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Tchoffo, Rodrigue and Ngouhouo, Ibrahim and Nkemgha, Guivis

University of Dschang, University of Dschang, University of Dschang

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Ibrahim Ngouhouo[1], Rodrigue Tchoffo[2], Guivis Nkemgha[3]

[1] Ibrahim Ngouhouo

Associate Professor of Economics, Vice Dean in charge of Programs and of academic activities at the Faculty of Economics and Management, University of Dschang/ Cameroon. He is specialized in macroeconomy and economic development. TEL: +237 694662260 E-mail: ngouhouo@yahoo.fr

[2] Rodrigue Tchoffo

Doctorate candidate in Faculty of Economics and Management, University of Dschang/Cameroon. He is specialized in computable general equilibrium and international economic. TEL: +237 697542689 E-mail: r_tchoffo@yahoo.fr

[3] Guivis Nkemgha

Doctor in economics, Faculty of Economics and Management, University of Dschang/Cameroon. He is specialized in international economic and econometric. TEL: +237 695754269 E-mail: nkemghazeufackguivis@yahoo.fr

Abstract

This article analyzes the impact of trade liberalization in a situation of imperfect competition (IC) on the economy of Cameroon as part of the bilateral economic partnership agreement (EPA) with the European Union. As a result, the article shows that taking into account the trade liberalization in a situation of imperfect competition perspective will have amplified impacts on the economy. This result is supported by the implementation of a recursive dynamic computable general equilibrium model based on the 2016 social accounting matrix we built for Cameroon which reveals specifically that: growth losses estimated at 1381.10 billion of CFAF between 2016 and 2040 in perfect competition increase with the consideration of the IC up to 1474.13 billion of CFAF. The losses in customs revenue amount to more than 1008 billion of CFAF against 237.42 billion recorded in perfect competition. Hence, we recommend to the Cameroonian government to resign the agreement.

Keywords: Imperfect Competition, Economic Partnership Agreement, Computable General Equilibrium, Social Accounting Matrix

Jel classification : C68, D43, D58, F47, L13

1. Introduction

In general, the issue of imperfect competition (IC) is a critical issue in developing economies. In developed countries the market structure is such that it can promote competition between companies of similar size. On the other hand, leading companies in a sector in developed countries generally dictate their law to the entire economic structure. When these are not local, multinationals do not lack to become a leader and even very often to hurt their competitors on the local level. This is not without direct consequences on the economic performance of the host country since these multinationals very often repatriate almost all the wealth they create. The argument of the IC finds all its justification. Rodrik (1988) points out that the entry of new foreign competitors is so widespread in developing countries that the presence of IC is inevitable. This usually involves lifting customs barriers, import quotas, which very often leads to the reduction of the power of local producers. As a result, there is an asymmetry information between these new competitors and local firms (Elgstrom and Larsen 2010, Heron 2011, Bernal 2013, Gonzales 2017). Thus, this imbalance compromises in many ways the investment efforts of local entrepreneurs (Kuruk 2012, Bernal 2013).

When we examine the current structure of the Cameroonian economy, it does not seem to escape these illustrations. Especially since this developing country has made a bilateral agreement in the framework of an economic partnership agreement signed with the European Union, implemented since August 2016. Since the ratification of this agreement in January 2008, the government has undertaken a prospective study on its risks and potential opportunities supported by a set of compensatory measures that could be considered in case of sharp losses for Cameroon (MINFI 2008). But the latter ignores the effects of IC. In order to fill this gap, the present study raises the issue of the macroeconomic impact of taking into account IC's hypothesis on the Cameroonian economy as a whole within the framework of the Cameroon-EU EPA. According to the 2016 Cameroonian economic memorandum, 31% of companies operate in an oligopoly situation. This important figure confirms the argument advocated by Cockburn et al. (1998) who support the idea that the IC phenomenon is pronounced in developing economies. Theoretically, there may be a contraction of unprotected sectors[1], an expansion of protected sectors and a loss of well-being in the context of trade liberalization. Moreover, Etro (2015) supports that under constant elasticity of substitution (CES) preferences and Cournot (or Bertrand) competition, a larger market induces exits of domestic firms,

[1] Cockburn et al. (1998) call protected sectors the industrial sector and unprotected sectors are the agricultural sector

lower prices, and larger production of surviving firms because of competition from more foreign firms. Hence, the central question is the following: does taking the IC into account significantly affect the impact of the EPA on the economy compared to the situation of perfect competition? That said, the overall objective of this study is to evaluate the impact of the bilateral Cameroon-European Union EPA on the Cameroonian economy in IC. It is specifically a question of being able to identify the aggregates which undergo the greatest variations when deviating from the perfect competition to the IC.

As finding result, the imperfect competition in trade liberalization leads to an amplification of the impacts on an economy with respect to the perfect competition perspectives. Indeed, this paper reveals that in the case of economic partnership agreement, the legal losses are higher than those recorded in perfect competition. This is due to the fragility of the most ACP counties whose industries are not well structured in order to response positively to the UE's competition. This argument is in line with the conclusion of Etro (2015) who pointed that stronger competition reduces the markups and forces the firms to produce more in order to cover the fixed costs.

In that perspective, the main contribution of this paper is taking into account the imperfect competition hypothesis in the study of Cameroon macroeconomic impacts of bilateral EPA.

Thus, we devote the following section to the literature review on the theoretical and empirical aspects of IC between the EU and developing countries. The limits of this work will allow us to build a viable methodology and hence encouraging results.

2. Review of the literature on imperfect competition

By addressing the question of the impact of the Cameroon-European Union EPA under the assumption of IC we present respectively the theoretical and empirical achievements that will guide the methodological approach we adopt in this study.

2.1 Theoretical review of the literature on imperfect competition

The reflections on the IC revolve essentially around the new theory of international trade as an extension of the latter[2].

[2] The theoretical developments are largely inspired by Cockburn et al. (1998)

This theory emphasizes the importance of considering the presence of IC and returns to scale in trade policy analysis (Cockburn et al. 1998). If hesitation could be observed in developed economies, at least this must be taken into account in the context of developing economies when we know that their market structure does not escape the bias of the IC. A considerable number of companies in the African context in particular operate in oligopoly situations.

According to Bonanno (1990), the first rigorous analysis of the behavior of firms that does not treat prices as exogenous parameters is due to Cournot (1838). The latter whose works precede those of Walras (1874), then pioneer of the general equilibrium, studies more precisely the behavior of firms offering an industrial product where each knows the inverse demand function of others. In doing so, they face to the same market price. The notion of equilibrium in the sense of Cournot is therefore a special case of the general notion of Nash equilibrium introduced later (Nash 1950, Nash 1951). The latter shows that it is impossible for a firm once at equilibrium to unilaterally improve its profit by modifying its output level. This equilibrium, which is an extension of Cournot's equilibrium, is thus called the Cournot-Nash equilibrium. Moreover, when firms have control over the price, the resulting equilibrium is called the Bertrand-Nash equilibrium.

However, it is recognized that the first theoretical development on IC was later by Negishi (1961). For this purpose, Bonanno (1990) underlines three fundamental reasons which justify the need to take the IC into account in theoretical analysis. The first reason is based on the realism. The author justified it by the fact that the economies of the real world are for the most part characterized by large firms whose behavior is difficult to grasp when they behave like price takers. The second reason is based on the idea that most empirical studies on IC are based on the theory of partial equilibrium, the flaws of which can be bridged in a theoretical development on the general equilibrium. Finally, the author puts forward the third argument concepts related to the notion of perfect competition whose semantic ambiguity would be removed in IC.

In this section, therefore, we present the theoretical ambiguity about the effects of trade liberalization[3] in the presence of IC, which will be a reference for the empirical validation of the application we make for the Cameroon-European Union bilateral EPA.

Thus, Cockburn et al. (1998), Acting the theoretical ambiguity on resource allocation, explain that traditionally applying to CGEs, a reduction of tariff barriers usually leads to a reduction in prices in

[3] In the current context of the study, trade liberalization refers to the process of dismantling customs barriers

protected sectors (industrial sector in general) relatively to prices in the least protected sectors (agricultural sector in general). These changes in relative prices lead to a reallocation of resources from sectors relatively protected to the less protected sectors[4]. In the same way, the relative prices of exportable goods increase with respect to those of substitutes imported goods.

However, if firms in protected sectors operate under IC conditions, this could modify the latter conclusions. This is particularly the case in developing countries where tariff barriers are an important source of the market power of local producers.

Under Armington's hypothesis, the reduction of tariff barriers in IC leads to two effects: the demand effect and the supply effect. The demand effect is materialized by the drop in demand for products following the reduction in the price of its imported substitute. Consequently, the production decreases. The supply effect takes place once in IC, where the market power of monopolist or oligopolistic is threaten by foreign products and constrains this firms to reduce his margin and hence the price of its sales to increase its offer on the local market. This effect, that Decaluwé et al. (2001) call pro-competitive effect of trade liberalization, predominates because it allows an expansion of manufactured products to the detriment of agricultural products.

Well-being aspect of imperfect competition

Cockburn et al. (1998) indicate that, in general, welfare effects depend on the optimality of the initial level of production in each sector and the reallocation of resources resulting from trade liberalization. Hence, a contraction of the protected sectors and an expansion of the unprotected sectors could reduce the well-being.

Factor compensation

In a two-factor mobile model (capital and labor), a reduction of tariffs will normally reduce the actual remuneration of the factor used, relatively intensive in industries experiencing a decline in protection (Stolper-Samuelson effect).

In applied studies, however, the Stolper-Samuelson effect is sometimes offset by other factors. Taking into account the IC, it is possible that, as a result of trade liberalization, relatively protected sectors will expand while others contract. This leads to an increase in factor remuneration used intensively in the protected

[4] It is generally a contraction of the manufacturing sector in favor of an expansion of the agricultural sector

sectors. If trade liberalization yields to positive economies of scale, it is possible that the factors of production share the benefits of this efficiency Earnings, which leads to a simultaneous increase in their respective real wages.

2.2 Review of Empirical Works on Imperfect Competition

The empirical studies on IC can be grouped into five ways: IC and public policy (Leahy and Neary 1997, Cockburn et al. 1998, Decaluwé et al. 2001, Naito and Abe 2010, Chin et al. 2010, Luniko 2014), IC and customs union (Meza 1989, Long and Soubeyran 1997, Naito and Abe 2010), IC and labor market (Gersbach and Schniewind 2008, Hennessy and Lapan 2009). IC and environment and then IC and endogenous market structure.

The first axis justifies the framework of intervention of the government in IC to facilitate the operation of oligopolistic firms under trade liberalization. As a result, Leahy and Neary (1997) highlighted in their study in industry R&D the issue of competing effects on output level, R&D, profit and well-being. The low impact in result let them to think of spillover effects in R&D which allowed them to conclude that firms' cooperation is benefit and lead to an increase of profits. Indeed, following that measure, we face to an expansion of social and private sector activities and the public intervention is therefore undesirable. Regarding the effects of price regulation on social welfare in IC, Chang (2004) showed that a price floor can be usefulness for the social welfare even if it augments the industrial output and the consumer surplus. Naito and Abe (2010) also support the use of a tax reform policy in a context of trade liberalization that contributes to increasing government revenue, but also to improving well-being. The same argument is taken up in the work of Chin et al. (2010) who experiment elsewhere the effects of competition and the externalities of consumption. This optimism is optimized in the case of equality between the average income and the marginal cost, but under the assumption of positive externalities. In the case of negative externalities, the average revenue must be greater than marginal cost in order to achieve the maximum welfare. Therefore, the relative prices of exportable goods increase relatively to those of imported goods.

With regard to the second axis of the literature mentioned above, the underlying idea is to find support measures for oligopolistic industries that promote their competitiveness. In this respect, Meza (1989) argues that the imposition of an IC import barrier allows a country to assert its monopsony power, thus creating a break with protectionist policy. In addition to this measure, the argument of the barter term of trade that consists of taxing exports to encourage the competitiveness of local industries is diametrically

opposed to the export subsidy policy. Thus, it is possible to create customs unions that contribute to improving the welfare of member countries without damaging that of non-members (Long and Soubeyran 1997). To do so, it is sufficient for a country to select a firm that will play the role of price maker. Cockburn et al. (1998) to justify the theoretical ambiguity of international trade in IC argue that a reduction in tariff barriers leads to a reduction in prices in protected sectors (industrial in developing countries) relative to unprotected sectors (agricultural).

Concerning the third group of research which deals with the labor market, the investigations revolve around the effects induced by the malleability of the structure of firms on unemployment. For this purpose, Gersbach and Schniewind (2008) show that in the case of labor mobility between industries, unemployment in the steady state is higher in partial equilibrium than in general equilibrium. The converse is true if the labor factor is immobile. Hennessy and Lapan (2009) prove that taking into account a harmonic price function leads to an improvement in oligopolistic profits, especially since the unit costs of firms are dispersed.

With respect to environmental regulations many studies have attempted to explain the behaviour of firms when they are subject to environmental constraints (Gullì 2009, Mansur 2013, Colacicco 2016, Rentschler et al. 2018). In the case of the imposition of an environmental tax, firms are unable or unwilling to adjust their behaviour and technology in response to the price signals (Rentschler et al. 2018). Gullì (2009) shows that IC makes it harder and more expensive to achieve environmental features. In particular, the author shows that IC can lead to increased pollution in the output market and this propensity is even higher in the input market. Moreover, Colacicco (2016) shows that the optimal tax on emissions can even be negative in a bilateral trade liberalization policy. This trend is closely linked to the concomitant management of people's well-being. In this regard, Mansur (2013) shows that tradeable products can improve well-being in an imperfect competitive market depending on the level of emission tax borne by firms.

With regard to the structure of the endogenous market, the investigations are both theoretical (Etro 2012, Etro 2015) and empirical (Colciago and Rossi 2011, Impullitti et al. 2018). In a theoretical framework, Etro (2012) points out that when the size of demand increases in a market, it attracts new firms, which increases competition, reduces profit margins, and leads to an expansion of production in each firm. Under the assumptions of the constant elasticity of substitution and of competition with the Cournot or the Bertrand, a large market involves the existence of the domestic firms, low prices, and important

productions because of the competition launched by the firms' foreign countries (Etro 2015). From an empirical standpoint, Colciago and Rossi (2011) constructed a flexible price model where market structures and friction in the labour market interact endogenously. They show that technological shocks in the labour markets go through the strategies of interaction between producers and the endogenous entry of firms and they help to understand unemployment and the puzzle of volatility. The authors also show that new firms create large proportions of work and spread faster than mature firms. In this way, Impullitti et al. (2018) show that when trade costs are low, export profits are high as long as firms see their costs lightened for foreign consumers.

However, it must be noted that, despite the various questions that have enmeshed previously, it is rather scare to find studies that have investigated on the implications of trade liberalization in imperfect competition on macroeconomic performance for a country in economic union. It is specifically this flaw that justifies the interest of this study.

3. Methodology

This study is based on a recursive dynamic computable general equilibrium model for Cameroon. The latter is based on a social accounting matrix (SAM) that we build for the year 2016. The basic data for the implementation of this matrix come mainly from the "Tableau des Resources et Emplois" (TRE 2016). There are supplemented by some information drawn from MINFI (2017) as well as national accounts which are an outline to the absence of the table of integrated economic accounts (TCEI 2016)[5]. The SAM after inserting data is then balanced by adopting the cross-entropy method (Fall 2011, Nlemfu 2014). The dynamism of the model derived from that of Hosoe et al. (2010).

3.1 Main accounts of the social accounting matrix

Our matrix consists of 96 accounts. 43 activity accounts[6], 43 product accounts, 4 accounts for institutional agents (salaried households, capitalist households, firms, government), one account for the rest of the world[7], one account for the tariff customs import, and one accumulation account.

[5] Of course, the TAR and TCEI are the main sources of baseline data for constructing a SAM (Fofana 2007).

[6] These branches cover all three sectors including the agricultural sector, industrial, and services (market services and non-market services)

[7] It should be noted here that a distinction is made between the EU and other trading partners in Cameroon in order to fully understand the scenario of dismantling customs barriers to products from the EU

3.2 Equations and functional forms of the model

The basic equations of the model are taken from the PEP (Partnership for Economic Policy) site. For simplicity, let's go into detail about the new equations that describe the behavior of firms in IC.

3.2.1 Market Structure and Pro Competitive Profits

To relate the IC hypothesis to the production behavior, we make the following assumptions:

- There are N firms in the market;
- Each firm produces Q_i quantity of output with $i = 1,2, \dots, N$;
- All firms offer the same units of product i.e. the total market supply is $Q = \sum_i Q_i = NQ_i$;
- There is an identical market situation for each firm $\Omega = \Omega_i = \frac{\partial Q}{Q_i}$.This parameter measures the response of the sector following *i*'s firm production choice;

Thus, the program of each firm based on the profit maximization is written as:

$Max\ \pi_i = PQ_i - TC_i$,

Where P is the market price and TC_i the total cost of the firm[8].

Applying the first order condition gives

$$\frac{d\pi_i}{dQ_i} = 0 \iff \frac{dP}{dQ_i}Q_i + \frac{dQ_i}{dQ_i}P - \frac{dTC_i}{dQ_i} = 0 \iff \frac{dP}{dQ}\frac{dQ}{dQ_i}Q_i + P - mc_i = 0$$

$$\iff \frac{dP}{dQ}Q_i.\Omega_i + P = mc_i \iff P\left(\frac{dP}{dQ}\frac{Q_i}{P}.\Omega_i + 1\right) = mc_i$$

Or $-\frac{dP}{dQ}\frac{Q}{P} = \frac{1}{\epsilon}$ where ϵ refers to the price elasticity of demand for goods. Also, $Q_i = \frac{Q}{N}$

Hence, $P\left(\frac{dP}{dQ}\frac{Q}{NP}\Omega + 1\right) = mc_i \iff P\left(-\frac{1}{N\epsilon}\Omega + 1\right) = mc_i$

$$\iff \quad \frac{P - mc}{P} = \frac{\Omega}{N\epsilon} \tag{1}$$

[8] Note that P is a function of Q that is $P = P(Q)$

Equation (1) indicates that the market power of each oligopolistic firm (left hand side) decreases with the number of firms in the industry and the price elasticity of demand. It can be broken down according to Decaluwé et al. (2001) into two equations, expressing the fact that a branch of activity can sell its products on the domestic market or export them. From that decomposition we get what he calls Lener equations[9] written as follows:

$$\frac{Pd_j - mc_i^d}{Pd_j} = \frac{\Omega}{N_j \epsilon_j^d}$$

$$\frac{Pfob_j - mc_i^E}{Pfob_j} = \frac{\Omega}{N_j \epsilon_j^E}$$

Pd_j representing the market price of the local product j sold on the domestic market; $Pfob_j$ the free on board price for the product j; $N_j$the number of producers in branch j ; $\epsilon_j^d$the price elasticity of the domestic demand of the local product j in absolute value $(0 < \epsilon_j^d < \infty)$; $\epsilon_j^E$the price elasticity of the export demand of the product j in absolute value $0 < \epsilon_j^E < \infty$; $\Omega = \Omega_j$ the power of reaction of the branch j following a modification of the production of firm i; Cm_i^d the marginal cost of production of the product sold on the domestic market; Cm_i^E the marginal cost of production of the exported product.

Given the degree of impact that EPAs are expected to have on local production, we assume that the price elasticity of export demand $\epsilon_j^E$is exogenous in the model and therefore only the price elasticity of domestic demand $\epsilon_j^d$is likely to change. Hence, to link the latter with customs tariff in the model, we adopt the following approach:

$$\epsilon_j^d = -\frac{\delta D_j}{\delta Pd_j}\frac{Pd_j}{D_j} \qquad (4)$$

The behavior of Pd_j is described by:

$$Pd_j = \frac{PC_j Q_j - Pm_j M_j}{D_j} \qquad (5)$$

[9] These equations differ from those of Decaluwé et al. (2001) in that they take into account the conjuncture Ω which aspect is omitted in the latter.

And M_j is defined by $M_j = \left[\left(\frac{\alpha_j}{1-\alpha_j}\right)\left(\frac{Pd_j}{Pm_j}\right)\right]^{\sigma_j} D_j$ (6)

Replacing equation (6) into equation (5), we have:

$$Pd_j\, D_j = PC_j\, Q_j - Pm_j \left[\left(\frac{\alpha_j}{1-\alpha_j}\right)\left(\frac{Pd_j}{Pm_j}\right)\right]^{\sigma_j} D_j$$

$$\Leftrightarrow \quad Pm_j\ \alpha_j{}^{\sigma_j}\ (1-\alpha_j)^{-\sigma_j}\ Pd_j{}^{\sigma_j}\ Pm_j{}^{-\sigma_j}\ D_j + Pd_j\, D_j = PC_jQ_j$$

$$\Leftrightarrow \quad Pd_j{}^{\sigma_j}\ (1-\alpha_j)^{-\sigma_j}\ \left[\alpha_j{}^{\sigma_j}\ Pm_j{}^{1-\sigma_j} + (1-\alpha_j)^{\sigma_j}\ Pd_j{}^{1-\sigma_j}\ \right]D_j = PC_jQ_j$$

$$\Leftrightarrow D_j = (1-\alpha_j)^{\sigma_j}\, Pd_j{}^{-\sigma_j}\left[\alpha_j{}^{\sigma_j}\ Pm_j{}^{1-\sigma_j} + (-\alpha_j)^{\sigma_j}\ Pd_j{}^{1-\sigma_j}\ \right]^{-1} PC_jQ_j \quad (7)$$

The derivative of D_j with respect to Pd_j, in expression (7) gives:

$$\frac{\delta D_j}{\delta Pd_j} = (1-\alpha_j)^{\sigma_j}\, PC_jQ_j\,.\Big[-\sigma_j\, Pd_j{}^{-\sigma_j-1}\left[\alpha_j{}^{\sigma_j}\ Pm_j{}^{1-\sigma_j} + (1-\alpha_j)^{\sigma_j}\ Pd_j{}^{1-\sigma_j}\ \right]^{-1} - Pd_j{}^{-\sigma_j}(1-\alpha_j)^{\sigma_j}\big(1-\sigma_j\big)\ Pd_j{}^{-\sigma_j}\left[\alpha_j{}^{\sigma_j}\ Pm_j{}^{1-\sigma_j} + (1-\alpha_j)^{\sigma_j}\ Pd_j{}^{1-\sigma_j}\ \right]^{-2}\Big]$$

$$= (1-\alpha_j)^{\sigma_j}\, Pd_j{}^{-\sigma_j}\left[\alpha_j{}^{\sigma_j}\ Pm_j{}^{1-\sigma_j} + (1-\alpha_j)^{\sigma_j}\ Pd_j{}^{1-\sigma_j}\ \right]^{-1} PC_jQ_j\,.\Big[-\sigma_j\, Pd_j{}^{-1} - \big(1-\sigma_j\big)\,(1-\alpha_j)^{\sigma_j}\, Pd_j{}^{-\sigma_j}\left[\alpha_j{}^{\sigma_j}\ Pm_j{}^{1-\sigma_j} + (1-\alpha_j)^{\sigma_j}\ Pd_j{}^{1-\sigma_j}\ \right]^{-1}\Big]$$

$$= -D_j.\left[\sigma_j\ Pd_j{}^{-1} + \left(1-\sigma_j\right)(1-\alpha_j)^{\sigma_j}\ Pd_j{}^{-\sigma_j}\left[\alpha_j{}^{\sigma_j}\ \ Pm_j{}^{1-\sigma_j} + (1-\right.\right.$$
$$\left.\left.\alpha_j)^{\sigma_j}\ \ Pd_j{}^{1-\sigma_j}\ \right]^{-1}\right]$$

Hence, equation (4) becomes:

$$\epsilon_j^d = -\frac{\delta D_j}{\delta Pd_j}\frac{Pd_j}{D_j}$$

$$= Pd_j\left[\sigma_j\ Pd_j{}^{-1} + \left(1-\sigma_j\right)\ (1-\alpha_j)^{\sigma_j}\ \ Pd_j{}^{-\sigma_j}\left[\alpha_j{}^{\sigma_j}\ \ Pm_j{}^{1-\sigma_j} + (1-\right.\right.$$
$$\left.\left.\alpha_j)^{\sigma_j}\ \ Pd_j{}^{1-\sigma_j}\ \right]^{-1}\right]$$

$$= \sigma_j + \left(1-\sigma_j\right)(1$$
$$-\alpha_j)^{\sigma_j}\ \ Pd_j{}^{1-\sigma_j}\left[\alpha_j{}^{\sigma_j}\ \ Pm_j{}^{1-\sigma_j} + (1\right.$$
$$\left.-\alpha_j)^{\sigma_j}\ \ Pd_j{}^{1-\sigma_j}\ \right]^{-1}$$

Or $\epsilon_j^d = \sigma_j + \left(1-\sigma_j\right)\frac{(1-\alpha_j)^{\sigma_j}\ \ Pd_j{}^{1-\sigma_j}}{\alpha_j{}^{\sigma_j}\ Pm_j{}^{1-\sigma_j} + (1-\alpha_j)^{\sigma_j}\ Pd_j{}^{1-\sigma_j}}$ (8)

σ_j in the previous equation represents the trade elasticity of substitution defined by:

$\sigma_j = \frac{1}{\rho_j+1}$

3.2.2 By what channel does this equation affect the original perfect competition model?

Let us start from the following equation (9) which illustrates the behavior of the import price of goods on the domestic market.

$$PM_{tr} = PWM_{tr}.E.(1 + TX_{tr}).(1 + TM_{tr}) \quad (9)$$

Linked to that equation, the behavior of tariff revenue throughout the UE is illustrated:

$$TIMUE_{tr} = M_{tr} * TM_{tr} * TMUE_{tr} * PWM_{tr} \quad (10)$$

Since $tr \subset j$ [10]the application of EPA described in equation (10) negatively affects the tariff TM_{tr} which affects the price import of goods PM_{tr}.

Concerning the elasticity $\epsilon_j^d$of equation (8), it indicates that EPA application leads to an increase of the elasticity of demand since Pm_j is decreasing consequently.

Beyond these equations illustrating the behavior of IC firms, Cockburn et al. (1998) emphasize the importance of studying them by assuming increasing return to scale. They argue that trade liberalization reduces but does not eliminate the market power of local firms, bypassing then Armington's assumption on imperfect substitutability between local and imported products. For this reason, it must be assumed that IC is linked to institutional or technological barriers to entry. This is implicitly validating the argument of increasing economies of scale.

Taking into account the increasing economies of scale as described by Cockburn et al. (1998) like the above description amounts to considering that the firm bears a fixed capital cost (KF_i) and a variable cost (KV_i). The latter being related to the number of firms in the branch (N_i). This link is highlighted in equation (11) below:

$$KV_i = Kd_i - N_i\, KF_i \quad (11)$$

Finally, the profits of the oligopolistic branch are treated residually as the difference between the value of oligopoly production and the cost of production inputs illustrated by the following equation (12):

[10] Only commercial services are concerned here because they are not the object of international trade

$$PR_i = P_i XS_i - \sum_j Pl_j\, DI_{ij} - wLd_i - r_i Kd_i \quad (12)$$

Hence, the total cost of the enterprise is defined by:

$$TC_i = \sum_j Pl_j\, DI_{ij} - wLd_i - r_i Kd_i \quad (13)$$

Where PR_i is the profit, P_i the producer price of the product i, XS_i the total production of the branch, Pl_i the producer price of product j to be sole on the domestic market, DI_{ij} the intermediate demand for the product i by the branch j, w the wage rate, r_i the capital rate of return in the branch i, Ld_i the labor demand by the branch i, Kd_i capital demand by branch i.

In sum, the equations which illustrate the IC are: $(2), (3), (8), (11), (12), (13)$.

3.2.3 Calibration of the model

For simplification, we present only the calibration of the new equations above. But, rather than calibrating the parameters, the concern here is to determine the basic values for the following parameters: ϵ_j^{d0}, ϵ_j^{E0}, $CT0_i$, $mcd0_i$, $mce0_i$, $KV0_i$, $KF0_i$. However, this exercise is possible if for a given equation, the values of all the other components except the desired parameter are known. Some of the equations above do not meet this condition. This is for example the case for equation (11) which allows to determine $KV0_i$ while N and $KF0_i$ are unknown. To overcome this, most studies propose to calibrate N so that equations (2) and (3) are respected (see Cockburn et al. 1998, for example). However, it may happen that the value after calibration of N does not reflect the actual number of firms in the industry. That is why given some criteria related to oligopolistic enterprises in Cameroon, we have selected $N = 30$. The price elasticity demand with exports ϵ_j^{E0} being assumed to be exogenous, we have assigned it for all branches the high absolute value of 56. Indeed, Decaluwé et al. (2001), while retaining the value of 20, justify in the case of Tunisia that the adoption of such an option makes it possible to take into account the low market power of exports when this is the case. And Cameroon does not derogate from this rule for the moment. Also, the value of Ω is fixed, thus varying from 1 to N. Recall that $\Omega = 0$ brings us back to the situation of perfect competition, $\Omega = 1$ corresponds to a Cournot conjecture, and $\Omega = N$ describes the situation of monopoly

or perfect collusion. In the framework of this study, we conduct three simulations on Ω for the respective values of $1, 2,$ and N.

For the rest of the parameters, their values are calculated from the following equations: of course, the parameters of the straight member are known beforehand.

$$\epsilon_j^{d0} = \sigma_j + \left(1 - \sigma_j\right) \frac{(1-\alpha_j)^{\sigma_j} \ Pd0_j^{\,1-\sigma_j}}{\alpha_j^{\sigma_j} \ Pm0_j^{\,1-\sigma_j} + (1-\alpha_j)^{\sigma_j} \ Pd0_j^{\,1-\sigma_j}} \tag{14}$$

$$mcd0_i = \ Pd0_i \left(1 - \frac{\Omega}{N \, \epsilon_j^{d0}}\right) \tag{15}$$

$$mce0_i = \ Pm0_i \left(1 - \frac{\Omega}{N \, \epsilon_j^{E0}}\right) \tag{16}$$

$$TC0_i = w0 \ Ld0_i + r0_i \ Kd0_i + \sum_j Pl0_j \ DI0_{ij} \tag{17}$$

$$PR0_i = P0_i \ XS0_i - \sum_j Pl0_j \ DI0_{ij} - w0 \ Ld0_i - r0_i \ Kd0_i \tag{18}$$

$$KV0_i = Kd0_i - N_i \ KF0_i \tag{19}$$

In Table 1 below, we present the values of some of these parameters after calibration using the GAMS software. The marginal costs are given for $\Omega \ = \ N$.

Table 1: Parameter Values

Activities	$\boldsymbol{\epsilon_j^{d0}}$	$\boldsymbol{PR0_i}$	$\boldsymbol{mcd0_i}$	$\boldsymbol{mce0_i}$
Agricultural products	1.911	-135.706	0.479	1.073
Livestock and hunting products	1.988	-11.407	0.559	1.231
Silvicultural products	1.976	5.391	0.706	1.647
Fishery and fish farming products	1.986	9.999	0.496	0.962
Energy products	0.675	66.614	-0.482	1.308
Other extraction products	0.546	-24.717	-1.096	1.454
Meat and fish	1.986	57.643	0.508	1.165
Grain and product work products	1.983	19.848	0.500	1.140

Cocoa, tea and sugar products	1.996	-35.866	0.534	1.144
Oilseeds and animal feed	1.985	7.875	0.503	1.005
Cereal products	1.985	61.236	0.503	0.977
Dairy products, fruit products	1.981	0.973	0.553	1.329
Drinks	1.992	11.679	0.674	1.690
Tobacco products	1.000	0.361	0.000	1.903
Products of the textile industry	1.018	62.675	0.021	1.188
Leather and shoes	1.989	5.614	0.592	1.204
Woodworking products and articles	0.909	-88.106	-0.131	1.583
Paper and cardboard, printed and printed products	1.987	-1.949	0.497	1.034
Refining, coking products	1.999	80.049	1.050	2.226
Chemical products	0.652	-18.000	-0.663	1.577
Rubber and plastic products	0.801	2.110	-0.322	1.412
Other non-metallic mineral products	1.982	18.782	0.676	1.571
Basic metal products and articles of metal	0.648	-113.322	-0.726	1.429
Machinery, electrical appliances and equipment	0.738	-0.169	-0.423	1.261
Audio-visual equipment and devices	1.981	-8.573	0.661	1.409
Transport equipment	0.727	4.376	-0.479	1.345
Furniture, products of various industries and services	1.983	77.934	0.538	1.083
Repair and installation of machines	1.958	5.482	0.489	0.960
Electricity and energy support	1.981	18.620	0.592	1.147
Water and sanitation	1.980	1.567	0.750	1.455
Construction work	1.989	193.714	0.499	0.962
Repair and maintenance of vehicles and motorcycles	1.182	-1.843	0.154	0.960
Hotel and restaurant services	1.991	172.033	0.567	1.202
Transportation and warehousing	1.985	78.504	0.603	1.166
Information and Communications Services	1.182	90.817	0.257	1.764

Financial services	1.970	-122.411	0.602	2.487
Estate services	1.977	53.036	0.679	1.409
Professional, Scientific and Technological Services	1.978	-108.329	0.494	0.960

Source: authors

Remind that, ϵ_j^{d0} represents the price elasticity of domestic demand, $PR0_i$ the profit of the oligopolistic branch considered residual, $mcd0_i$ the marginal cost of production of the product i sold on the domestic market, $mce0_i$ the marginal cost of production of i's product exported.

4. Results and Interpretation

We first present the results for 2016 according to three selected values of Ω before returning to the indicators most likely to be affected (Decaluwé et al. 2001).

4.1 Results of the base year

The results presented in this section are those of the impact for 2016, the year from which the process of dismantling customs barriers has begun.

Table 2 shows in general that, the impact increases as omega is increasing respectively to 1, 2 and 3. This means that the closer the market situation gets to the monopoly, the greater the losses to the economy. It is therefore desirable that the oligopoly be at its absolute that is being in perfect competition market[11]. The second observation is that the impact is negative for most branches. This is indicative of possible losses, which will be discussed in detail later in Section 4.3.

Considering Table 3, which presents the results on the indicators that state the behavior of the economy, it appears that the EPA would generate losses more than 0.18% of GDP growth in 2016. These losses increase when the market power, omega increases that is when one tends towards a monopoly situation. The same downward trend is followed by the indicators wage rate and dividends paid to the capitalist households, whose impact starting from -0.44% and -0.32% respectively reaches in case of monopoly -

[11] Recall that perfect competition is described in this situation for $\Omega = 0$ and that for $\Omega = N = 30$ we are in monopoly or perfect collusion.

1.14% and -0, 34%. Four indicators benefit from the EPA: corporate income, government savings, direct business income tax and the exchange rate.

Table 2: Impacts of the EPA on the elasticity of domestic demand for 2016 according to the values of $\Omega = 1$; $\Omega = 2, \Omega = N = 30$ (value in %)

Activity branches	**Elasticity of domestic demand (ϵ_j^{d0})**		
	$\boldsymbol{\Omega = 1}$	$\boldsymbol{\Omega = 2}$	$\boldsymbol{\Omega = 30}$
Agricultural products	-0.02	-0.20	-0.20
Livestock and hunting products	-0.04	-0.20	-0.18
Silvicultural products	1.27	-0.02	-1.55
Fishery and fish farming products	-0.04	-0.18	-0.20
Energy products	-0.20	0.04	-0.34
Other extraction products	0.01	0.65	-0.23
Meat and fish	-0.05	-0.18	-0.19
Grain and product work products	-0.02	-0.30	-0.34
Cocoa, tea and sugar products	-0.01	-0.18	-0.22
Oilseeds and animal feed	-0.13	-0.28	-0.13
Cereal products	-0.01	-0.28	-0.26
Dairy products, fruit products	-0.04	-0.24	-0.18
Drinks	0.01	-0.18	-0.18
Tobacco products	0.00	0.00	0.00
Products of the textile industry	0.00	-0.19	-0.19
Leather and shoes	-0.03	-0.33	-0.28
Woodworking products and articles	0.00	-0.20	-0.14
Paper and cardboard, printed and printed products	-0.03	-0.24	-0.22
Refining, coking products	0.00	-0.19	-0.18
Chemical products	0.21	-0.17	-0.02
Rubber and plastic products	-0.21	-0.29	0.00

Other non-metallic mineral products	0.31	-0.02	-0.75
Basic metal products and articles of metal	-0.10	-0.18	-0.66
Machinery, electrical appliances and equipment	-0.15	-0.17	-0.28
Audio-visual equipment and devices	-0.06	-0.15	-0.23
Transport equipment	-0.07	-0.20	-0.21
Furniture, products of various industries and services	-0.10	-0.23	-0.22
Repair and installation of machines	-4.01	-29.12	-34.64
Electricity and energy support	-0.60	6.57	-2.20
Water and sanitation	-6.80	1.29	-8.69
Construction work	2.35	-5.04	-8.98
Repair and maintenance of vehicles and motorcycles	0.97	-0.43	1.88
Hotel and restaurant services	0.25	-0.12	-0.15
Transportation and warehousing	-10.66	2.04	-3.13
Information and Communications Services	0.09	-0.23	-0.18
Financial services	0.26	-0.14	-0.03
Estate services	0.66	0.36	2.41
Professional, Scientific and Technological Services	-0.96	22.15	-5.73

Source: authors

Table 3: Impact on some indicators for 2016 (%)

Variables	$\boldsymbol{\Omega = 1}$	$\boldsymbol{\Omega = 2}$	$\boldsymbol{\Omega = 30}$
GDP	-0.18	-0.22	-0.24
Firms' revenue	0.35	-0.04	0.00
Government saving	0.02	-0.19	-0.16
Firm's saving	1.32	0.05	0.47
Direct tax on firms' revenue	0.32	-0.09	0.01
Wage rate	-0.44	-0.56	-1.14
Dividend receipted by capitalist households	-0.32	-0.24	-0.34

Exchange rate	33.64	9.84	15.15

Source: authors

4.2 Impacts over the period 2016-2040

To simplify the presentation, we have devised our horizon into three sub periods. The first one goes from 2016 to 2023, the second one from 2024 to 2032, and the last period goes from 2033 to 2340. The results correspond to $\Omega = 1$.

Results are exposed in two ways. Table 4 to Table 17 present the results of the aggregated impact according to the different sectors (agricultural, industrial, private services and government services). Tables 20 and Table 21 in appendices tell us about impact within each branch.

For the moment, let's report on aggregated results. Table 4 shows the results of EPA on Cameroonian production. The agricultural sector is expanding by 0.57% during the first period (2016-2023) before contracting over the last two periods (2024-2032 and 2033-2040) with respective rates of -0.15% and -0.34%. The expansion of the first period can be explained by two factors: first the *total value added of the branch* shown in Table 5 which increases by 0.17%. The latter results from the remuneration of labor and capital factors perceived by salaried and capitalist's households indicated in Table 7 and Table 8 respectively. The labor demand by salaried households increases by 0.16%, although at the same time a contraction of capital of 0.62% is observed. But, the weakness of capital in the economy reduces its effect on output, which is largely driven by labor. The second source is the *total intermediate consumption of the branches* presented in Table 6. The latter, which increases by 0.34%, includes production inputs from the agriculture sector, which may consist of agricultural products, industrial products and services[12].

From the second period, production decreases. This leads to the contraction of the agricultural sector, initially by 0.15% at the second period and then by 0.34% at the last period. This contraction is also justified by the resources which are declining for the value added up to -1.08%. As a result, the contraction of the agricultural sector is in favor of the industrial sector. Indeed, the expansion experienced by this sector is 0.19% in the first period, 1.31% in the second period and 1.22% in the third period. It must be

[12] See Decaluwé et al. (2001) pages 109 to 125 on reading the elements of a SAM for more details

noted, however, that this result is contrary to the theory which provides for a contraction of the agricultural sector for an expansion of the industrial sector.

To understand such a contradiction, the government document "vision 2035", written in 2007, indicates that to achieve the objective of emergency of the country by 2035, industrial sector must contribute more than agricultural sector to the GDP. Indeed, it is expected in that document that the contribution of 18.5% for the industrial sector to GDP in 2007, against 44% for the agricultural sector, will increase to 28.3% by 2035 while the agricultural sector will see its contribution fall from 44% to 26.9% between these two dates.

Let's now report the results of Table 20 in the appendix which presents the detailed impacts on production as well as value added by branch[13]. It shows that the contraction in the agricultural sector is due to the negative impact observed in the C1 account of agricultural products. This branch appears to be the only one to suffer from a negative impact which goes from -0.18% to -1.88% between the first two periods, then to -2.02% during the third period. On the other hand, accounts C2 to C4 (livestock and hunting products, forestry products, fishery and fish farming products), which include the rest of the activities of the primary sector, are positively affected by the EPA with impacts of up to 9.29% for fishery and fish products. Although surprising, the agricultural products branch with a smaller impact contributes alone to the contraction of primary sector activities. This is due to the wide range of products in this branch compared to nearest branches. In addition, the value added of the branch contributes practically in the same direction to the formation of this result. But agricultural products are experiencing a decline in value added, which is increasing. This means that we will see in time a contraction of wages, dividends paid to capitalist households in the agricultural sector.

With regard to the details of the activities of the industrial sector, they are expanding. This is due to the expansion in 13 branches against 13 branches also that negatively receive the shock of the EPA. Among the virtuous branches, the most pronounced are branches of extraction products (C6), tobacco products (C14), products published and printed (C18), furniture (C27), product grain milling (C8), meat and fish (C7), cereal products (C11), oilseeds and animal feeds. On the other hand, the sectors most in difficulty are: branches of electrical machinery and apparatus (C24), fruit-based dairy products (C12), woodworking products and articles (C17), water and sanitation (C30), electricity and energy carriers (C29).

[13] We recall that 43 branches are concerned here

In the private services sector (accounts C31 to C38), 3 branches against 6 are positively affected by the shock of the EPA. These are construction (C31), transportation and storage (C24) and professional scientific and technological services (C38). On the other hand, this agreement will undermine branches such as information and communication services (C35), repair and maintenance of vehicles and motorcycles (C32), water and sanitation services (C30), air traffic control services, hotels and restaurants (C33), estate services (C37) and financial services (C36).

For government services, the branches of education (C40) as well as health and social services (C41) will be in difficulty while the public administration and security services (C39), with the other administrative services (C42) will have a positive impact.

Table 4: Production Impacts by Sector: aggregated results (value in %)

Sectors	**2016-2023**	**2024-2032**	**2033-2040**
Agriculture	0.57	-0.15	-0.34
Industry	0.19	1.31	1.22
Private Service	-0.42	-0.87	-0.86
Public Services	0.02	-0.05	-0.07

Source: calculations of authors from GAMS software results

Table 5: Impact on value added by sector: aggregated results (value in %)

Sectors	**2016-2023**	**2024-2032**	**2033-2040**
Agriculture	0.17	-0.96	-1.08
Industry	-1.99	-2.05	-2.42
Private Service	-0.62	-1.13	-0.96
Public Services	-0.16	-0.41	-0.31

Source: calculations of authors from GAMS software results

Table 6: Impact on total intermediate consumption of branches: aggregated results (value in %)

Sectors	2016-2023	2024-2032	2033-2040
Agriculture	0.34	0.31	-0.12
Industry	2.95	6.52	6.71
Private Service	-2.04	-3.80	-3.98
Public Services	-3.12	-4.20	-4.91

Source: calculations of authors from GAMS software results

Table 7: Impact labor demand: aggregated results (value in %)

Sectors	2016-2023	2024-2032	2033-2040
Agriculture	0.16	0.39	0.44
Industry	0.39	0.71	0.78
Private Service	-0.23	-0.47	-0.60
Public Services	-0.12	-0.21	-0.11

Source: calculations of authors from GAMS software results

Table 8: Impact on capital demand: aggregated results (value in %)

Sectors	2016-2023	2024-2032	2033-2040
Agriculture	-0.62	-7.44	-8.60
Industry	-18.48	-14.08	-26.33
Private Service	-3.49	-5.64	-3.06

Source: calculations of authors from GAMS software results

Table 9: Impact on imports: aggregated results (value in %)

Sectors	2016-2023	2024-2032	2033-2040
Agriculture	0.20	-0.58	-1.20
Industry	-0.40	0.33	0.37
Private Service	31.90	31.43	53.18

Source: calculations of authors from GAMS software results

Table 10: Impacts on exports: aggregated results (value in %)

Sectors	2016-2023	2024-2032	2033-2040
Agriculture	-5.27	-11.87	-13.42
Industry	-4.17	-4.44	-5.42
Private Services	-6.92	-16.63	-20.29

Source: calculations of authors from GAMS software results

Table 11: Impact on households' consumption: aggregated results (value in %)

Sectors	2016-2023	2024-2032	2033-2040
Agriculture	-2.39	-3.94	-3.98
Industry	-4.08	-6.52	-7.05
Private Services	1.20	1.86	1.43

Source: calculations of authors from GAMS software results

Table 12: Impact on demand for products: aggregated results (value in %)

Sectors	2016-2023	2024-2032	2033-2040
Agriculture	3.42	5.44	5.64
Industry	2.23	3.78	4.15
Private Services	-0.53	-0.47	0.05

Source: calculations of authors from GAMS software results

Table 13: Impacts sur la demande composite de produits : résultats agrégés (valeurs en %)

Sectors	2016-2023	2024-2032	2033-2040
Agriculture	-0.05	-0.48	-0.50
Industry	0.04	0.18	0.12
Private Services	0.01	0.00	-0.04

Source: calculations of authors from GAMS software results

Table 14: Impact on price to producer: aggregated results (value in %)

Sectors	2016-2023	2024-2032	2033-2040
Agriculture	2.27	5.12	5.88
Industry	-4.35	-5.39	-13.93
Private Services	-0.59	-2.65	-3.20

Source: calculations of authors from GAMS software results

Table 15: Impacts on the importation price of goods: aggregated results (value in %)

Sectors	2016-2023	2024-2032	2033-2040
Agriculture	-4.49	-13.47	-18.27
Industry	14.54	7.33	5.20
Private Services	-19.79	-23.29	-34.78

Source: calculations of authors from GAMS software results

Table 16: Impact on producer price for the domestic selling: aggregated results (value in %)

Sectors	2016-2023	2024-2032	2033-2040
Agriculture	3.61	7.58	6.87
Industry	2.35	4.78	3.49
Private Services	1.49	2.28	2.96

Source: calculations of authors from GAMS software results

Table 17: Impact on the oligopolistic firms' profit: aggregated results (value in %)

Sectors	2016-2023	2024-2032	2033-2040
Agriculture	-3.75	-9.33	-9.89
Industry	20.86	37.79	35.12
Private Services	-5.51	-16.55	-21.53

Source: calculations of authors from GAMS software results

To understand what is happening in terms of trade. Let's start from the analysis of the behavior of oligopolistic firms which by their commercial weight could make rush to the products from the European Union.

Indeed, Table 14 shows that producer prices in the agricultural sector increase over the three periods (from 2.27% to 5.12% and then to 5.88% respectively). This means that these firms to challenge foreign products will be forced to improve the quality of their products. Consequently, they bear an additional cost, which is partly reflected in the growing market price at rates of 3.61%, 8.58% and 6.87% over the three periods. In spite of all efforts, the domestic supply of agricultural products decreases as presented above. Finally, these firms suffer from a decrease in profit of 3.75%, 9.33% and 9.89% respectively. Beyond this pattern, Table 15 shows a continuous decline in the price of imported products, which explains the rise in imports of agricultural products of 0.20% over the period 2016-2023, as illustrated by the results of Table 9.

Domestic and foreign supplies also reduce the demand for composite goods while the demand for local products increases. This reflects a certain preference that consumers could show for local goods as a result of the efforts of oligopolistic firms to deal with foreign products. But, despite that, the decline in household final consumption as shown in Table 11 could be seen as a direct result of higher local market prices. These trends contribute to the conclusion that the EPA undermines oligopolistic firms in their strategies of conquest and the maintenance of market power.

To understand what is happening in the industry sector, let's first report to the results of Table 17 which show that the profits of firms increase by 20.86%, 37.79% and 35.12% respectively over the three periods. This result comes from a series of mechanisms that takes place from the increase in the import price (Table 14) while the producer price decreases continuously over the three periods (-4.35%, -5.39% and -13.93%). This reduction has a positive effect on production costs and given the oligopolistic power of firms, they manage to increase the price on the market but more slowly than the increase in prices of imported products on the domestic market (2.35%, 4.78% and 3.49% against 14.54%, 7.33% and 5.20%).

On the demand side of composite goods, it increases at the same time as local demand, albeit slightly (see Tables 12 and 13). We can deduce here that consumer demand is largely driven by local products as presented above and therefore strongly contributes to the profit formation of oligopolistic firms.

These trends can be justified by triggering the effects of the structuring projects implemented by the government since 2009 such as the hydroelectric dams, gas-fired power plants and deep-water ports of Kribi.

On the service side, although not very pronounced in a context marked by the IC, it appears however that their imports are increasing strongly to the detriment of local production. Table 9 shows a growth in net services imports of 31.90%, 31.43% and 53.18% over the three periods, while the productive capacity although marginal, declined in the last two periods by 0.05% and 0.07% after a slight improvement of 0.02% in the first period. This is a logical consequence of the decline in the prices of services imports as shown in Table 15, to the detriment of the producer price for sale in the domestic market.

It follows that the activities of this sector will be undermined. Moreover, the decline in profit as shown in Table 17 is a perfect illustration. This behavior is strongly linked to the expansion of estate services, which are experiencing almost exponential growth as shown in Table 21. This explains the increase in household consumption of 1.20%, 1.86% and 1.43% even though local demand as a composite is marginal.

Now let's look at what's happening on the export side. The first observation is that all sectors suffer from a considerable and increasing decline over time (see Table 10). This behavior is not surprising when production was already losing momentum, especially for agricultural products and services (private and public). The only effort observed in the production of industrial goods is stifled in terms of local competitiveness between imported products and those of local firms. For illustration, we have already hammered it higher; substitutes for local industrial products suffer from a significant drop in prices once on the Cameroonian market. And it is not less the decline in profits of oligopolistic firms that is the cause. There is also a clear understanding of the role that local product demand has played in lowering these exports.

4.3 Impacts in terms of losses and earnings

In this section, we describe the Earnings and losses resulting from the application of the EPA over the 2016-2040 periods. Table 18 presents the comparative results in perfect competition and in IC.

Let’s start by noting that 11 indicators in Table 18 have reversed their trend once the IC hypothesis is highlighted that is a change of more than 42%.

The losses that were attributed to the GDP in perfect competition of 1381.10 billion of CFAF are amplified in IC up to 1474.13 billion of CFAF. Hence, the IC with a considerable number of oligopolistic companies (omega taking the value 1) has caused to the economy an additional loss of 93 billion of CFAF. This reveals that the deployment of oligopolistic firms on the Cameroonian market as it is currently perceived does not favor its development. Incentive conditions for a multiplication of firms in a given activity sector by government support could in this respect help to reduce or even reverse the trend, thus putting the economy on the desirable growth path.

Household consumption, which grew at an average annual rate of 0.73% in perfect competition, is now decreasing at a rate of 3.11%. This result is logically due to the reduction in disposable income of households by 85 billion of CFAF. Indeed, given the exogenous character of disposable income as well as household savings in our model, the household consumption can only increase through the price channel of goods on the market. And Table 15 clearly shows how the prices of imported goods on the local market as well as the price of locally manufactured goods are increasing.

It is also observed that the demand for products is increasing and, in this respect, the detail we did in section 4.2 remains constant. What need further attention is the concomitant losses associated with export volumes as well as imports. The IC by the power of oligopolistic firms reduces the weight of foreign products arriving in Cameroon. We are witnessing an amplification of the current deficit of -5982.70 billion of CFAF.

Among the losses in customs revenue, they increase with the IC and those due to the application of the EPA amount to 1008.19 billion of CFAF compared to losses of 237.42 billion of CFAF.

Table 18: Earnings and losses due to the EPA between 2016 and 2040

Variables	Perfect competition		Inperfect competition	
	Total variation †	Average rate (%)	Total variation †	Average rate (%)
Households' consumption (salaried and capitalists)	1781.82	0.73*	-7552.30	-3.11**
Total intermediate consumption of branches	-465.15	-0.68**	363.72	0.53*
Demand for Product	-2158.76	-0.82**	4555.55	1.73*
Intermediate demand for Product	-506.95	-0.74**	400.10	0.59*
Total Investment	-96.40	-0.15**	35.24	0.05*
Dividends paid to capitalist households	39.35	0.14*	-95.10	-0.34**

Exchange rate		1.87*		28.22*
Exports	-703.27	-0.88**	-6206.53	-7.75**
Imports	47.17	0.04*	-223.83	-0.17**
Courant balance	-750.43	*	-5982.70	*
Investment demand for Product	-297.10	-0.53**	-897.15	-1.59**
Capital demand in the economy	-1164.75	-3.63**	-2733.73	-8.53**
Labor demand in the economy	9.38	0.00*	81.75	0.03*
Market price for Product		15.53		-21.52
Price for exportable Product		-2.17		-9.18
Price consumption index for households		-7.38		-48.01
Prices of products sold by producers in the local market		0.42		3.67
Prices of imported products on the local market		-24.87		27.35
Producer price of locally made products		-0.21		-5.22
Value-added price throughout the economy		-0.26		-27.06
World price for imports of products		-2.69		-20.91
Demand for composite products	-36.23	-0.01**	-33.43	-0.01**
Government savings	-0.12	0.00**	5.94	0.02*
Revenue from Direct Tax	-4.47	-0.13**	8.23	0.24*
Revenue from indirect tax on products	319.22	0.46*	2382.43	3.45*
Customs revenue without cancellation of the customs tariff towards the EU	-380.89	-1.64**	-2441.97	-10.49**
Customs revenue from imports from the rest of the world	-143.47	-0.89**	-1433.77	-8.94**
Customs revenue lost due to EPAs	-237.42		-1008.19	*
Total production throughout the economy	-2477.81	-0.62**	4.90	0.00*
Household disposable income (employees and capitalists)	-5.56	0.00**	-85.07	-0.02**
Real household income (employees and capitalists)	-2.46	0.00**	-59.02	-0.02**
Firms' revenue	-50.72	-0.14**	86.51	0.23*
Total value added	-1371.40	-0.39**	-3622.78	-1.03**
Gross Domestic Product	-1381.10	-0.16**	-1474.13	-0.17**

*earnings, **loss, † total variation in billions of CFAF

Source: calculations of authors from GAMS software results

4.4 Impacts on well-being

On a theoretical level, the dismantling of customs barriers in IC can lead to the reduction of welfare. Table 19 below shows the results found in perfect competition by including those in IC according to the different

values of Ω. Globally, Well-being decreases as the market moves towards a monopoly position. Indeed, it appears that well-being is deteriorating from $\Omega = 2$. And in monopoly the losses in well-being are most screaming. This result shows that IC deteriorates and amplifies well-being. This is due to the fact that the declining in domestic market prices as expected by trade liberalization is marginal and they somewhat tend to increase. The justification of this tendency is based on the fact that oligopolistic firms by their efforts are able to offer products competing with those imported.

Table 19: Impacts on household well-being

Households	**Equivalent variation (value in billions of CFAF)**		
	2016-2023	2024-2032	2033-2040
Perfect competition			
Salaried households	81.35	120.84	290.45
Capitalist households	7.32	10.35	26.52
Cournot situation ($\Omega = 1$)			
Salaried households	15.08	59.10	575.92
Capitalist households	3.18	13.61	59.31
Situation for $\Omega = 2$			
Salaried households	-45.86	-86.75	-117.62
Capitalist households	-9.16	-15.70	-20.76
Collusion situation ($\Omega = N = 30$)			
Salaried households	-3.23	-188.00	-251.79
Capitalist households	-1.19	-15.88	-22.60

Source: calculations of authors from GAMS software results

5. Conclusion

In this study we have raised the problematic of the implication of trade liberalization on economic performance in imperfect competition for a country in economic union, particularly for Cameroon. Indeed, Decaluwé et al. (2001) stress the need to take into account the behavior of oligopolistic firms in the study of trade liberalization. Ignorance of this aspect of the phenomenon may not only lead to underestimate the

results but also the reallocations of resources between production activities may be misunderstood. Much more, according to the economic memorandum (2016), 31% of Cameroonian companies operate in IC. This observation is not, however, a singularity of the Cameroonian economy, because in general IC is pronounced in most developing economies (Cockburn et al. 1998). By validating this hypothesis in the context of the Cameroon-European Union bilateral economic partnership agreement in a dynamic computable general equilibrium model, it appears that: the losses in growth which estimated at 1381.10 billion of CFAF between 2016 and 2040 in perfect competition are amplified more in IC. They amount to 1474.13 billion of CFAF. This indicates that the deployment of oligopolistic firms on the Cameroonian market as it is currently perceived does not favor its development. Incentive conditions for a proliferation of firms in a sector of activity accompanied by government support could in this respect help to reduce or even reverse the trend. Thus, putting the economy back on the path of growth that is desirable. The losses in customs revenue amount to more than 1008 billion of CFAF against 237.42 billion recorded in perfect competition. It also appears that the welfare of households deteriorates when the market is strongly under monopoly power. With regard to trade, it appears that exports and agricultural products continue to fall while imports of industrial products increase. Meanwhile, production is declining in both agriculture and services. All these results combine to conclude that the Cameroon EPA constitutes more of a risk than an opportunity for the latter.

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