for the debt. Thus, mobilizing resources for reprofiling or repaying other creditors may not impact the fiscal balance, while indebtedness to finance government spending does affect the fiscal balance. As for the unemployment rate, the results show that it significantly and negatively affects the fiscal balance in the long run. This result corroborates the one obtained by Maltritz and Wüste (2015), who indicate that the increase in the unemployment rate implies an increase in unemployment benefit payments by the state and ultimately an increase in the deficit due to the increase in expenditure. As for the urbanization rate, it has a significant negative sign in the long run on the fiscal balance. It follows that greater urbanization in WAEMU countries leads to a deterioration in the budget deficit. This result confirms the work of Combes and Saadi-Sedik (2006) who argued that in the case of developing countries, urbanization reinforces underground and informal activities that are difficult to tax. This could affect the level of government tax revenues and ultimately worsen the level of the budget deficit.

The robustness of the results obtained, particularly with regard to the effects of natural openness and openness policy, were verified through Model 2, which used the ratio (Exports of goods and services + Imports of goods and services)/GDP as a measure of trade openness. The results show that trade openness has a positive and significant impact on the fiscal balance in the case of WAEMU countries.

## CONCLUSION

The objective of this paper was to highlight the effect of trade openness on the fiscal balance in the case of WAEMU countries. For this purpose, an error correction model was used. The results show that natural openness and openness policy have a positive long-term effect on the fiscal balance. This study showed that the conclusions of the work of Combes and Saadi-Sedik (2006), particularly with respect to the negative and significant effect of natural openness on the budget balance, are not verified in the case of WAEMU member countries.

The results obtained on the effect of trade openness on the budget deficit make a significant contribution to the economic literature on the impact of trade openness on the budget balance by highlighting the case of WAEMU countries. They show that the various mixed conclusions are also explained by the characteristics of the economies analyzed and the study period. In addition, the results indicate that trade openness is a factor in mitigating the budget deficit in the WAEMU zone. However, a trade policy that reduces the budget deficit is not sufficient to achieve development objectives. It is also necessary to measure the impact of trade openness on other macroeconomic aggregates, notably growth, business productivity and unemployment.

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# Appendix

**Table 2: Testing for cross–sectional dependence of Pesaran**

| Variables | p–value (H0: Independence cross-sectional) |
|---|---|
| Budget balance excluding grants/GDP | 0.062 |
| Natural opening | 0.000 |
| Debt/GDP | 0.000 |
| Unemployment rate | 0.275 |
| Urban population growth rate | 0.003 |
| Trade policy | 0.023 |

**Source**: Authors

**Table 3: Pesaran stationarity test (2nd generation test). H0: presence of unit root and Hadri test (1st generation) H0: stationary series**

| Variables | Séries en niveau | Séries différenciées |
|---|---|---|
| Budget balance excluding grants/GDP | 0.056 | |
| Natural opening | 0.993 | 0.001 |
| Debt/GDP | 0.065 | |
| Unemployment rate | 0.000 | 0.3999 |
| Urban population growth rate | 0.000 | |
| Trade policy | 0.024 | |

**Source**: Authors

**Table 4: Westerlund cointegration test (2nd generation test) H0: Absence of cointegration**

| | P-value |
|---|---|
| Westerlund cointegration test | 0.098 |

**Source**: Authors

**Table 5: Choice of optimal p and q**

| p | Q | AIC |
|---|---|---|
| 1 | 0 | -1388.660 |
| 1 | 1 | -1490.534 |
| 2* | 2* | -1557.551 |
| 3 | 2 | -1557.345 |

**Source** : Authors

**Table 6: Hausman test (H0: PMG and MG are not significantly different, H1: PMG consistent while MG is not)**

| | P-value |
|---|---|
| Hausman test | 1.000 |

**Source** : Authors

**Table 7: Westerlund cointegration test (2nd generation test) for explanatory variables H0: No cointegration**

| | P-value |
|---|---|
| Westerlund cointegration test | 0,385 |

**Source** : Authors

**Table 8: Estimations results (short- and long-term)**

| | MODEL 1 | MODEL 2 |
|---|---|---|
| **Long run** | | |
| Natural opening | **0.002\*\*\*** | |
| Debt/GDP | 0.00002 | 0.0002\*\*\* |
| Unemployment rate | -0.014\*\*\* | -0.012\*\*\* |
| Urban population growth rate | -0.035\*\*\* | -0.040 |
| Openness policy | **0.001\*\*\*** | |
| Trade openness | | **0.001\*\*\*** |
| Lag 1 (Budget deficit excluding grants/GDP) | -O.965\*\*\* | -0.752\*\*\* |
| | | |
| Lag 2 (Budget deficit excluding grants/GDP) | -0.121 | -0.102 |
| | | |
| **Short run** | | |
| Δ(Natural openness) | -0.004\*\*\* | |
| Δ(Debt/GDP) | -0.001\*\*\* | -0.001\*\*\* |
| Δ(Unemployment rate) | -0.012 | -0,014 |
| Δ(Urban population growth rate) | -0.048 | -0.027 |
| Δ(Openness policy) | -0.001\* | |
| Δ(Trade openness) | | -0.001\*\* |
| Δ(Lag 1 (Natural openness)) | -0.002\* | |
| Δ(Lag 1 (Debt/GDP)) | -0.000 | -0.000 |
| Δ(Lag 1 (Unemployment rate)) | -O.016 | -0.007 |
| Δ(Lag 1 (Urban population growth rate)) | 0.023 | 0.014 |
| Δ(Lag 1 (Openness Policy)) | -O.001 | |
| Δ( Lag 1 (Trade openness)) | | -0.000 |
| | | |
| Average | | |
| Average (Natural openness) | 0.003 | |
| Average (Debt/GDP) | 0.000 | -0.000 |
| Average (Unemployment rate) | 0.011 | 0.006 |
| Average (Urban population growth rate) | 0.023 | 0.028 |
| Average (Openness policy) | 0.000 | |
| Average (Trade openness) | | 0.001 |
| | | |
| Constant | -0.338 | -0.166 |
| Number of observations | 216 | 216 |

Significance 1% (\*\*\*), 5% (\*\*) and 10% (\*)

**Source:** Authors