

**Helmuth Yesid
Arias Gómez**

Corresponding Author

Czech Technical University in Prague,
Masaryk Institute of Advanced Studies,
Institute of Economic Studies,
Czech Republic

✉ ariashel@cvut.cz

Gabriela Antošová

Academy of Humanitas in Sosnowiec,
Sosnowiec,
Poland

✉ gabriela.antosova@humanitas.edu.pl

Management of a Strategic Policy, Exports and External Performance of the Colombian Regions

Summary: In terms of international trade, normative economics outrightly inspired the implementation of the economic policy. The classical and neoclassical interpretations of trade advocate for the full development of an export profile consistent with comparative advantage and endowments. In contrast, the new trade theory properly matches the implementation of a strategic trade policy. This article aims to hurl the theoretical discussion about the comparative advantages and the endowments-based export pattern into the regional export performance of Colombian departments. In doing so, some theoretical bedrocks are highlighted, and a panel data technique is run for modeling the essence of regional exports. The conclusion reinforces the arguments of several authors asserting a raw material predominance in Colombian exports and the strong reliance on endowments of the Colombian department exports. Some ideas suggest the plausibility of a currently missing strategy of an explicit productive development policy or, in other words, the implementation of a Colombian-tailored strategic trade policy.

Keywords: Regional exports, Comparative advantages, Endowments, Strategic trade policy, Management, Public policy.

JEL: C33, R12.

Colombia has demonstrated an enduring primary profile in its international insertion strategy, participating mainly in the exports of raw materials and primary commodities. The quina (or *Chinchona*, a precious medication for fevers highly appreciated in Spain), the coffee, the oil and the agricultural richness, subsequently defined the international Colombian specialization. In this article, a theoretical debate is conducted to pledge the implementation of a trade policy more prone to promote a strategic policy that contributes to propelling a more qualified international insertion.

The article is structured as follows: First, a general regional contextualization of the exports is set forth; the second section exposes theoretical ideas; the third section deals with the arguments in favor of the convenience of a strategic policy; finally, a panel data is run focusing on the regional performance of Colombian exports; in the last section, a conclusive discussion is outlined.

1. Background

Historically, the Colombian insertion in the international market has been shaped by the specialization in raw materials and strongly natural resources-based commodities. From the colonial times when the quina led Colombian exports, until the time when coffee exports assumed a flagship role during the middle of the 20th century, the agricultural activity and the related geographic conditions have made up the bedrock for this historical export performance.

In a more general Latin American context, manufacturing exports concentrated on labor-intensive goods, namely, wearing apparel, leather products, and food, *inter alia*. Loosely speaking, the role of commodities in the export profile is an ubiquitous aspect in the analysis of economic growth. The outcomes of celebrated integration efforts, such as NAFTA (USMCA), reinforced the biased specialization in labor for Mexico in every way. The remarkable integration of Central America in international manufacturing delocalization is another clear example (David de Ferranti et al. 2001, p. 49). Regarding Colombia, oil has been topping Colombian exports; and the cyclical booms directly strengthened the current account result, the exchange rate, and the fiscal stance.

Over the years, the dominance of full specialization in natural resources and labor-intensive industries in Latin America raised concerns about the regional vulnerability regarding the deterioration of terms of trade and the exposure to the deleterious volatility of the external sector. Admittedly, the origin of the pervasive occurrence of the regional balance of payment crises pertains to a precarious international insertion (de Ferranti et al. 2001 p. 92).

The exports of commodities propelled economic growth in Latin America until 1920; after the export substitution, the strategy maintained a large share of the natural resources-based exports. With the market reforms, few countries really diversified the external basket supplied. At the beginning of the current century, the expansion of the Chinese economy blatantly propelled commodity markets; as a result, Latin America experienced a new growth cycle, that is, a return to the primary activity termed *reprimarization* that recently occurred (José Ocampo 2017, p. 55).

However, the Latin-American evolution following the market reforms has not been so homogenous. Ocampo (2017, p. 54) identifies two styles in the evolution of countries across the hemisphere. There was a Northern pattern based on the *maquila* process, focused on labor-intensive processes intended to meet the North American market needs. A second Southern pattern is dominant in meridional countries of the hemisphere, defined as a combination of the export of commodities, natural resource-based manufacturing, and a wider range of products exchanged in an interregional trade. In South America, there is a variety of conditions. A set of Andean economies based their specialization on mineral resources such as oil, gas, tin, and copper; meanwhile, in the rest of South America, the export of agriculture-based goods predominates (Ocampo 2017, p. 53).

However, from an empirical point of view, some idiosyncratic determinants such as local institutions and variables affecting the political decision-making and the government can be relevant for shaping the trade profile and the net export result (Daniel Lederman and Collin Xu Lixin 2007, p. 19).



Notes: The statistical source touts the data excluding the oil exports.

Source: Own elaboration with information of DANE.

Figure 1 Colombian Departments: Non-Oil Exports per capita (U.S. dollars) 2019

Figure 1 depicts the most remarkable exporter regions in terms of exports per capita, emphasizing that only the non-oil commodities are accounted for. The most prominent place is reserved for two fully mining-specialized departments: Guajira (coal) and Cesar (ferro-nickel).

Concerning the flagship production of coffee, there is a more dispersed pattern of production and exportation: Coffee crops are located mainly in Caldas, Quindío, and Risaralda. Other important producers are Huila and Santander. The regions where the main cities are located excel in the production of some manufacturing goods, mainly labor-intensive: Bogotá and Cundinamarca, Antioquia (Medellín), Valle (Cali) and Atlántico (Barranquilla). Other departments participate in the export of textiles, clothes and leather products: Risaralda, Tolima and North Santander. Boyacá excels at exporting emeralds. Overall, the remaining departments in the southern and eastern territories exploit mainly agricultural products and natural resources.

For highlighting recent developments, some business opportunities loomed as prosperous projects relate to the agricultural sector: avocado, beef, rice, emeralds, and banana, inter alia. These recent stakes are strongly inclined to directly export natural resources; this is triggered by a recent upswing in international demand and by increased prices of commodities, while the post-pandemic recovery is consolidating.

2. Theoretical Discussion

Since the end of the 80s, the Trade Theory has witnessed a compelling internal debate between the defenders of the classical tradition and the theorists engaged with the New Trade Theory based on economies of scale. The dominance of intra-industry trade propelled the appearance of disrupting models of imperfect competition with firms working under the increasing returns principles. Several economists, seduced by the astonishing coherence of the classical framework, understand the trade under the classical vein of the comparative advantages and endowments, namely Edward Leamer (1995, pp. 2-4) and Alan Deardorff (2005, pp. 941-943), *inter alia*. On the other hand, another stream is more prone to follow a new paradigm resorting to models of monopolistic competition and patterns of trade based on economies of scale. However, a more recent stream pledges for a joint explanation of trade patterns and specialization, combining principles of Ricardian comparative advantages and exploitation of economies of scale (Lucca Ricci 1999, p. 358; Steven Brakmann, Harry Garretsen, and Charles van Marrewijk 2009, p. 372).

Regarding the first theory, the strength of the Ricardian model relies on the possibility for the countries to increase the world output and welfare by deepening the specialization in the abundant factor, at least in one of the countries. The same result is achieved in the case of getting a marginal factor reallocation in favor of the respective comparative advantages.

The gains of trade are derived from microeconomic and welfare economics principles. With free trade, countries' conditions are not worsened when compared to countries under autarky conditions. These countries can be better off if the international prices differ from those in autarky and if the price ratio ensures net gains from trade (Deardorff 2005, p. 953). Furthermore, the predominance of intra-industry trade across countries rolling out similar endowments defies the Heckscher-Ohlin corollary of implicit trade of factor services from abundant factor places to scarce factor countries (Leamer 1995, p. 1).

The Heckscher-Ohlin model emerges in the same vein as the Ricardian tradition; however, it highlights the differences in endowments but not in costs. Besides, the main difference in the Ricardian approach is the assumption of constant marginal costs; whereas in the most modern endowments-based theory, the marginal costs are assumed as increasing, leading to a concave production possibility function (Deardorff 2005, p. 954).

The clear-cut specialization of Latin American countries in raw materials made the interest turn again toward the comparative advantages and the composition of endowments incorporated into the primary commodities exported. In fact, in spite of the liberal wave so dominant during the 90s, the Latin American countries reinforced their specialization based on raw materials (de Ferranti 2001; Lederman and Xu Lixin 2007), and their relevance as providers of mineral commodities and agricultural goods is still pervasive. This specialisation should predominate as long as the neoclassical pattern predicts that land- and natural resources-intensive countries reinforce this specialization even more during the liberalization wave.

Theoretically, the classical approach based fully on the classical Ricardian framework is embedded in an impressive and coherent structure of perfect competition

with optimizer agents who maximize the output and the utility by clearing market prices. In turn, assuming perfect mobility of commodities, the setting of prices is coherent with the countries' specialization in the commodity governed by the comparative advantage principle. Strictly, the classical corollary of no-one losses from trade depends more on the perfect competition structure rather than on the comparative advantage principle (Deardorff 2005, p. 953). The implication is a pristine performance of market forces with no room for activism; therefore, the pure free trade policy is embedded in a general case of *laissez-faire* in which the efficiency of markets is a powerful assumption (Paul Krugman 1987, p. 134).

In this vein, the principle that spurs engagement with the comparative advantage is a higher level of world prices compared to the autarky relative cost of the commodity. Following Deardorff (2005, p. 954) and the Haberler model, an equivalent criterion for defining the specialization pattern is the marginal opportunity cost of producing one product instead of others. In such terms, the comparison of opportunity costs between the two countries under autarky leads to increasing world output. With such purpose, a marginal switch in favor of the goods with smaller relative opportunity costs must be performed in each country, in such a way that the international supply can be ensured (Deardorff 2005, p. 954).

In classical theory, the assumption of international immobility of factors exerts a powerful influence on the theoretical framework (Robert Mundell 1957, p. 321). In this vein, there is a theoretical reason to vest the factor immobility as a fundamental piece. In the classical world, the impossibility to equalize the rate of profit at the international level implies that the labor theory does not fit in international trade because the rate of profit does not tend to equalize across countries, therefore, differences in costs emerge as the basis for international trade (Mark Blaug 1997, p. 122).

The assumption about the degree of factor mobility is crucial for switching the conclusions in the trade models when the factors become immobile (Dong Baomin and Siu Wong 2017). They assert that a labor-intensive country can benefit from taking distance from the neo-classical view of specialization because the development of a capital-intensive industry allows the country to produce capital goods at a lower price. Explicitly, it follows an argument in favor of an activist policy to promote a non-endowed sector.

The comparative advantage theory is stated in terms of differences in relative costs or opportunity costs (Deardorff 2005, p. 954). In fact, under the assumption of one productive factor (labor), two countries and two commodities, the cost advantage will play in favor of the country with a relatively lower requirement for labor. The conclusion of global efficiency allows asserting that the world's production increases if at least one of the two countries reinforces the reliance on its comparative advantage and if the labor is allocated for producing the pertaining commodity. The final landscape for the world economy ends up better than the autarky case.

The beauty of the neoclassical world, endowment-based specialization leads to a connection between the Factor Price Insensitivity theorem and the Factor Price Equalization theorem (Leamer 1995, p. 5). The assumption of a perfectly elastic supply of factors leads to a world with convergent factor prices because the factor price

equalization makes up an indeed international market for factors. Therefore, empirically, the demand for factors must be more elastic alongside the economic integration.

In accordance with Heckscher-Ohlin, the international elasticity of demand leads to preservation in factor price equalizations. In consequence, when the trade pattern intensifies and the specialization plays in favor of abundant factor goods, the effect of increasing the supply of the abundant factor maintains its price invariable because the international trade offsets the declining effect of the higher factor supply. In contrast, the development theoreticians believe that raw materials suffer a low income and price elasticity alongside a world expansion, and the price of primary goods tends to depress (Ocampo 2017, p. 58).

Deardorff (2005, p. 955) rolls out the conclusion of the Haberler model in terms of the comparison of autarky and world prices of commodities. Therefore, the criterion for detecting the presence of comparative advantages is a discrepancy in prices. The difference between the world prices and autarky prices emerges as the indicator for deepening specialization. Therefore, the wrong policy intended to stimulate the production or export of the good with no comparative advantage *via* subsidies conveys substantial losses in the context of international trade.

Hence, the more recent assumption about price equalization of productive factors is a succedaneum of the mobility of factors as Mundell (1957, p. 321) points out. Even under the condition of immobility of factors, international trade can bolster a process of equalization of factor payoffs, precisely because there is an open unrestricted movement of commodities. It means that the factors can receive the same payoffs even remaining all the time in the same original spot, thanks to the full mobility of goods.

In this vein, other theoretical corollaries (Leamer 1995, p. 5) deal with the implicit trade of factors embodied in the exchanges of commodities, in concordance with the factor proportion theory. It entails that along with goods, factor services are transferred from abundant factor countries to scarce factor locations, conveying concomitant equalization of factor prices at an international level. If such an assumption is finally validated, the factor market becomes a worldwide space for exchange as long as the international markets for factors tend to converge. This impressive theoretical structure supports the assertion that trade contributes to balance the blatantly uneven geographical distribution of resources and endowments.

The generalization of the Ricardian model can lead to a comparison across a set of commodities and countries through a “chain of comparative advantages” as exposed in the Haberler model (Deardorff 2005, p. 954). Assuming that “c” is the country and “g” is the good, the individual factor requirement for two countries is defined as a^c_g , and the criterion for an international comparison of a factor requirement is as follows:

$$a^1_1/a^2_1 < a^1_2/a^2_2 < \dots < a^1_g/a^2_g.$$

Here, it is clear that Country 1 can get important economies producing Good 1 to the extent that its relative requirement for the factor is lower, disclosing a clear advantage. The comparative advantage will guide the countries’ specialization in such a way that any country tends to behave as an exporter to the left and as an importer to the right (see the explained criterion). In a recent article, Baomin and Wong (2017)

have developed a model assuming interregional differences in the labor endowment based on productive factors immobility, finding a conclusion in the opposite direction than the comparative advantages approach.

This theoretical disagreement seems to create a connection with the economic policy postures. In terms of the political economy, the debate seems to have a policy posture pertaining to each theoretical approach. The full development of a classical trade specialization is guided by the spontaneous principles of comparative advantages and the endowment composition.

The defenders of classical views assert that the strategic policy protecting sectors can really have a redistributive effect but can be costly in terms of efficiency, when in fact there are other alternatives with better results, such as tools for accomplishing redistributive goals (Leamer 1995, p. 39). On the other hand, the decided implementation of the trade policy bolsters the upsurge of new sectors supported by explicit government activism.

The tariff policy can be disruptive in terms of the effective protection when countries protect the branch of inputs; this can seriously affect the competitiveness of the downstream sectors producing the final good that operate fully by the comparative advantage. In the end, a strategic trade policy can weaken the final goods originally favored by the comparative advantage (Deardorff 2005, p. 954).

3. Literature Survey on Strategic Trade Policy

During almost 2 centuries, the Ricardian mainstream inspired a free trade approach and a trade policy based on the international deployment of national advantages and resources. However, during the 20th century, the trade pendulum oscillated from blatant protectionism to an open trade environment. The protectionist era proved to be dramatically devastating for the international economy when the United States implemented the Smooth-Hawley tariff that amplified the tragic effects of the big depression. The results of such home market protection had an expected backfire effect on the United States declining American exports by 40% and imports by 30% (Mundell 2000, p. 327). In recent times, the Trump protectionist tender threatened to unleash an international war involving the China and European Union interests, and the renegotiation of the existent agreements in force purposely intended to turn the terms advantageous for American interests. The strongly intertwined trade relationships across developed countries are a stubborn fact that cannot be ignored by unilateral stances (Dominick Salvatore and Fred Campano 2019). Recent studies also confirmed the effect of US tariffs on European unemployment and demonstrated a recessionary impact on the old continent (Pascal Jacquinot, Matija Lozej, and Massimiliano Pisani 2022). In other perspectives, Trump's rhetoric blamed the international competitors, mainly China, for manipulating the exchange rate to affect the American trade balance; however, the recent analysis identified the behavior of the dollar exchange rate with more fundamental internal factors, productivity growth, and with the shape of expectations (Yang Liu and Ivan Shaliastovich 2022, p. 305).

Normally, trade wars convey the utmost outcome of worsening the position of all participants and traditionally pointed out that in trade wars no winner emerges, but all participants are losers. It ends up with a prisoner's dilemma that is solved only

through the establishment of rules of the game minimizing the most harmful effects for the players (Krugman 1987, p.141). In light of nationalist stances as the “America First” motto, the pursued goal of closing the commercial gap or creating new jobs failed and conversely conveyed a set of retaliation that undermined the global institutional *status quo*. Besides, the American structure of production is currently very much complex than in the past. Any unwise excessive tariff intended to help the upstream sectors will hurt the downstream industries whose inputs become more expensive. Pursuing one original goal, the result turns out to be the opposite, taking into account the number of impaired workers downstream. For instance, the affectation of American steel consumer industries and the confectionery sector *t* has been derived from the protective measures at an upstream level in the steel and sugar industries (Irwin Douglas 2017, p. 46).

Nowadays, strategic policy is commonly applied everywhere. It is usual that China, as an emergent player in the international context, implements a set of individual incentives to domestic firms. The strategic policy has been deployed along several industries and sectors (Krugman 1983). Some measures as quotas, localization, and import management increased the protection in the automotive industry, and the subsidies to R&D activities boosted the performance of carmakers. The stimulus in the shape of R&D was driven also by electronic information products that improved substantially their performance in terms of exports. The Chinese synthetic rubber production received the benefit of typical industrial policy intended to expand the appropriation of international rents by increasing the domestic welfare by the profit-shifting appropriation (Jing Linbo 2017, p. 99).

The forceful lesson taught by the Smooth-Hawley Tariff Act has guided the modern conviction for fostering a fluent trade system, with international enforcers institution intended to solve the conflicts. There is an international consensus on the destructive effect of unilateral protectionist stances, *inter alia* the unpredictable effects of retaliations amid trade wars (Mundell 2000; Bilgin Orgun 2012, p. 1285; Douglas 2017, p. 47) and the dearly negative effect of tariffs on welfare (Jagdish Bhagwati 1964, p. 5). However, the pure free trade mechanisms are hindered by the implementation of the strategic policy as well (Krugman 1987, p. 135). It means that the mainstream theory of trade neglected the role of trade policy to promote the national welfare through the application of strategic trade policy (Limbo 2017). On the other hand, turning the attention toward an international context, the application of monopolistic competition to the context of trade policy sets forth a set of policies that commonly are deemed as deleterious for the national welfare, however when applied in a domestic context, are recognized as political instrument for increasing the national welfare by appropriating the international revenues amid an international trade monopolistic structure (Orgun 2012, p. 1287).

A set of disparate measures can make room for the government intervention in favor of domestic players, eager to appropriate the latent profits floating on an international market where the monopolistic competition proliferates. In fact, the New Trade Theory along with the Industrial Organization Theory underwent an abysmal development during the 70s settled the bedrock for the emergence of a strategic trade policy because the government can tilt, in favor of domestic players, the excess of

profits enjoyed by foreign firms (Krugman 1987, p. 138). In both fields, the microeconomic bedrock supports the presence of few firms taking advantage of their market power. Some elements from the renewed organization theory emphasize a set of strategic moves intended to deter the entry of potential rivals. As usual in microeconomic models, the monopolist's stance must be sufficiently credible to become a real threat to the new entrant, who finally decides to curtail its plans of entering the market (Orgun 2012, p. 1288).

This argument is strongly rooted in the increasing returns and imperfect competition principles. It assumes that in the concentrated international market, barely a few firms can take advantage of the benefits of scale economies, but all of them contend for grasping the extra rents latent in a noncompetitive market.

The government intervention for excelling the role of domestic firms in the international market is diverse. Barbara Spencer and James Brander (1983, p. 1) in their influential paper highlight the approach focused on the R&D activities, noticing that the government intervention widens the share of national firms in the international market and that protective measures cast signals to domestic firms to enter the market, finally encourages the expansion of exports (Orgun 2012, p. 1284).

From a microeconomic viewpoint, it entails a strategic game in which domestic firm's make strategic moves in taking into account the reaction of affected companies elsewhere. In this context, the government intervention looms powerful for tilting the international developments in favor of national interests. The ultimate purpose of the government intervention is twofold: First, appropriating domestically the international profits and, second, promoting the expansion of specific sectors, mainly technologically advanced, are more prone to taking advantages of externalities and technical spillovers (Orgun 2012, p. 1289). Another field of government activism is through subsidizing the exports whose prices can be curtailed, becoming artificially more competitive. It contributes in shifting the conditions for the national firm when competing with a foreigner by expanding the market share of monopoly rent (Linbo 2017, p. 101).

The implementation of strategic policies and some hints of protectionism were common during the 80s and 90s in countries such as the United States, Japan, and in some European industries such as aircrafts; but nowadays, this theory has been revisited and has become a relevant discussion for international trade and geostrategic deployments of power.

However, this international rivalry is not over yet. The recent trade dispute and the impairment of the international environment, mainly during Trump's tenure, demonstrate that the government intervention, strategic policy, and protectionism are arguments currently valid in international markets and are widely implemented. However, the unilateralism during Trump's era demonstrated how awkward and harmful this kind of stances are, and that the policy maker must be able to distinguish between what the posture of trade policy can achieve and what it cannot and to recognize the constructive changes and those blatantly counterproductive (Douglas 2017, p. 48).

The old-fashioned vision describing a strategic policy deployed by rich countries made room for a noticeable implementation of this stance in developing countries, mainly amid the emergence of China as a key player in the international context; however, its planned economic system becomes a powerful constrain when implementing

the strategic policy. Otherwise, in full market economies with efficient governments and full availability of information, the active cooperation of firms and the international environment turn more fluent the implementation of the strategic policy. China is a key player in the international value chain and faces not only a strong competition from other developing countries but also the mistrust of markets in the developed countries as well (Linbo 2017, p. 105).

4. The Suitability of an Assertive Strategic Policy

In consonance with the pure Ricardian theory or the endowment-based trade approach, the bedrock of a coherent trade policy is the full reliance on the gains of trade conveyed by the cost-based specialization pattern. However, the blind reliance on the comparative advantage model is derived from the support on the constant returns model and the optimizing behavior, embedded in a harmonic world of perfect competition.

This approach ends up being troublesome in the case of commodity exporters and, in particular, when analyzing the Latin American countries. A pervasive constraint in the development of commodity exporters is the instability in trade resulting from the ups and downs in commodity prices. In consequence, a specific problem steaming from the external sector spreads out into the whole economy in the form of sharp devaluations, substantial capital outflows, and unemployment.

The cycles of commodities conveyed additional troublesome macroeconomic challenges such as the “Dutch disease”, an outcome of the unexpected inflows of capital associated with the buoyant international conditions in the commodity markets. This macroeconomic disruption finally resulted in a de-industrialization process because of the exchange rate appreciation (Ocampo 2020, p. 19). Theoretically, the disturbing effects of changes in international conditions were already contemplated in neoclassical models of trade assuming small countries are unable to manipulate the international conditions because the prices are taken as fixed even as the internal supply of products is modified (Leamer 1995, p. 7). This idea and the basic functioning of perfect competition are quite similar.

The Latin American history of the external sector claims for a policy approach focused on the identification of innovative branches looming as promising winners fully integrated in the global market.

Accordingly, the New Trade Theory approach based on increasing returns and unexhausted economies of scale arise as pillars of the implementation of a government activism policy, as a resort for improving the market outcomes. Despite shifting the emphasis and proposing a new arbitrary specialization based on economies of scale, this new approach reinforces the mutual gains derived from trade and the introduction of imperfect competition touts a landscape of mutual benefits for monopolistic competitive firms (Krugman 1987, p. 133).

The strategic policy was a widely spread idea focused on a set of tools intended to promote specific sectors pursuing the promotion of modern sectors able to compete internationally and to generate domestic employment. In light of the high volatility and the changing conditions in the international markets conveyed by the model based on a raw material international insertion, policymakers pledge for one activist policy intended to promote “high value-added” sectors rowing against the conventional stream

of free trade. The rationale commonly invoked is mainly the “infant industry” argument and the inherent instability predominant in the basic commodity markets (Lederman and Xu Lixin 2007).

Krugman (1983, pp. 125-131, 1984, p. 81, 1987, p. 131, 1993b, p. 25) and Spencer and Brander (1983, p. 23) showcase a microeconomic-based set of arguments pledging for a policy focused on the encouragement of specific sectors. Normally, the starting point is the recognition of externalities in the international market that are not sufficiently internalized by a number of firms operating under monopolistic competition. In fact, a firm can generate a myriad of benefits derived from the knowledge that the firm itself is unable to fully appropriate. It is a clear demonstration of microeconomic models based on monopolistic competition (Krugman 1993a, p. 26).

The monopolistic competition models perfectly match the necessity for a strategic policy. The assumptions include that the industry is composed of a set of firms, each one producing differentiated goods, with a cost structure putting the prices above the marginal costs. In this microeconomic context, firms are enabled to deploy strategic moves as reactions to the behavior of rivals. A stubborn fact is that in this landscape, the range of government activist policies can be wider than in a purely competitive market (Krugman 1984, p. 82).

In this way, the exploitation of economies of scale becomes a source of specialization of countries, opening space for the intervention of economic policy intended to grasp the noninternalized advantages implicit in the international market. In the end, the international market is the place where a diversity of firms supply differentiated goods, and the economic integration bolsters the intra-industry trade with no considerable effects in terms of employment losses, to the extent that each country is engaged in producing a specific variety addressed to the international market.

However, talking about theoretical models, the assumption of a world working in a context of imperfect competition implies that the gains of trade derived from perfect competition are not realized (Krugman 1987, p. 134). The original strategic policy proposals roll out a set of oligopolistic firms seeking rents and receiving government subsidies with the explicit goal to export or conduct R&D activities, pursuing to appropriate the non-internalized benefits in the international market at the expense of international competitors (Spencer and Brander 1983, p. 22).

This policy gives rise to clear side risks. Paradoxically, the strategic policy of pursuing the promotion of national branches at the expense of foreigners potentially harms other national firms. The government aid granted to specific sectors distorts the resources, attracts capital and labor to strategic branches while divesting other national firms (Krugman 1993b, p. 26). The negative effects can occur because in the sectorial promotion strategies, it is necessary to allocate artificially the investment to some sectors deemed underinvested (Krugman 1983, p. 131). Those measures cause a clear discriminative detriment to the other sectors, producing a kind of crowding out effect.

5. Empirical Strategy

To validate the stubborn dependence of the Colombian external sector on primary exports, in this section, we run an econometric exercise applying the panel data

technique, making up a blend of time series and cross section for modeling a set of assumed invariant features in the individual Colombian exporter regions.

For this econometric model, panel data from 22 Colombian departments were gathered, analyzing a period spanning from 2011 to 2018. This period picks up the outcomes of the boom in the commodity prices in the first decade of the century. It was not possible to include the whole set of Colombian departments due to the scarcity of complete information available for all of them.

Indeed, overarching information at a department level is hard to acquire in a consistent way. The regional information is consistent when extracted from remarkable surveys (e.g., a labor market survey) and demographical information. However, consistent, up-to-date, and comprehensive information for all departments in terms of capital accumulation, R&D, and education is hard to find. This is the reason for having failed to find continuous and consistent available data for variables such as years of education for all regions. On the other hand, the variables included represent mainly the endowments in different ways and some idiosyncratic variables, promoting a specific regional description.

We consider that by running the panel data of Colombian exporter departments, we can identify time invariant factors pertaining to each geographical unit, rolling up the idiosyncratic climatic, natural, and factorial conditions explaining the export performance. Lederman and Xu Lixin (2007, p. 22) assert that the predominant empirical approaches analyzing the trade of patterns have relied on the estimation of pure cross-country data, but new models suggest the relevance of a panel data technique.

They pretend to model the determinants of trade, which include a set of explanatory variables that are clearly space-specific (country or region) or are seemingly typically spatially immobile such as infrastructure, local conditions, and specific knowledge. In the model, variables such as GDP per capita and population embody some kind of scale effects. Their model uses net exports as an endogenous variable and performs a set of estimations for nine clusters of commodities, recognizing that the composition of endowment can vary according to the quality of the cluster of goods. Regarding the type of models, the authors perform three estimations: cross section, random and fixed effect, and a nonlinear system of equations (Lederman and Xu Lixin 2007).

In turn, this article is based on the regional performance in terms of exports to validate the determinants of the shipments of commodities. As the source of data (the Colombian Statistical Office DANE) offers a regional breakdown only for exports, it is impossible to calculate the net exports for each Colombian department. However, exports perform properly as an accurate proxy of the external behavior of Colombian regions.

On the other hand, the statistical source excludes oil exports because the bulk of those shipments are made through determined ports of exportation, in spite of the very specific origin of the resource transported by an extensive network of national pipelines. However, as explained in the introduction, the larger part of the Colombian export relies strongly on natural resources and labor endowments, and the characteristics of endowments can be fully modeled. Obviously, other flagship national exports are readily included: coffee, ferronickel, banana, flowers and other agricultural goods.

The sources of other exogenous idiosyncratic variables were the Colombian labor market survey (GEIH) and the Consumer Price Index information. Two of them are conducted by the Colombian statistical office (DANE) as well. However, these surveys do not cover all the Colombian departments, so only the regions with available and overarching information deserved to be included in the panel data.

An additional comment worth making is that the mentioned surveys dealing with labor markets and prices have mainly an urban and metropolitan significance because the information is collected in the regional capital and the pertaining metropolitan areas. However, the two surveys include information dealing with relevant local and specific characteristics.

For the econometric exercise, the variable used as a proxy of the net exports is the exports per worker in US dollars. The dynamics of external trade suggest that commodities with a noticeable advantage for competing end up increasing their exports and seemingly can reinforce the surplus in net exports. Particularly, this variable represents the trade intensity.

According to Lederman and Xu Lixin (2007), the concept of endowments pertains to a global notion related to the degree of international immobility (transferability), a quality that can reinforce idiosyncratic resources. For the present article, a set of exogenous variables was included embodying the resources more abundant locally. The resources composition can be more understood when observing the article introduction. All the exogenous variables are inserted into the model as natural logarithms with the purpose of reducing the risk of heteroskedasticity.

Conventionally, typical variables tapped as proxy of endowments are those related to land, labor, and capital; but capital is considered as almost perfectly mobile, so it can lose its local idiosyncrasy (Lederman and Xu Lixin 2007, p. 23).

The first group included the log of the total area per capita, the log of the employed people, and the log of the population enabled to work according to their age. The second group of specific variables included the local Consumer Price Index (for the regional capital city) and the GDP log. Once the fixed and random effect model was run, all exogenous variables ended up as significant variables. In Lederman and Xu Lixin (2007, p. 21), the GDP is a proxy of demand and scale effects, and it suggests association between consumption preferences and income.

The panel data technique reveals more advantages than traditional approaches based on cross section. The estimators become more accurate because the set of observations is larger and in addition, it involves the underlying time series variation latent in the trade patterns, while controlling the cross-region heterogeneity of intercepts (Lederman and Xu Lixin 2007 p. 27).

The panel data technique identified the determinants of department exports per worker assuming the presence of time invariant characteristic in the Colombian regions affecting the productive performance and the behavior of exports. The panel data specification has the following form:

$$y_{it} = X'_{it}\beta + (\alpha_{it} + \varepsilon_{it}),$$

where

α_{it} collects the unobservable factors that do not change in time;

ε_{it} is the idiosyncratic error collecting all unobservable factors, but that can change in time.

The panel data technique predicts unbiased estimators even in the presence of omitted variables (Jeffrey Wooldridge 2002, p. 248). As usual in panel data models, the purpose is to determine if the best structure of estimation pertains to a fixed effect or random effect model using the Hausman test as a guiding criterion. The decision depends on the validation of a clear correlation between the individual effects and the exogenous variables.

We assume normal errors and the regional specific effects were kept unobserved but can become fixed over time or randomly correlated with unobserved region-specific traits (fixed or random effects, respectively).

Thus, in the case of fixed-effect specification, we assume that α_i can be correlated with X_{it} , so this regressor can be endogenous. In such situation, OLS estimations of β are inconsistent; however, the estimators regressed by fixed effects are consistent.

For random effects models, we assume that α_i is a randomly generated process unrelated to X_{it} ; consequently, such regressor is exogenous and all estimations render consistent parameters.

The panel data technique enables us to identify the determinants of the export performance of export per capita encompassed in a specialization pattern clearly supported by the natural resources and factor intensities. The exports are expressed in US dollars per worker and are transformed into logarithms for making the set of data smoother and for reducing the risk of heteroskedasticity (Lederman and Xu Lixin 2007).

All exogenous variables fit relatively well in the model and all of them end up as significant in the determination of the endogenous.

Table 1 Descriptive Statistics

		Mean	Std. dev.	Min	Max	Observations
lareatotpercap	overall	13.36975	3.046629	0	15.53983	N = 176
	between		3.108973	0	15.49661	n = 22
	within		0.053528	13.2754	13.63305	T = 8
lworker	overall	0.0000328	0.0000174	5.16e-06	0.0000848	N = 176
	between		0.0000176	5.32e-06	0.0000782	n = 22
	within		2.45e-06	0.0000189	0.0000448	T = 8
lgdp	overall	9.943976	0.8979216	8.60453	12.30886	N = 176
	between		0.9132441	8.735646	12.20482	n = 22
	within		0.0748937	9.723287	10.06467	T = 8
cpi	overall	121.233	11.73309	107	150	N = 176
	between		3.836172	117.125	130.25	n = 22
	within		11.11476	103.983	141.108	T = 8
lpopage	overall		0.6612177	6.097492	8.812078	N = 176
	between	7.147903	0.6739492	6.123922	8.758918	n = 22
	within		0.0341997	7.032248	7.258312	T = 8

Source: Own elaboration.

The econometric output seemingly backs the choice of the panel data technique for modeling the regional exports per worker. All exogenous variables are significant, and the mathematical sign is consistent.

As stated, we performed the OLS first. In fact, the OLS is compared with other models, providing an insight into the existence of time-invariant characteristics, hinting an intrinsic heterogeneity across regions based on a proper path dependence and a divergent export performance. In the panel data technique, the results are robust and hard to reconcile with the pure cross-section estimates using OLS. In all explicative variables, the sign of coefficients is the same and significant in both random effects and fixed effects models.

The comparison of the three models reveals that in OLS some exogenous variables lose strongly their significance, hinting that the OLS estimations are biased, and they warn effectively about the existence of time-invariant characteristics. It can be observed that the two variables, lgdp and cpi, lose statistical significance, indicating that basic OLS estimators can be biased, and it is necessary to run a panel data procedure. Later in the fixed effects models, the significance of those two variables improves, and the influence of regional individual features is confirmed by the significance of rho parameter.

In our fixed effects model, rho indicates that the 99% of variance is attributed to the differences across panels. All exogenous variables exhibit interesting interactions with the regional exports per capita.

Table 2 Panel Data Estimations, Endogenous Variable: Exports per capita

	Fixed E effects	Random effects	OLS
	lx_worker	lx_worker	lx_worker
lareatot	7.01e-06** (2.70e-06)	-9.44e-07* (5.32e-07)	-1.36e-06*** (1.74e-07)
lworker	-4.85e-05*** (5.44e-06)	-4.45e-05*** (5.29e-06)	-4.26e-05*** (6.99e-06)
lgdp	1.12e-05*** (3.50e-06)	5.92e-06** (2.70e-06)	5.88e-07 (1.36e-06)
cpi	-9.99e-08*** (2.79e-08)	-4.09e-08*** (1.54e-08)	-5.14e-08 (4.19e-08)
lpopage	2.50e-05*** (9.34e-06)	1.46e-05** (5.99e-06)	1.78e-05** (7.33e-06)
Constant	-1.89e-05 (6.93e-05)	0.000180*** (2.17e-05)	0.000205*** (1.14e-05)
Observations	176	176	176
R-squared			0.876
N	176	176	176

Source: Own elaboration.

The arguments reinforcing the relevance of endowments are clearly confirmed in the regional potential area for agriculture and the number of workers. It supports the assertion that the exports relate strongly to the abundance of factors, for the booming agricultural activities and for some manufacturing branches intensive in labor.

The local CPI is related to specific local conditions and suggests that the local price stability reinvigorates the regional export performance. Price stability can send signals about local competitive cost conditions and an argument for stimulating real wages. It means that this variable can swing the businessmen and worker's decisions to choose the most competitive areas to develop productive activities.

Working-age population represents a clearer indicator of the regional availability of labor for productive purposes. Amid the interregional population migrations, the availability of workers can internalize the movements of people looking for a contract related to export production. In Colombia, some spatially localized export activities blatantly trigger the mobility of the mass of people moving across different regions for labor purposes. The process of harvesting coffee in the export regions and the exploitation of gold mining are typical examples of interregional mobility of labor.

The regional mobility of factors can unleash a process of convergence in wages across different regions mainly speaking about non-skilled labor. In conclusion, the specific significance of exogenous variables confirms strong influences on regional exports coming from diverse sources. The local endowments can truly excel as significant variables, but they do not represent the whole history as other idiosyncratic features affect the performance of exports (Lederman and Xu Lixin 2007 p. 27).

The Brausch-Pagan test provides information to bear out the existence of individual time-invariant effect characteristic for the Colombian exporter regions that reverberate in the value of exports per worker, bolstering or weakening the trends to compete in the international market. All exogenous variables are strongly significant, and in the majority, the mathematical signs are consistent with economic intuition.

Whether unobservable factors α are not correlated with the exogenous variables, we must assume that α performs as an additional factor reverberating in the endogenous variable. However, a serious drawback emerges whether $\text{Cov}(X_i, \alpha) \neq 0$ for some i , and the process continues embedding α into the error term (Wooldridge 2002, p. 301). With such caveat, the Hausman test guides the decision criterion about what model to choose in case of independence between the non-observed factors and the exogenous variables or in the case of $\text{Cov}(X_i, \alpha) \neq 0$.

The Hausman test suggests that the fixed effects model estimates robustly the interaction between the exports per capita and the exogenous variables. Trustfully, the Hausman test becomes the decision criterion for choosing the fixed effect model as the optimal structure of modeling for our panel data structure.

6. Evaluation of the Model

The panel data's technique is the optimal procedure for coping with any data set of observations characterized by time-invariant attributes affecting the behavior of the endogenous variable; but such fixed individual-specific effects must be modeled in an independent term, aside from the idiosyncratic error term. In the presence of these individual factors, the pooled technique lacks robustness because it would keep the fixed effect embedded into the error term. Putting it in the other way, this estimation could include time-invariant correlated random effects that could be arbitrarily correlated over t . Commonly, in the panel data work, there are concerns about the bias stemming from this sort of serial and cross-sectional correlations, which can be explained when

there are time-invariant variables for each observation that can convey autocorrelation. The description of the bias is possessed in the terms of Colin Cameron and Douglas Miller (2015, p. 318) as “clustered errors” when the individual belongs to the same geographical region and, consequently, the model errors for each individual pertaining to the same region may be correlated. However, the model errors for individuals belonging to different regions is taken for granted as uncorrelated.

Fully aware of this flaw in the running of panel data, our script in STATA included the pertaining command that makes the estimates robust (`xtreg vce[robust]`). In this way, we get a consistent variance-covariance matrix of the idiosyncratic residuals even when occasionally such errors are not identically distributed, or whether there is serial correlation between errors for the same individual. Accordingly, when facing this potential for errors to be correlated within clusters, frequently the most straightforward procedure is the traditional cluster-robust variance estimators (Cameron and Miller 2015, p. 367). Simultaneously, the existence of within standard deviations in our exogenous variables (see Table 1) indicates the existence of any sort of within variability in all exogenous variables, leaving the time-invariant individual attributes fully embedded in the fixed effects term. The confirmed variability in each exogenous variable discards the existence of any individual invariant characteristic embedded in it, reducing the risk of serial autocorrelation.

On the other hand, coping with the risk of endogeneity, the Hausman test provided us with the procedure for making the best decision. Once the presence of fixed effects time-invariant is verified, it is necessary to determine which specification is more coherent between the intragroup (IG) estimates or the Generalized Least Squared estimates (GLS). According to Jerry A. Hausman (1978, p. 1251), the test intended for coping with cases of endogeneity is stated as follows:

$$H_0 = E(\varepsilon|X) = 0.$$

It means that the conditional expectation of the error term given X is zero. Now, under the assumption of H_0 , IG estimates become consistent, whereas GLS estimates turn to be either consistent or efficient. The last estimators are now available in all situations. Conversely, when H_0 's assumption fails, the alternative hypothesis requires a more expanded framework of specification, whose estimates turn out to be consistent under both hypotheses.

The practical conclusion is that assuming H_0 , the GLS estimates become either consistent or efficient; however, under the alternative hypothesis, only the IG estimates turns out to be consistent. Accordingly, and based on the Hausman test, our model decided to choose the fixed effect estimator as the most consistent framework for dealing with endogeneity.

7. Conclusions

The discussion about the implementation of the strategic policy is timely after the taking over of the new Colombian government in 2022 because of the clear willingness to implement a blatantly interventionist model of development with several goals and sectorial strategies. The external sector is the focus of transversal policies spanning the promotion of specific sectors (a new spatial agency and aerospace developments), the

expansion of expenditure of R&D activities, and the implementation of a protectionist agricultural policy. There appears to be an interest in providing from the government, a public investment intended to endow the private production scheme with cutting-edge technologies in specific industries. Explicitly, there appears to be a role of the pharmaceutical industry as a key player in the process of innovation, and the public policy purports the self-sufficiency in the provision of medicines. There are goals in terms of spurring a digital industry as well.

Apparently, the government intervention purports to influence the agricultural external balance. The Colombian public policy disclosed the overwhelming flow of food imports mainly in products such as corn, wheat, and barley, in a country fully gifted to produce staple food domestically and even for export. In this regard, the profuse amount of agriculture subsidies in the rich world distorts the international patterns of specialization and hinders the full participation of developing countries that should reveal their comparative advantages. This international system of subsidies and interventionist policies are at odds with the real international system guided by free market principles.

This set of activism comes about after decades of changes in the stance of public policy. In the case of Colombia, the 90's wave of liberalization implied the virtual disappearance of the strategic policy of manufacturing promotion. The bureaucracy, the ministry (Ministerio de Desarrollo Económico), and the government bank for industrial development (IFI) were suppressed. Afterwards, the practical implementation of activist policies faced a blatant hindrance in the typical Colombian government interventions. In reality, the subsidies and direct aid programs sometimes involve rent seekers and free riders (Agro Ingreso Seguro plan of subsidies); in the end, the beneficiaries of programs originally intended for genuine producers and exporters ended up leveraging agents not genuinely concerned about the business. In conclusion, the government activist programs entail a serious problem of moral hazard.

Theoretically, the dominant classical stream advocates for the marginal allocation of the factors in the direction of the comparative advantage, leading to an outcome that increases the world output. With this argument, it is proposed that deepening own advantages is a necessary assumption for expanding the world economy. It is valid under the microeconomic condition of a perfect competition world in which countries are able to maximize their production and trade.

With regard to the econometric exercise, the strong influence of natural resources-based activities excels as key determinants in Colombian exports. Variables representing the agricultural extension and the labor local pool emerge as significant and consistent influential forces in the regional exports. Specific departmental features are determinant for the external behavior of Colombian regions: the level of local prices and the regional GDP.

The technique of gathering panel data using a fixed effects model enables us to confirm the existence of a set of time-invariant features in each individual department, which contributes in explaining the external performance of the regional production and its penetration into external markets.

According to panel data results, there is evidence about the existence of invariant fixed effects that underlie the external performance of Colombian departments. Such time-

invariant features can be pointed out as specific in idiosyncratic regional endowments or particular traits reverberating the behavior of exports. Theoretically, this type of effects is interpreted as abilities, specific motivations, or particular backgrounds (Wooldridge 2002, p. 247).

References

- Baomin, Dong, and Siu Wong.** 2017. "A Theory of Comparative Advantage with Specialized Subnational Regions." *Review of International Economics*, 25(3): 567-577.
- Bhagwati, Jagdish.** 1964. "On the Underinvoicing of Imports." *Bulletin of the Oxford University Institute of Economics & Statistics*, 27(4): 389-397.
<http://dx.doi.org/10.1111/j.1468-0084.1964.mp27004007.x>
- Blaug, Mark.** 1997. *Economic Theory in Retrospect*. Cambridge, M. A.: Cambridge University Press.
- Brakmann, Steven, Harry Garretsen, and Charles van Marrewijk.** 2009. *The New Introduction to Geographical Economics*. Cambridge, M. A.: Cambridge University Press.
- Cameron, Colin, and Douglas Miller.** 2015. "A Practitioner's Guide to Cluster-Robust Inference." *The Journal of Human Resources*, 50(2): 317-372.
<http://dx.doi.org/10.3368/jhr.50.2.317>
- De Ferranti, David, Guillermo Perry, Daniel Lederman, and William Maloney.** 2002. *From Natural Resources to the Knowledge Economy Trade and Job Quality*. Washington, D. C.: The World Bank.
- Deardorff, Alan.** 2005. "How Robust Is Comparative Advantage?" *Review of International Economics*, 13(5): 1004-1016. <http://dx.doi.org/10.1111/j.1467-9396.2005.00552.x>
- Douglas, Irwin.** 2017. "The False Promise of Protectionism: Why Trump's Trade Policy Could Backfire." *Foreign Affairs*, 96(3): 45-56.
- Hausman, Jerry A.** 1978. "Specification Tests in Econometrics." *Econometrica*, 46(6): 1251-1271. <http://dx.doi.org/10.2307/1913827>
- Jacquinot, Pascal, Matija Lozej, and Massimiliano Pisani.** 2022. "Macroeconomic Effects of Tariffs Shocks: The Role of the Effective Lower Bound and the Labour Market." *Journal of International Money and Finance*, 120(C).
<http://dx.doi.org/10.1016/j.jimonfin.2021.102528>
- Krugman, Paul.** 1983. "Targeted Industrial Policies: Theory and Evidence." In *Proceedings of Economic Policy Symposium*, 123-176. Jackson Hole: Federal Reserve Bank of Kansas City.
- Krugman, Paul.** 1984. "The U.S. Response to Foreign Industrial Targeting." *Brookings Papers on Economic Activity* 1.
- Krugman, Paul.** 1987. "Is Free Trade Passé?" *The Journal of Economic Perspectives*, 1(2): 131-144.
- Krugman, Paul.** 1993a. "On the Relationship between Trade Theory and Location Theory." *Review of International Economics*, 1(2): 110-122.
<http://dx.doi.org/10.1111/j.1467-9396.1993.tb00009.x>
- Krugman, Paul.** 1993b. "What Do Undergrads Need to Know about Trade?" *The American Economic Review*, 83(2): 23-26.
- Leamer, Edward.** 1995. "The Heckscher-Ohlin Model in Theory and Practice." Princeton Studies in International Finance Working Paper 77.
- Lederman, Daniel, and Lixin Collin Xu.** 2007. *Comparative Advantage and Trade Intensity: Are Traditional Endowments Destiny?* Washington, D. C.: The World Bank.
- Linbo, Jing.** 2017. "The Development of the Strategic Trade Policy and Its Application in China." *The Chinese Economy*, 50(2): 97-111.
<http://dx.doi.org/10.1080/10971475.2016.1227163>

- Liu, Yang, and Ivan Shaliastovich.** 2022. "Government Policy Approval and Exchange Rates." *Journal of Financial Economics*, 143(1): 303-331.
<http://dx.doi.org/10.1016/j.jfineco.2021.06.031>
- Mundell, Robert.** 1957. "International Trade and Factor Mobility." *The American Economic Review*, 47(3): 321-335.
- Mundell, Robert.** 2000. "A Reconsideration of the Twentieth Century." *The American Economic Review*, 90(3): 327-340. <http://dx.doi.org/10.1257/aer.90.3.327>
- Ocampo, José.** 2017. "Commodity-Led Development in Latin America." In *Alternative Pathways to Sustainable Development: Lessons from Latin America*, 51-76. Geneva: Graduate Institute of International and Development Studies.
<http://dx.doi.org/10.4000/poldev.2354>
- Ocampo, José.** 2020. "Industrial Policy, Macroeconomics and Structural Change." Center on Global Economic Governance Working Paper 81.
- Orgun, Bilgin.** 2012. "Strategic Trade Policy versus Free Trade." *Procedia - Social and Behavioral Sciences*, 58: 1283-1292. <http://dx.doi.org/10.1016/j.sbspro.2012.09.1111>
- Ricci, Lucca.** 1999. "Economic Geography and Comparative Advantage: Agglomeration versus Specialization." *European Economic Review*, 43(2): 357-377.
[http://dx.doi.org/10.1016/S0014-2921\(98\)00065-8](http://dx.doi.org/10.1016/S0014-2921(98)00065-8)
- Salvatore, Dominick, and Fred Campano.** 2019. "Global Implications of US Trade Policies for Reducing Structural Trade Imbalances." *Journal of Policy Modeling*, 41(3): 537-554. <http://dx.doi.org/10.1016/j.jpolmod.2019.03.020>
- Spencer, Barbara, and James Brander.** 1983. "International R&D Rivalry and Industrial Strategy." National Bureau of Economic Research Working Paper 1192.
- Wooldridge, Jeffrey.** 2002. *Econometric Analysis of Cross Section and Panel Data*. Cambridge, M. A.: The MIT Press.

THIS PAGE INTENTIONALLY LEFT BLANK