

Domestic Demand and Export Performance in CEMAC: An Assessment with Endogeneity-related Model

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Abstract

Based on several alternative approaches there is by now some evidence suggesting that there is a negative relationship between exports and domestic sales. But in the majority of cases this regularity has focused on industrialized countries. While the external trade of African countries faces numerous challenges, with the low level of intra regional trade and the concentration of exports in some raw materials. Thus the aim of this paper to assess this new export channel for African countries. We then estimate a dynamic panel model with an error correction mechanism of the export market share (the difference between exports and foreign demand) for the six economies of the CEMAC zone between 1974 and 2021. Through the use of instrumental variables (2SLS) we address the role of endogeneity. According to the results, such link is prominent for African countries such the CEMAC countries where domestic demand impacts effectively negatively exports in CEMAC with a negative elasticity of around 53 %. When allowing for an asymmetric relationship between domestic sales and exports the results remain unchanged suggesting that a significant relationship between domestic demand and exports performance still holds.

Keywords: *Exports, domestic demand, asymmetry, endogeneity*

JEL Classification: C23, C50, F10, O10

INTRODUCTION

Since the North specialize in manufacturing and the South in commodities, we can think that the most appropriate framework to explain the dynamics of trade in this case is that which relies on the theory of comparative advantage. To this end, the forms of protectionism are those actions to take advantage of this comparative advantage (Krugman, 1984). It has been suggested that this difference in export structure has largely contributed to the dramatic difference in growth performance between these two regions over the past decades (Wood and Mayer, 2001, pp.1). The macroeconomic measures are those actions to put the economy on a high growth trajectory of North countries, already put forward by Keynes with an emphasis on stimulating local demand from an accommodating fiscal and monetary policy,. In terms of fiscal policy, the State would need to increase its consumption that is the public spending should increase. On the monetary policy side, the Central Bank needs to increase the purchasing power of agents, either from a decreasing in

the refinancing rate, in order to encourage agents to borrow, or from an increase in the quantity of money using an open market policy, in order to encourage agents to consume. Between these two strategies (foreign trade and macroeconomic policies), in order to foster the internal dynamic of economic growth, the objective is to identify the strategy best able to achieve this aim. On the idea that these two strategies interact with each other, this study aims to establish the interaction between Keynesian policies and foreign trade. If the so-called endogenous growth theories provide elements for understanding the effects of foreign trade on macroeconomic policies with Rivera-Batiz and Romer (1991) as the pioneering model since they reveal that openness is an opportunity to master technology, here we will focus on the effect of macroeconomic policies on foreign trade.

The channel through which Keynesian policies influence export performance is through domestic demand (Ball et al., 1966). The literature has widely discussed the role of the traditional determinants of exports, which are the evolution of imports among trading partners and an indicator of price competitiveness taken as the real exchange rate generally. Regarding the real exchange rate, the literature develops the idea according to which the mechanical chain of national exports stimulation from a depreciation of the real exchange rate seems unlikely to occur in the context of Sub-Saharan Africa (SSA) resulting from the price inelasticity of their imports concentrated in basic products (manufactured goods, capital goods, etc.) necessary for the manufacture of local inputs but few substitutables to local products due in particular to the content in technological progress of these imported products not yet acquired by these economies (Kamin, 1988 ; Rose, 1991 ; Ghei and Pritchett, 1999). While regarding imports, in general the evolution of imports in the trade partners is used to proxy the foreign demand and its relative evolution vis-à-vis exports is used as a measure of market share developments.

If internal demand is traditionally considered as a factor which only influences imports, it is also an essential determinant of exports which it affects according to two distinct channels, on the one hand a channel from the demand side and on the other hand a channel from the supply side. Depending on the demand side, in particular when domestic demand is growing (respectively is decreasing), the associated inflationary pressures can lead to a rise (respectively a decline) in inflation or to an appreciation (respectively a depreciation) of the nominal exchange rate in flexible exchange rates which makes exports less competitive (respectively more competitive). Depending on the supply side, in fact, it is likely that domestic conditions influence firms' willingness or ability to supply exports. In a context of high domestic demand pressure, firms will work at full capacity and will not be able to follow, in the short-run, external demand increases. In contrast, during a domestic recession, firms will be able to allocate more resources to exports. In other words, in periods of slacking domestic demand firms try to compensate for the decline in domestic sales through increased efforts to export while in boom periods production can be mainly sold on the domestic market. This alternative explanation resonates with the "vent-for-surplus" theory of the benefits of international trade, which has a long tradition in economics dating back to Adam Smith.

The literature of domestic demand pressure on export performance can be viewed as recent contributions to international trade theory to introduce new and more concrete elements into traditional explanations of comparative advantage. The

hypothesis that the volume of trade between two countries is larger the closer they are in terms of per capita income. This fact being due to the export potentiality developed in the two markets by the similar national demand patterns that accompany similar levels of income. Despite its intuitive nature and distinguished lineage, the link between a domestic slump and export growth is hard to reconcile with modern workhorse models of international trade. The reason for this is that these canonical models, including those emphasizing product differentiation and economies of scale of the Krugman-Melitz type (Krugman, 1979 ; Krugman, 1980; Melitz, 2003) assume that firms face constant marginal costs of production, an assumption that implies that firms' domestic and export sales decisions can be studied independently from each other.

However, based on several alternative approaches, mainly at the firm level, there is by now some evidence suggesting that the firm decisions are affected by both markets. Vannoorenberghe (2012) finds a negative relationship between exports and domestic sales for French firms. Having established a causal link between changes in domestic demand and exports that operates through firms changes in domestic sales, the literature generalize the baseline model `a la Melitz (2003) to allow for non-constant marginal costs of production (Almunia *et al.*, 2021 ; Esteves *et al.*, 2021). To study the empirical relevance of the “vent-for-surplus” mechanism, the empirical research test for an asymmetric by dividing the sample into a “boom” period and a “bust” period, and measure the extent to which, at the firm level, a decline in the domestic sales in the bust period relative to the boom period is associated with an increase in export sales over the two periods.

METHOD

The starting point for the analysis of export performance behavior is the econometric model that stress the dynamics of export performance over time. The method and the variables selection are then presented in the following.

The Econometric Model

We assume that the export market share for each country i at time t (the difference between exports of goods and services X_{it} and the foreign demand D_{it}) follows both short run and long-run determinants. For the long-run dynamics, we consider the Real effective exchange rate $REER_{it}$ a price/cost competitiveness indicator defined such as an increase represents an appreciation. For the short-run behavior, the export market share is explained by its own evolution in the previous year, and the present and past developments of the real exchange rate $REER_{it}$ and domestic demand DD_{it} (Esteves and Rua, 2013 ; Bobeica and *al.*, 2015 ; Esteves and Prades, 2016). Thus considering a dynamic panel error correction model for annual panel data:

$$\Delta X_{it} - \Delta D_{it} = \alpha_i + \beta(\Delta X_{it-1} - \Delta D_{it-1}) + \sum_{k=0}^1 \varphi_k \Delta REER_{it-k} + \sum_{l=0}^1 \omega_l \Delta DD_{it-l} + \sum_l \theta_l (X_{t-1} - D_{t-1}) + \lambda REER_{t-1} + \varphi t \dots (1)$$

where Δ is the first difference operator. The model considers all the variables except the trend measured in log allowing for a maximum of one lag. The interpretation of the time trend is not straightforward as it can capture the long-run effects of the so-called non-price competitiveness factors.

An additional issue that was raised in the previous literature is the hypothesis that a high product concentration of exports will reduce this trade-off between sales to domestic and foreign markets. The model using the interaction with the concentration indicator is the following:

$$\Delta X_{it} - \Delta D_{it} = \alpha_i + \beta(\Delta X_{it-1} - \Delta D_{it-1}) + \sum_{k=0}^1 \varphi_k \Delta REER_{it-k} + \sum_{l=0}^1 \omega_l \Delta DD_{it-l} + \sum_{m=0}^1 \omega_m^{CI} \Delta DD_{it-m} \cdot CI_{it-m} + \lambda REER_{t-1} + \varphi t \dots (2)$$

where CI_{it} accounts for the export concentration index in goods.

The effects of domestic demand on export performance is determined by looking at the sign and the size of the coefficient ω . From a policy point of view it is important to assess whether the negative influence of domestic demand pressure on trade outcomes is an effect which appears only during economic downturns or whether there is a trade-off between domestic sales and exports also during growth periods. In order to investigate this, we test for the existence of an asymmetric relationship between domestic demand and exports by splitting domestic demand in two different variables, as this have been done into the literature (Esteves and Rua, 2013 ; Bobeica and *al.*, 2015 ; Esteves and Prades, 2016) depending of its change being positive (ΔDD^+) or negative (ΔDD^-). The estimate equation becomes:

$$\Delta X_{it} - \Delta D_{it} = \alpha_i + \beta(\Delta X_{it-1} - \Delta D_{it-1}) + \sum_{k=0}^1 \varphi_k \Delta REER_{it-k} + \sum_{s=0}^1 \omega_s \Delta DD_{it-s}^+ + \sum_{p=0}^1 \omega_p \Delta DD_{it-p}^- + \lambda REER_{t-1} + \varphi t \dots (3)$$

The experiment was conducted on the model using the interaction with the concentration indicator as the following:

$$\Delta X_{it} - \Delta D_{it} = \alpha_i + \beta(\Delta X_{it-1} - \Delta D_{it-1}) + \sum_{k=0}^1 \varphi_k \Delta REER_{it-k} + \sum_{s=0}^1 \omega_s \Delta DD_{it-s}^+ + \sum_{p=0}^1 \omega_p \Delta DD_{it-p}^- + \sum_{u=0}^1 \omega_u^{CI} \Delta DD_{it-u}^+ \cdot CI_{it-u} + \sum_{v=0}^1 \omega_v^{CI} \Delta DD_{it-v}^- \cdot CI_{it-v} + \lambda REER_{t-1} + \varphi t \dots (4)$$

where ΔDD^+ is a variable obtained by multiplying ΔDD by a dummy variable which takes the value 1 in years where this change is positive or zero (and 0 otherwise), ΔDD^- is a variable obtained by multiplying ΔDD by a dummy variable which takes the value 1 in years where this change is strictly negative (and 0 otherwise).

Estimation Method: the issue of endogeneity

The presence of the lagged endogenous might suggest the use of instrumental variables (2SLS); based on the Hansen's J statistic (Hansen, 1982), we not reject the overall validity of the instruments at the standard level this suggests the orthogonality conditions hold. In this type of analysis based on a single equation approach, the potential endogeneity of some of the explanatory variables is an issue that should also be addressed (Esteves and Rua, 2013, pp. 23):

In the one hand, toward long-run equilibrium. In fact, under the assumption that the short run dynamics do not exhibit level feedback with respect to the long-run relationship (in other words are weakly exogenous for the parameters of

interest) we can factorise the ECM into two blocks: on the one hand, the marginal model that contains variables which are not influenced by the long-run relationship, in this case the short run determinants. On the other hand, the conditional model that contains variables which exhibit level feedback with respect to the long-run relationship, in this case only the export market share. Since the marginal model does not contain information about the long-run parameters we can obtain fully efficient estimates of the long-run parameters from the conditional model (Engle *et al.*, 1983). Thus as an additional robustness check we address the endogeneity for the export market share through the significance testing of the error correction term. In practice, this can be accomplished through the t-ratio of the error correction term coefficient the parameter θ .

In the other hand, toward the endogenous (the export market share). In fact, the presence of the lagged endogenous variable might suggest that the assumption of strict exogeneity is necessary violated. Furthermore, with the marginal model it's likely that the short run determinants thus domestic demand are endogenous in the conditional model. Finally, with keynesian policies that put more emphasis on total spending the domestic demand appear endogenous and the export structure as represent by the concentration index rather exogenous with the theory of comparative advantage.

Data Set

The macroeconomic data set for the six CEMAC member countries (Cameroon, Central African Republic, Chad, Congo, Equatorial Guinea and Gabon) covers 1974 to 2021 in annual frequency thus 48 observations for the exports of goods and services, the foreign demand. They come from the World Bank's World Development Indicator (WDI) database. The real exchange rates are based on the the most commonly used price series, i.e. Consumer Price Index (CPI) against the top 30 trading partners for each country (narrow-based indices) using weights based on trade. We employ the cepii's EQCHANGE database (Couharde *et al.*, 2018). Exports are measured in real terms and refer to both goods and services. Foreign demand is computed as the geometric weighted average of the imports in real terms of goods and services of the main trading partners, where the weights correspond to the export shares of the CEMAC countries to the respective trading partner countries. The real effective exchange rate measure relies on the Purchasing Power Parity (PPP) and defines the real exchange rate as the relative price of domestic to foreign consumption or production baskets. This definition captures incentives to consume home's products relatively to foreign's products. An increase in the real exchange rate will make the consumption of foreign's products relatively more profitable inducing appreciation of the nominal exchange rate (in other terms, of the currency). A decline in the real exchange rate is perfectly symmetrical. The domestic demand measure refers to the final demand including private consumption, gross fixed capital formation and public expenditures in real terms. There is no a concentration index for exports covering both goods and services thus we use the United Nations Conference on Trade and Development (UNCTAD) Herfindahl-Hirschman index on export concentration covering goods. It is normalized in order to obtain values between 0 (zero concentration) and 1 (maximum concentration). Table 1 presents the variables used in the analysis.

Table 1. List of Variables

Variables	Abreviation	Définition	Source
The exportations of goods and services	<i>X</i>	The value of all goods and other markets services provided to the rest of the world.	World Bank, WDI
The foreign demand	<i>D</i>	The imports of goods and services of the main trading partners.	World Bank, WDI
The real effective exchange rate	<i>REER</i>	The price/cost competitiveness indicator of the home economy compare to the foreign partner.	Cepii, EQCHANGE
The domestic demand	<i>DD</i>	The final demand including private and public consumption and gross fixed capital formation	World Bank, WDI
The conccentration index for goods	<i>CI</i>	It is normalized in order to obtain values between 0 (zero concentration) and 1 (maximum concentration).	UNCTAD

Source: Author

RESULTS AND DISCUSSION

We will first focus on the symmetric relation (equations 1 and 2) and then on the asymmetric relation (equation 3 and 4). Given the annual periodicity, as in Esteves and Prades (2016) it is assumed that the substitution effect between domestic and foreign markets sales occurs contemporaneously.

The Symmetric relation

The estimation concerns equation (1) and equation (2). Estimates are in Table 2 for each equation. As obtained on European economies the existence of a correction mechanism towards the long run equilibrium is confirmed by the statistically significant and negative error correction term suggesting thus that the endogeneity of export market share is well established. As for the European countries this ter mis not sizeable. The real effective exchange rate in (2) appears with a negative sign in the long-run, that is, an appreciation hurts exports performance. The time trend is strongly significant, evidencing an increase in exports market shares of CEMAC countries with what could not be explained by the real effective exchange rate itself. Concerning the short-run dynamics, the real effective exchange rates series appear to impact market share growth with a negative sign. The one period lag of export market share change exhibit negative coefficients. Over the traditional export determinants, domestic demand appears to significantly influence export market shares on the short-run with a negative elasticity around 64 per cent.

Table 2. The Symmetric Relation

$\Delta X_t - \Delta D_t$	(1)	(2)
<i>Error Correction Term</i>		
$X_{t-1} - D_{t-1}$	-0.03 (0.01)**	-0.03 (0.02)*
<i>Long run parameters</i>		
t	0.01 (0.00)***	0.01 (0.00)**
$REER_{t-1}$	-1.22 (0.33)***	-0.78 (0.41)*
<i>Short run parameters</i>		
Constant	5.16 (1.48)***	3.07 (1.76)*
$\Delta X_{t-1} - \Delta D_{t-1}$	-0.36 (0.04)***	-0.32 (0.09)***
$\Delta REER$	-1.94 (0.51)***	-1.08 (0.50)**
ΔDD	-0.53 (0.31)*	-3.92 (2.20)*
$\Delta DD \cdot CI$		4.85 (2.80)*
<i>Statistics</i>		
<i>Adjusted R²</i>	0.19	0.11
<i>Nobs</i>	51	52
<i>Sample</i>	1974- 2021	1995- 2021
N	6	6
<i>J Statistic</i>	11.14 (0.26)	8.11 (0.42)

Source: Author, *** (**, *) null hypothesis is rejected at the 1% (5%, 10%). *Nobs* is available observations, (.) standard deviation. (.) the significance level.

Esteves and Prades (2016) suggest that domestic demand developments are more relevant to explain exports in countries with a lower product concentration index (that is, more diversified exports). To assess this result we turn on the estimation of equation (2). The coefficients are clearly significant and their sign is as expected from the theory. In fact, the coefficient of domestic demand is negative while the coefficient of the cross term is positive, implying that the coefficient between domestic demand and exports becomes less negative when exports are more concentrated.

The Asymmetric relation

The estimation concerns equation (3) and equation (4). Estimates are in Table 3 for each equation. The results are qualitatively unchanged than in the symmetric case. However, regarding the domestic demand variable, it appears that only the positive changes in domestic demand present a statistical significant negative effect on exports dynamics. During growth periods, a rebound in domestic demand would translate into contraction of exports in favor of local sales. This result is qualitatively different from that of European economies where domestic demand in the asymmetric relationship continues to negatively impact export

market share just in times of crisis. To explain this result note that the willingness of exports of developed countries is not the same compare to those of developing countries considering the difference of advantage in competing and thus the preference of the less (respectively the most) advantaging economies towards the domestic markets (respectively foreign markets). The infant industry argument theory of Krugman (1984) is at the heart of this explaining by demonstrating that there are opportunity for the local firms to sale just in the domestic market when this is protected.

Table 3. The Asymmetric Relation

$\Delta X_t - \Delta D_t$	(3)	(4)
<i>Error Correction Term</i>		
$X_{t-1} - D_{t-1}$	-0.03 (0.02)*	-0.04 (0.02)*
<i>Long run parameters</i>		
t	0.01 (0.00)**	0.01 (0.00)***
$REER_{t-1}$	-1.09 (0.41)**	-0.76 (0.39)*
<i>Short run parameters</i>		
Constant	4.74 (1.74)***	3.03 (1.71)*
$\Delta X_{t-1} - \Delta D_{t-1}$	-0.29 (0.06)***	-0.22 (0.10)**
$\Delta REER$	-3.35 (0.61)***	-2.17 (1.18)*
ΔDD_t^+	-1.69 (0.60)***	-6.29 (1.26)***
$\Delta DD_t^+ \cdot CI_t$		7.13 (2.16)***
<i>Statistics</i>		
<i>Adjusted R²</i>	0.21	0.29
<i>Nobs</i>	52	52
<i>Sample</i>	1974- 2021	1995- 2021
<i>N</i>	6	6
<i>J Statistic</i>	5.49 (0.79)	5.45 (0.71)

Source: Author, *** (**, *) null hypothesis is rejected at the 1% (5%, 10%). *Nobs* is available observations, (.) standard deviation. (.) the significance level.

Regarding the equation with the interaction term the results look as precedently the coefficients are clearly significant and their sign is as expected from the theory. In fact, the coefficient of domestic demand is negative while the coefficient of the cross term is positive, implying that the coefficient between domestic demand and exports becomes less negative when exports are more concentrated.

CONCLUSION

The six CEMAC economies have adopted the classic measures intended to increase intra-community trade such as the reduction (or elimination) of customs tariffs on either side of their common borders, the adoption of common protection or Common External Tariff. Despite this, intra-community trade still remains very weak while they carry out the majority of their trade with the outside. Indeed, in 2016, according to Bikai and Afomongono (2017, pp.7), intra-community trade in the CEMAC zone represents only 8 % of total exports of the union and 6.4 % of its total imports while 86 % of its exports are for other continents, and 89.7 % of its imports come from other continents. The traditional adjustment mechanism of exports which are the evolution of imports among trading partners and the real exchange rate don't really work as the real exchange rate variations are limited by the common currency itself. Thus this reorientation of firms towards the foreign market caused by domestic demand may constitute an additional adjustment mechanism for the export performance of CEMAC countries.

Based on a dynamic panel error correction model of export market share (the difference between exports and foreign demand) for the six economies of the CEMAC zone between 1974 and 2021 in annual data, domestic demand appears to significantly influence export market shares on the short-run with a negative elasticity of around 53 %. These results remain qualitatively unchanged with an additional issue that was raised in the previous literature that is the non-linearity when we admit an asymmetric relationship between export market share and local demand. Domestic demand continues to impact negatively export performance during growth periods suggesting that such link is prominent as well as for the case of African countries such the CEMAC countries. During times of crisis, the insufficiency of domestic demand in relation to existing production capacity does not result in an effort by firms to export. A rebound in domestic demand during growth periods would translate contraction of exports in favor of local sales. Having paid irrecoverable costs of entry into foreign markets can explain that the willingness of exports of developed countries is not the same compare to those of developing countries considering the difference of advantage in competing and thus the preference of the less (respectively the most) advantaging economies towards the domestic markets (respectively foreign markets).

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