

# CUADERNOS DE ECONOMÍA

ISSN 0121-4772

# 71

Facultad de Ciencias Económicas  
Escuela de Economía  
Sede Bogotá



UNIVERSIDAD  
**NACIONAL**  
DE COLOMBIA

# TRADE DIVERSIFICATION IN COLOMBIA, 1991-2011

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**Argüello, R. (2017). Trade diversification in Colombia, 1991-2011. *Cuadernos de Economía*, 36(71), 345-378.**

In this paper we describe the evolution of international trade and the behaviour of export diversification in Colombia during the 1991-2011 period. In order to measure trade diversification and follow its behaviour throughout the period, we employ alternative ways of decomposing trade flows in their intensive and extensive margins, using the latter as a measure of diversification. The results indicate that trade diversification in Colombia is relatively limited, and seems to follow a pattern according to which exports are diversified mainly through increases in the number of products rather than in the number of partners. At the same time imports tend to diversify mainly by increases in the number of countries of origin rather than by the number of products. Furthermore, trade with upper middle-income countries seems to be an important driver of trade diversification.

**Keywords:** Export diversification, import diversification, trade margins, Colombia, empirical trade studies.

**JEL:** F14, O24.

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Sugerencia de citación: Argüello, R. (2017). Trade diversification in Colombia, 1991-2011. *Cuadernos de Economía*, 36(71), 345-378. doi: [10.15446/cuad.econ.v36n71.39261](https://doi.org/10.15446/cuad.econ.v36n71.39261).

**Este artículo fue recibido el 8 de agosto de 2013, ajustado el 29 de marzo de 2016 y su publicación aprobada el 7 de abril de 2016.**

**Argüello, R. (2017). Diversificación del comercio internacional en Colombia: 1991-2011. *Cuadernos de Economía*, 36(71), 345-378.**

En este artículo se describe la evolución del comercio internacional y el comportamiento de la diversificación de este en Colombia durante el período 1991-2011. Para la medición de la diversificación del comercio y su seguimiento, se emplean formas alternativas de descomponer el comercio en sus márgenes intensivo y extensivo, empleando estos últimos como medida de la diversificación. Los resultados indican que la diversificación del comercio es relativamente limitada y que parece seguir un patrón de acuerdo con el cual las exportaciones se diversifican principalmente mediante un mayor número de productos, mientras que las importaciones lo hacen principalmente a través de un mayor número de países de origen. Además, el crecimiento del comercio con países de ingresos medios altos parece ser un determinante de este patrón.

**Palabras clave:** diversificación de exportaciones, diversificación de importaciones, márgenes de comercio, Colombia, estudios empíricos de comercio.

**JEL:** F14, O24.

**Argüello, R. (2017). Diversification du commerce international en Colombie : 1991-2011. *Cuadernos de Economía*, 36(71), 345-378.**

Dans cet article, nous décrivons l'évolution du commerce international et le comportement de sa diversification en Colombie pour la période 1991-2011. Pour mesurer cette diversification et son suivi, nous utilisons des formes alternatives de décomposition du commerce dans ses marges intensive et extensive. Les résultats montrent que la diversification du commerce est relativement limitée et qu'elle semble suivre un patron selon lequel les exportations se diversifient principalement via un plus grand nombre de produits tandis que les importations le font surtout à travers un plus grand nombre de pays d'origine. En outre, la croissance du commerce avec les pays de revenus moyens-élevés semble être un élément déterminant de ce patron.

**Mots-clés:** Diversification des exportations, diversification des importations, marges de commerce, Colombie, études empiriques de commerce.

**JEL :** F14, O24.

**Argüello, R. (2017). Diversificação do comércio internacional na Colômbia: 1991-2011. *Cuadernos de Economía*, 36(71), 345-378.**

Neste artigo, aparece a evolução do comércio internacional e do comportamento da diversificação dele na Colômbia durante o período 1991-2011. Para a medição da diversificação do comércio e o seu acompanhamento, são utilizadas formas alternativas para decompor o comércio nas suas margens intensiva e extensiva, utilizando estas últimas como medida da diversificação. Os resultados indicam que a diversificação do comércio é relativamente limitada e que parece seguir um padrão de acordo com o qual as exportações se diversificam principalmente por um maior

número de produtos, enquanto as importações o fazem principalmente através de um maior número de países de origem. Além disso, o aumento do comércio com países de receita média alta parece ser um determinante deste padrão.

**Palavras-chave:** Diversificação de exportações, diversificação de importações, margens de comércio, Colômbia, estudos empíricos de comércio.

**JEL:** F14, O24.

## INTRODUCTION

Export and import diversification have been the subject of increased interest in the literature, especially from the viewpoint of their contribution to economic growth. While there is a growing body of empirical work on the subject, there is a notorious shortage of work on this topic in the case of Colombia. A step forward in contributing to fill this void, this empirical research aims to measure trade diversification in Colombia between 1991 and 2011 and to describe its behaviour throughout this period.

Beginning at the end of the 1990s, there has been a new revolution in trade theory with the advent of the so called “new new trade theory”, which is based on the observation that firms are heterogeneous and that this must have implications for trade. According to this idea, firms self-select into the international market based on their productivity levels and expand their international activity by entering new markets and/or broadening the basket of products they export, while at the same time facing a set of fixed costs of entry.

This theory has been developed by a broad set of empirical studies that have aimed at identifying and characterizing a series of stylized facts associated with the relationship between firms and trade, for which the theoretical developments must be able to provide an explanation. One of the avenues that the empirical work has used is the characterization of the behaviour of trade flows through their decomposition along the intensive and extensive margins of trade. Simply put, the intensive margin of trade refers to changes in trade values associated with trade in goods already traded with existing trade partners, while the extensive margin refers to changes in trade values due to the introduction of new goods, the establishment of trade flows with new partners, or a combination of both.

Following from the above, the idea of the extensive margin of trade precisely captures what is commonly understood as trade diversification: the development of new trade flows either due to the introduction of new products or of new trade partners. We use this in order to calculate the margins of trade for Colombia during the 1991-2011 period in order to measure and characterise the performance of trade diversification. Based on recent empirical trade literature, we use two decomposition techniques, one to calculate the values of the intensive and extensive margins of trade on a yearly basis, and the other to appraise the margins of trade’s contribution to trade variation. Using the first, we can visualize the evolution of trade margins and trace their behaviour over time, while from the second, we can learn how much of the contemporary variation in trade values is due to each of the margins.

We use both a trade partner and a product perspective to appraise diversification and explore its behaviour as trade partners are classified according to income level and products are classified according to their economic use. The results indicate that trade diversification in Colombia seems to follow a pattern, according to which exports are diversified mainly through increases in the number of products

rather than in the number of partners. At the same time, imports tend to diversify mainly by increases in the number of countries of origin rather than by the number of products. However, the short-term contribution of diversification is limited and, as an approximation, it can be said that trade diversification through the number of partner countries contributes nine percentage points more to trade variation than product diversification.

The paper is structured as follows: section two provides a broad overview of the role ascribed to trade diversification in the economics literature, while section three reviews the way trade diversification is framed in the more recent trade literature. Section four describes the data used and presents the methodology employed for measuring trade diversification and monitoring its behaviour throughout the 1991-2011 period. Section five discusses the most salient features of Colombian international trade during the period, providing a framework for appraising trade diversification. Section six presents and discusses the results, and section seven provides a summary of the results and some concluding comments.

## **THE ROLE OF TRADE DIVERSIFICATION**

There is no unified treatment in the literature of trade diversification<sup>1</sup>. The study of export diversification has relatively recently evolved around its relationship with economic growth, while examination of import diversification's role has been linked to the increased availability of final goods, access to new or higher quality intermediate goods, and access to new technology.

Export diversification, which can be understood as either the change in the composition of a country's existing export product mix or destination markets, has been deemed important since the early years of the Import Substitution Industrialization strategy. The arguments for export diversification originated from different fronts: vulnerability to commodity shocks, price fluctuations, deterioration of the terms of trade, low income elasticity of demand, etc. (Prebisch, 1950; Singer, 1950). Based on portfolio theory, different approaches to export diversification may be proposed (Ali, Alwang & Siegel, 1991). However, there are potential trade-offs between growth and stability of export earnings that make export diversification no panacea. As Bertinelli, Heinen and Strobl (2009) finds, there may be considerable welfare gains from getting closer to a more optimal export structure, but their magnitude varies widely across economies and openness degrees. It may also lead to greater export income variability.

This perspective runs afoul export specialization, as dictated by comparative advantage trade theories. This is because attempting to diversify the economy's export base beyond what fundamentals dictate results in an inefficient allocation

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<sup>1</sup> While a few exceptions can be found, these exceptions do not provide a consistent research focus.

of resources. However, it can be argued that while export specialization may be important for efficiency and growth, it does matter what the nature of specialization is (Naude, Bosker & Matthee, 2010). For instance, export specialization is positively related to growth, and the strength of the link varies with each sector of specialization (Greenaway, Morgan & Wright, 1999). Also, export specialization in goods with a high technological content has been found to be important for long-term growth (Crespo-Cuaresma & Würz, 2005), and in the presence of knowledge-spillovers, the mix of exported products may have important consequences for growth (Hausmann, Hwang & Rodrik, 2009).

The seminal work of Imbs and Wacziarg (2003) revealed that along the development process, countries first diversify their economic activity and then, at a rather high-income level, tend to once again specialize. As the structure of trade reveals the production structure, the behaviour of the former has been explored throughout the development process and an analogous hump-shaped pattern has been found for exports (Cadot, Carrere & Strauss-Kahn, 2011). Several studies have documented the relationship between export diversification and growth. Funke and Ruhwedel (2001) found a positive relationship between export diversification and per capita GDP and TFP growth in OECD countries. Lederman and Maloney (2003) found that the variables that characterize the structure of trade are also significant determinants of growth rates. Other strands of this literature focus on the determinants of export diversification. The role of absorptive capacity is deemed important, and there is evidence that it is subject to threshold effects (Habiaryemye & Ziesemer, 2006). The relationship between export discoveries and export diversification has been found to be persistent along the development path (Klinger & Lederman, 2011).

Some of the literature on structural change has had a bearing on the relationship between export diversification and growth. Rodrik (2011) found that there is unconditional convergence in labour productivity for a set of manufacturing industries and that diversification of the production base and of exports in the direction of convergence should be good for growth. In a somehow-related fashion, Hausmann *et al.* (2009) construct an index of the 'income level of a country's exports', finding that a higher share of high index value products in a country's export basket is associated with higher future growth.

The study of the role of import diversification has taken a completely different route that has been heavily marked by the pre-eminence of research on the effects that trade reform has had on domestic productivity. There is some evidence that diversification of import origins rises monotonically along the growth path and that, as shown in Jaimovich (2012), this is related to a gradual increase of imports originating in more distant countries. Parteka and Tamberi (2012) argue that import diversification follow a pattern similar to that of export diversification. In their view, relative import and export diversification increases with income levels.

The broadening of final goods imports has two expected effects<sup>2</sup>. On one hand, it follows from the trade models that are based upon the love-for-variety type of preferences that import diversification is expected to have a positive impact on welfare. Feenstra (1994) is an early example of the way in which import diversification impacts on consumers' perceived behaviour. Starting with Feenstra's (1994) contribution, Broda and Weinstein (2006) show that over a period of three-decade, the number of varieties (product-origin combinations) imported by the U.S. more than trebled and that this translated into a 2.6 per cent increase in welfare.

On the other hand, import diversification is expected to increase productivity due to greater competition for domestic firms. This happens because local producers are forced to be more efficient in order to stay in the market, and also because the less productive firms are expelled from the market, causing average productivity to rise. Fernandes (2007) shows that changes in trade policy during the period leading to unilateral liberalization of the Colombian economy resulted in positive changes in productivity that are neither attributable to plant or industry heterogeneity nor to endogeneity of protection or plant exit. Trefler (2004) analyses the impact that the NAFTA has had on Canada's economy and found that Canadian plants increased labour productivity by 14 per cent following the implementation of the agreement.

The case of import diversification related to inputs shows a more varied picture; however, we limit ourselves to some of the most important issues. Productivity gains arising from a greater variety of imported inputs are expected mainly due to lower input prices, higher quality of inputs, and access to embodied technology. These potential sources of productivity gains have been analysed in several theoretical works and explored in a set of empirical papers. We concentrate our attention on the latter for the purpose of providing a general idea of the topic.

Amiti and Konings (2007), use manufacturing census data for Indonesia, and found that tariff reduction on intermediate goods increases productivity by around twice the figure attained from a similar drop in tariffs on the final good. According to Keller (2004), the overall evidence supports the idea that importing is associated with technology spillovers<sup>3</sup>; however, it is still not clear if this takes place through technology embodied in intermediate goods or through other types of diffusion associated with imports. The literature on Foreign Direct Investment (FDI) as a diffusion channel for technology seems closer to providing a consensus: both case and micro-econometric studies suggest that there can be productivity spillovers from FDI, but its effect is heterogeneous across places (Keller, 2004).

Access to higher quality inputs and the corresponding increase in variety seems to be significant to enhance productivity due to imperfect substitution among inputs. This can be seen in the love-of-variety setting, such as in Ethier (1982). However, gains

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<sup>2</sup> We refer to 'broadening' in order to encompass the increase in same-product imports from the same origins and the spring of new products or varieties and origins (import diversification).

<sup>3</sup> A noted exception to this is Muendler (2004).



from input complementarity are made up by both elements from gains from variety and learning spillovers between foreign and domestic goods. Halpern, Koren and Szeidl (2011) estimate that for Hungarian importers there are significant productivity gains arising from imports of inputs.

Lastly, an important issue is that of the increase in the number of domestic varieties produced and exported due to the use of imported inputs. Goldberg, Khandelwal, Pavcnik and Topalova (2010) show that the increase in the number of imported varieties of inputs leads to a substantial increase in the number of domestic varieties produced. Additionally, Bas and Strauss-Kahn (2011) showed that increased imports of intermediates resulted in increases in the number of varieties exported by French firms, and that the effect caused an increase in firms' total factor productivity.

## **A NEW PERSPECTIVE ON TRADE DIVERSIFICATION**

The increasing availability of international trade micro data (product and firm level) has been credited as being one of the bases for the development of new trade theories that are based on the premise that firms are heterogeneous in several dimensions (Bernard, Bradford, Redding & Schott, 2007). Several findings arising from this work that were inadequately explained by the theories developed up until the 1990s are worth mentioning: a) firms are significantly heterogeneous in terms of productivity, size, and other characteristics, even within narrowly defined sectors of activity; b) firms tend to sell most of their output in the domestic market, and becoming an exporter is a rare outcome, which is associated with higher productivity and performance; c) trade liberalization episodes are related with factor reallocation that mainly occurs within an industry; average productivity is increased as the most inefficient firms exit the market and the most efficient enter the export market; and d) trade liberalization is also associated with endogenous changes in firm productivity that impinge upon factor reallocation (Redding, 2010).

A device widely used to describe the dynamics of trade that allows micro-behaviour to be recorded, as well as its impact on the aggregate, is decomposition in the extensive and intensive margins. These can be roughly defined as the portion in trade value that results from changes in the number of existing trade relations<sup>4</sup> –for the extensive margin– and due to changes in the value of previously existing trade relations<sup>5</sup> –for the intensive margin. From a number of firms and exported products perspective, for instance, the extensive margin refers to value changes arising from the entry or exit of new combinations of exporting firms and products

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<sup>4</sup> Changes in the number of firms, traded products, or partner countries.

<sup>5</sup> Changes in prices and quantities affecting existing firm-product-partner country relationships.

exported<sup>6</sup>, while the intensive margin refers to changes derived from movements associated with already existing firm-product combinations. Therefore, the extensive margin captures trade diversification.

The analysis of trade margins has allowed several hypotheses on export dynamics to be identified. Evenett and Venables (2002) identify the existence of a geographic diffusion export pattern for a set of 25 developing countries. According to this, the likelihood that a country imports a certain good from a specific country is higher when the latter exports the good to countries that are neighbour the first. It also establishes that the intensive margin contributed 63% of export-growth for this set of countries between 1970 and 1997. Felbermayr and Kohler (2006) examine the expansion of trade between world manufactures between 1950 and 1997. They found that the extensive margin contributes 40% of trade growth, while Brenton and Newfarmer (2007) found that the extensive margin explains just 20% of export-growth for a set of 99 countries between 1995 and 2004. Amurgo-Pacheco and Pierola (2008) found that for a set of 24 developed and developing countries between 1990 and 2005, the intensive margin is the largest contributor to trade growth, and that it is more important for developed countries.

Bernard, Bradford, Redding and Schott (2009) study of the behaviour of trade margins for the U.S. during 1993-2004 shows that even though in the short-term (year to year variations) the intensive margin dominates trade growth. In the medium to long-term the extensive margin is important to understand the trade dynamics. The extensive margin explains a significant share of trade variation across countries and, in this sense, greatly determines the relationship between trade flows and distance that is captured through the gravity equation (Bernard *et al.*, 2007). The role that trade margins play at different time horizons reflects the fact that new exporting firms enter the market with low activity levels, but, conditional on their survival, grow rapidly and expand to new markets (Albornoz, Calvo, Corcos & Ornelas, 2010).

This type of behaviour has also been documented in Colombia. Eaton, Eslava, Kugler and Tybout (2007) examine firm level data for the 1996-2005 period, and they found that: a) for any year, changes in exports by firms that have been exporting during more than a year are the largest contributor to changes in total exports; b) new entrants tend to survive less than a year and export low volumes, but those that survive grow in an accelerated manner in subsequent years and come to represent around half the expansion of exports along the observed period; and c) as exporters enter and exit markets they seem to follow a pattern, according to which, those that enter Latin American markets first have a higher likelihood of adding new markets than those that enter the U.S. market first.

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<sup>6</sup> In the case of positive growth, this may be due to the following: the entry of new exporters selling products already sold by other firms, the export of new products by firms already exporting, exports of products already exported by some firms but that are now also exported by existing exporters that did not export them before, or any combination of these possibilities.

Trade margins have also been used to analyse trade behaviour during periods of crisis. This route proved useful since the evolution of the margins is indicative of the deepness of the crisis and the speed of recovery. Schott (2009) points out that during the 1990 and 2001 U.S. crises, the drop in trade essentially took place through the intensive margin, which implied that the speed of recovery was high as firm exit or exit of product-partner country pairs was not the main vehicle for the decrease in trade.

## DATA AND METHODOLOGY

As previously mentioned, the purpose of this research is to empirically characterize the evolution of trade diversification in Colombia during the 1991-2011 period. In order to do this, we use transaction level data from the Colombian Customs Agency (DIAN), which deals with all Colombian foreign trade in goods, aggregated them annually, and used the harmonized system (HS) codification at six digits, which is also used as our product definition. Since several updates of the HS took place throughout the period, care was taken to use appropriate concordance tables in order to attain a uniform product codification, and to avoid counting code changes as product entry and exit.

We disregard the firm dimension and concentrate on products<sup>7</sup> and trade partners. We do this for simplicity and to have a more direct reference between our results and the trade diversification analysis that is usually carried out. In this regard, this work is an explorative characterization of trade diversification patterns over a relatively long period that aims to identify stylized facts that may prove useful in order to be able to further analysing Colombian trade dynamics and their relationship with economic growth and trade policy.

Several ways to measure trade diversification are used in the literature; the most common being concentration indexes such as the Herfindahl, Gini and Theil indexes. Simple product or country-of-destination counts are also used as measures of trade diversification, although there is a preference for relative measures. Hummels and Klenow (2005) define margins in relation to world exports, and Brenton and Newfarmer (2007) use active trade flows as a proportion of all potential trade flows. However, with the development of trade theories based on firm heterogeneity, the extensive margin of trade has become used as a measure of trade diversification. In general, the intensive margin measures changes in existing trade lines trade, while the extensive margin measures changes associated with new trade lines. When defined on the basis of export destinations, the extensive margin captures trade with new countries (whether in the same or new products); however, when defined on the basis of products, it captures trade in newly exported products (irrespective of their destination).

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<sup>7</sup> As defined above.

Therefore, we measure diversification by equating it to the extensive margin of trade in the context of a simple decomposition. This is based on Bernard *et al.* (2009) and can be represented as follows:

$$T_t = N_{j,t} * A_{i,t} * F_{ij,t} \quad (1)$$

where,  $T_t$  is total trade (exports or imports) of the economy in a given year,  $N_{j,t}$  is the total number of products or destinations in time  $t$ ,  $A_{i,t}$  is the average number of destinations in time  $t$  (when  $j$  is defined over the set of products) or the average number of products in time  $t$  (when  $j$  is defined over the set of destinations), and  $F_{ij,t}$  is the average value of trade per  $A_{i,t}$ , given  $N_{j,t}$ . Therefore,  $F_{ij,t} = T_t / (N_{j,t} * A_{i,t})$ . If we, for instance, consider exports and their destination markets, then  $F_{ij,t}$  is the average value of trade (the intensive margin of trade) while  $N_{j,t}$  and  $A_{i,t}$  constitute the extensive margin. The first component measures trade diversification in terms of the total number of destinations while the second does so by measuring the average number of products exported to a market. In this way, even though in this case we observe export diversification defined in geographic terms, we are able to decompose it into a geographical and a product dimension simultaneously.

Furthermore, we can analyse margin variation within the destination and product dimensions by simply noting that equation (1) can be written as:

$$T_t = \sum_{j=1}^n C_{j,t} = \sum_{j=1}^n (a_{ij,t} * f_{ij,t}) \quad (2)$$

where  $C_{j,t}$  is total trade (exports or imports) with country  $j$  at time  $t$ ,  $a_{ij,t}$  is the number of products traded with country  $j$  at time  $t$ , and  $f_{ij,t}$  is the average value of trade per product traded with country  $j$  at time  $t$  (so, that  $f_{ij,t} = C_{j,t} / a_{ij,t}$ )<sup>8</sup>.

Given this, trade with a particular destination (or of a particular product) can be expressed as:

$$\ln C_{j,t} = \ln a_{ij,t} * \ln f_{ij,t} \quad (3)$$

allows for a decomposition of trade between the intensive (average value of trade) and extensive (number of destinations or products) margins. Having set the identity in (3), we can regress  $\ln a_{ij,t}$  and  $\ln f_{ij,t}$  on  $\ln C_{j,t}$  to obtain the relative contribu-

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<sup>8</sup> The same approach works in the case in which annual trade is added for products instead of destinations.

tions that the two margins make to trade across destinations or products for each year in the database<sup>9</sup>. In this way, we can trace the role of the extensive margin along the destination or the product spaces as the coefficients in the above regressions can be read as a measure of how the intensive and extensive margins of trade explain the variation of trade across destinations or products.

## A PRIMER ON THE COLOMBIAN TRADE STRUCTURE AND ITS EVOLUTION

Colombian international trade was relatively dynamic throughout the 1991-2011 period, especially from 2003 onwards. Exports grew at an annual compound rate of 10.9% during this time-span, while imports grew at 12.7%; the base year value was multiplied by almost eight in the case of exports and by 11 in the case of imports. Over the same period, world exports grew at an annual compound rate of 8.6% and imports at 8.5%<sup>10</sup>. As for the trade balance, it has been negative for the majority of years (15 out of the 21 observed), and its value has ranged from 18% to 0.1% of total trade.

### A Product Perspective

Graph 1 shows the evolution of Colombian total exports and of its components in terms of the BEC nomenclature. By analysing this, it is clear that exports of intermediate goods have dominated the Colombian export structure and that the major dynamics experienced since 2003 is mostly due to growth in this type of trade. Exports of consumption goods were flat until 2003 and then doubled in value in current dollars by 2007, while exports of capital goods stagnate throughout the period. The share of intermediate goods in terms of total exports has gone from 66.2% in 1991 to 86.3% in 2011 with an almost permanent increasing trend.

Graph 2 provides a similar picture but from the import side. As can be seen, the majority of Colombian imports are intermediate goods. However, their share in total imports is patchy and a downward trend can be seen throughout the period (lowering to 53.9% in 2011). Imports of capital goods show the second highest share in total imports, increasing from 20.7% in 1991 to 26.5% in 2011, while those for consumption goods show the smallest but fastest growing shares, increasing from 10.6% in 1991 to 18.7% in 2011.

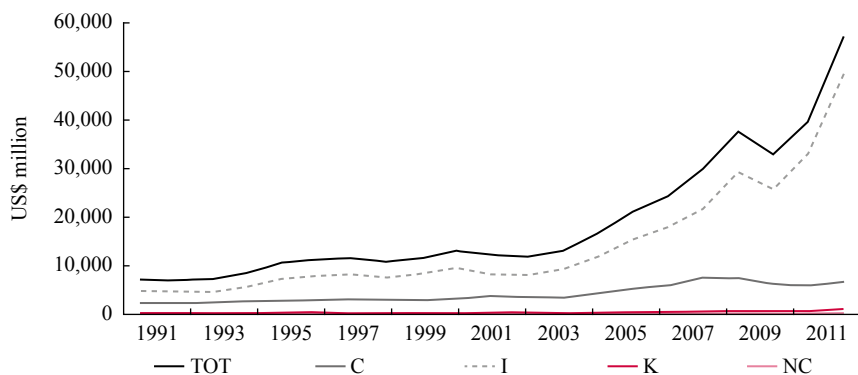
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<sup>9</sup> This is done by OLS. For details see Bernard *et al.* (2009).

<sup>10</sup> World trade data from the World Trade Organization.

**Graph 1.**

## Colombian Exports and Their Structures in Terms of the BEC Nomenclature

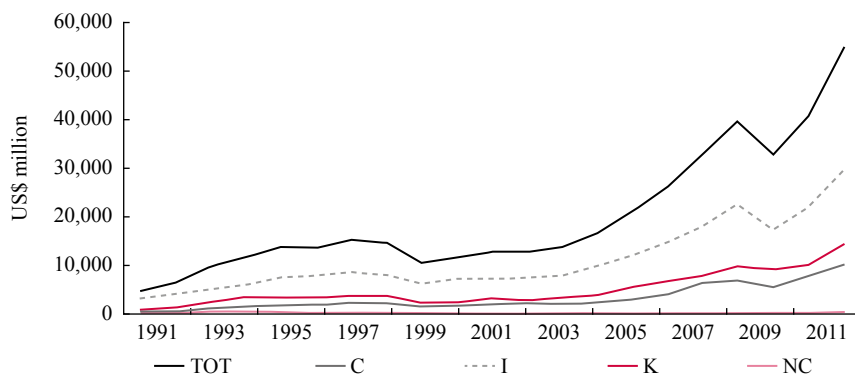


TOT = total exports; C = consumption goods; I = intermediate goods; K = capital goods; NC = goods not classified.

Source: Author's calculations based on DIAN/DANE data.

**Graph 2.**

## Colombian Imports and Their Structures in Terms of the BEC Nomenclature



TOT = total imports; C = consumption goods; I = intermediate goods; K = capital goods; NC = goods not classified.

Source: Author's calculations based on DIAN/DANE data.

**A Trade Partner Perspective**

We now briefly provide a depiction of trade behaviour from the standpoint of trade partners, which we classify into terms of current income level (using the World Bank classification). Graph 3 shows the composition of Colombian trade

for three points in time during the period considered. By viewing the panels on the left, it follows that the main types of export destinations are High Income (HI) and Upper-Middle Income countries (UMI). It also follows that the export share of UMIs has shown an increasing trend while that of HIs a decreasing one. These trends have sustained throughout the period, although from 2008 onwards there was a slight reversal. Moreover, the other stylized fact that emerges is the modest increase in export shares corresponding to Low-Middle Income countries (LMI).

On the import side (shown in the right panels of Graph 3), it can be observed that trade with HIs and UMIs accounts for the majority of trade. Also, there is a downward trend in HIs' import shares that is compensated by the UMI's behaviour. However, in contrast with exports, the decrease in HIs' import shares is systematic and pronounced, and import shares for these two country groups almost exactly offset each other.

With respect to the product composition of trade with each type of partner, illustrated for the exports case by Graph A1.1 in the appendix, it has been shown that trade in intermediate goods contributes the largest shares to all partner types (with the exception of Low Income countries (LI), which are not shown in the graph) and that these shares have increased over the period. In the case of HIs, the increase has been steady and represents a 21 percentage point increase over the period, while in the case of UMIs it has occurred during the last four years (from 55.7% in 2007 to 76.9% in 2011). For LMIs, the increase in the export share of intermediates has been steady, except for a 12 percentage points jump between 2008 and 2009. Lastly, the export share of intermediates for LIs decreased 14 percentage points ending at 35.5%.

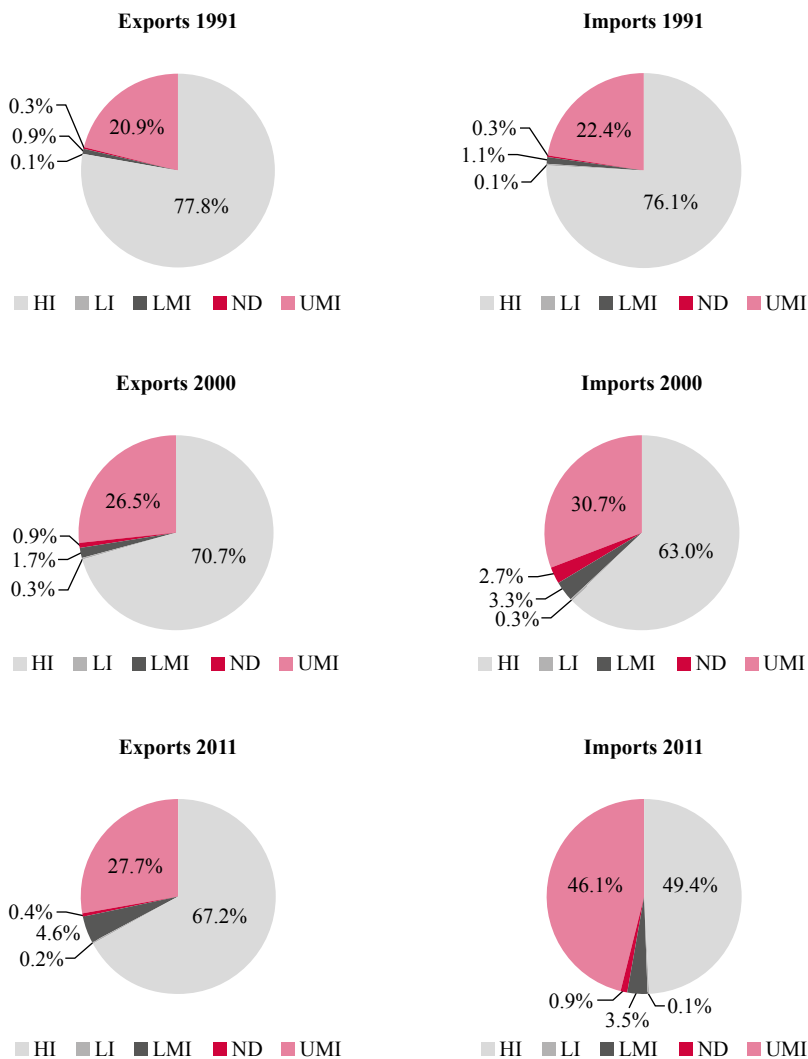
The second largest export to all destination types (except LIs) is consumption goods. However, their share has decreased across destination types. In the case of HIs, there has been a sustained decline that has led to a shrink of 20 percentage points, while in the case of UMIs there has been a 23 percentage points decrease that took place between 2008 and 2011. In the case of LMIs, there has been a loss of almost 36 percentage points from 1996 to 2011. For LIs there has been an increase of 12 percentage points throughout the whole period. There are essentially no exports of capital goods in the case of HIs; and UMIs are more important as destination as they have shares ranging from 3.7% to 7.3% and a decreasing trend. Trade of this product group is more important for LMIs but it has shown a decreasing trend over the period.

The behaviour of imports is illustrated in Graph A1.2, which can be found in the appendix. As suggested by the panels at the top, import shares for product groups coming from HIs tend to be stable throughout the period. A very different picture emerges in the case of UMIs, as there has been a clear recomposition of imports. The share of consumption goods increased from 8.2% in 1991 to 26.2% in 2011 (although, all the increase took place from the beginning of the period until 2001), and the import share of intermediates decreased from 84% in 1991 to 48.1% in

2011 (a change that took place until 2007). The rest of the decrease in the share of intermediates was offset by the increase in the import share of capital goods, which increased by almost 18 percentage points.

**Graph 3.**

Composition of Colombian Exports and Imports According to Type of Trade Partner



HI: high income countries; LI: low income countries; LMI: lower middle income countries; ND: not classified; UMI: upper middle income countries.

Source: Authors' calculations based on DIAN/DANE data.



Imports from LMIs also show a distinctive compositional change, essentially favouring consumption goods and to a lesser extent capital goods at the expense of intermediates that, nonetheless, continue to be the most important import group for these types of countries. Finally, the situation for imports from LIs (not shown in the graph) is also of marked changes. In this case, the evolution of the import structure has favoured consumption goods over intermediates and capital goods.

## RESULTS

It has been shown that short-run changes in exports are mostly explained by the intensive margin of trade since new exporters and newly developed product-destination pairs tend to be of a smaller size than existing exporters and trade flows. Furthermore, conditional on survival, recent exporters tend to grow at a relatively high rate and trade depends on a small set of big exporting firms (Bernard *et al.*, 2009; Bernard, Bradford, Redding & Schott, 2012; Eaton, Eslava, Kugler & Tybout, 2008). Consequently, the contribution of the extensive margin to trade growth is larger in the medium to long-term.

Our estimate of the contribution of the extensive margin to Colombian trade is in line with figures that can be found in the literature. As shown in Table 1, in the case of exports the extensive margin contributed 37% to export growth between 1991 and 2011, and the intensive margin was 63%. When the basic criterion for appraising diversification is the number of trade partners, its contribution is 11%, while that of the average number of goods exported to a partner is 26%. Moreover, when viewed from the perspective of the number of goods, its contribution is 12% and that of the average number of partner countries per good is 25%. There is, therefore, considerable symmetry between the two perspectives. Regarding imports, the contribution of the number of trade partners to imports growth is 17%, and the average number of products imported is 19%. However, when the perspective is the number of goods, its contribution is 4% and that of the average number of partners is 32%.

The above implies that, in terms of exports, trade tends to propagate in a relatively balanced manner across trade partners and products do not have any clear precedence. In contrast, in terms of imports, it seems that is the number of partner countries is the factor that leads to the expansion of trade since there is no sizable difference between this and the average number of goods. However, there is an important difference between the number of goods and the average number of partner countries.

As can be seen in Table 1, there is a striking difference between the contribution of the extensive and intensive margins to trade growth, both for exports and imports, when we compare the 1991-2011 period with the 1991-2001 period. For the latter, the contribution of the extensive margin is much larger, and it greatly outweighs the contribution of the intensive margin. This result arises as a consequence of a pattern

that spans along the whole period: the (cumulative) contribution of the intensive margin decreases from the beginning of the whole period until the first half of the 2000s (until 2003 for exports and roughly 2001 for imports). It then increases until the end of the period. This behaviour matches two distinguishable Colombian international trade phases (illustrated in Graphs 1 and 2): a relatively low growth period between 1991 and 2003 for exports and between 1996 and 2002 for imports, and a higher growth period for both from 2003-4<sup>11</sup>.

**Table 1.**

Contribution of the Margins to Trade Growth (percentages)

Item	Period	Extensive Margin				Intensive Margin
		Number of Trade Partners	Average Goods	Number of Goods	Average Partners	Average Trade
Exports	1991-2001	16	67	35	48	17
	1991-2011	11	26	12	25	63
Imports	1991-2001	40	25	11	54	35
	1991-2011	17	19	4	32	64

Source: Author's calculations based on DIAN/DANE data.

Within the previously mentioned context, we now discuss the of year-to-year behaviour changes in the margins of trade that are derived from equation (1) and then, in a second subsection, we move to the cross-section results given by equation (3). It should be noted that, in both cases, the margins are calculated for each year independently from the others. That is, we deal with 'static' margins in the sense that no cumulative effects over time are considered and, therefore, when we refer to the evolution or the behaviour of the margins, we are making reference to the series of yearly calculations that, in some sense, lead to the results that have already been discussed above.

## Year-to-Year Monitoring of the Margins

Calculation of the margins of trade, as given by equation (1), provides an absolute 'measurement' of their importance. However, this is not significant in itself as there is no benchmark against which to compare the values. This limitation can be overcome if we trace the behaviour of the margins back over time since this allows for an appreciation of their evolution. Furthermore, to have a better understanding of

<sup>11</sup>The reasons for this behavior are beyond the scope of this work. It may have to do with a set of factors including the opening up of the economy and the ensuing adjustment period, the enter into force of a set of free trade agreements (in particular the ones with other Andean countries), and the crisis of 1998 that had an important impact on trade.

the values of the margins, it is convenient to express them in relative terms, so that comparing absolute values belonging to different sets is avoided when interpreting them<sup>12</sup>. Considering the above, all margins have been “normalized” to proportions; for instance, the number of destinations is not expressed as the destination count but as a percentage of the total number of potential destinations. The only exception to this is the value of the average trade flow. Hence, the extensive margin is measured in terms of its progression (or lack of) towards a hypothetical full diversification<sup>13</sup>.

Graph 4 shows the path followed by the export margins when measured from a destinations standpoint. In this case, the extensive margin has two components: one is related to the relative number of export destinations (*numdes*) and the other is related to the relative average number of products exported to a destination (*avepro*). The intensive margin is given by the value of exports of the average product to the average destination (*aveexp*). Therefore, equation (1) takes the following form:

$$T_i = numdes_i * avepro_i * aveexp_i \quad (4)$$

The graph shows that the extensive destination margin (*numdes*, read on the left scale) increases from 56.7% of all possible destinations in 1991 to 71.3% in 2011; this has a 14.6 percentage point increase. The extensive product margin (*avepro*, read on the right scale) goes from 2% of all possible products to 3.5%; this has a 1.5 percentage point increase. For its part, the intensive margin (*aveexp*, read on the left scale) goes from US\$0.49 million in 1991 to US\$1.83 million in 2011: a 270% increase. Meanwhile, the growth behaviour of the extensive margins is relatively smooth and there is a clear regime switch in the behaviour of the intensive margin: it grew within a band similar to the one registered for the extensive margins until 2004 and then diverged.

In this sense, until 2004 there is a relative balance in the way the margins evolve, this situation allows the extensive margin to increase its contribution to export growth (with a bias in favour of the average number of products). However, since 2004 the intensive margin of trade has dominated the dynamics of Colombian exports, and this trend has been compounded by a decrease in the growth rate of the extensive margins. This most notably took place from 2004 onwards and primarily affected the average number of products.

When distinguished by type of product according to the BEC classification, the extensive destination margin for the whole period increases 15.8 percentage points for intermediates, 13.8 percentage points for consumption goods, and 16.9 percentage points for capital goods. The extensive product margin increases 1.3,

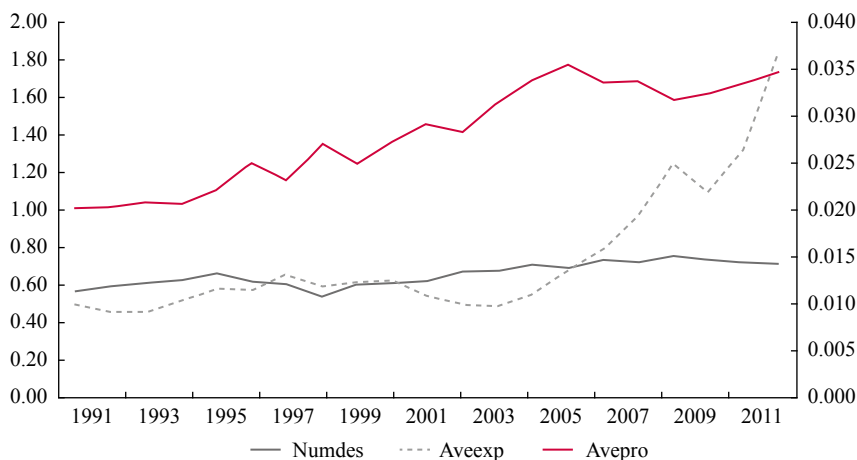
<sup>12</sup>For instance, the change in the destination or product count by one unit, or the change in the average number of destinations for a product, or the change in the average number of products to a destination.

<sup>13</sup>In theory, no economy would ever achieve this full diversification as it would not be possible to produce all possible goods, or export all of them to all possible destinations.

2, and 1.7 percentage points for intermediates, consumption, and capital goods, respectively, and the intensive margin increases 349% for intermediates, 53.2% for consumption goods, and 283% for capital goods.

#### Graph 4.

##### Export Margins from the Destination Viewpoint



Avepro: read on right scale.

Source: Author's calculations based on DIAN/DANE data.

As can be seen in the above, it is clear that the main contributor to the overall increase in the intensive margin is the intermediates group. Also, export diversification essentially operates through the increase in destinations rather than through the number of goods exported to each destination.

Table 1 shows the behaviour of export margins when distinguished by type of trade partner. As expected, the intensive margin is the main contributor to trade changes, while the extensive destination margin is the key driver of diversification (and the contribution from UMIs is the leading force determining this result). In terms of product diversification, results are nil across the board. Hence, from a country type perspective, both HIs and UMIs contribute to the increase in the intensive margin. Conversely, for the extensive destination margin, UMIs contribute the most.

The evolution of the margins of trade from an import perspective, illustrated in Graph 5, is similar to the one found in the case of exports, with a few differences<sup>14</sup>. First, the intensive margin (aveimp, read on the left scale) increased 362 times during the period, and was the most important force in shaping the import behaviour. However, its increase started from a considerably lower base than was the case of

<sup>14</sup>In this case, equation (1) becomes:  $T_i = numori_i * avepro_i * aveimp_i$ .

exports and its level did not reach that of average exports (the relationship between the two is slightly higher than 1:2 in favour of average exports). Second, the extensive origin margin (numori, read on the left scale) contributed the most to import diversification with a 26 percentage point increase. This change is slightly more than 10 percentage points above the one registered in the case of exports; the result is that the margin, which was below exports, surpasses it. Third, the extensive product margin (avepro, read on the right scale) contributes the least to import changes and therefore to import diversification. Nonetheless, its behaviour is marginally better than in the case of exports, increasing from 3.9% of products to 6.2% over the whole period.

**Table 2.**

Changes in Margins of Trade for Colombian Exports Between 1991 and 2011 in Terms of Destination

Partner Type	Extensive Margin <sup>a</sup>		Intensive Margin <sup>b</sup>
	Product	Destination	
High Income	1.1	8.3	287.0
Low Income	0.2	22.0	92.7
Lower-Middle Income	1.2	15.3	1,456.8
Upper-Middle Income	2.8	21.8	366.6

<sup>a</sup> Percentage point changes. <sup>b</sup> Percentage change.

Source: Author's calculations based on DIAN/DANE data.

In contrast to the exports case, when distinguished by type of product, distinctive patterns emerge. The extensive product margin for intermediates, the largest import product group, shows very close coincidence with the general import pattern. It has a 1.6 percentage point increase, and a slightly below average change in the extensive origin margin (with a 24.8 percentage point increase). The noticeable feature in this case is a decrease in the intensive margin, equivalent to an annual compound rate of -0.5%, which determines that changes in imports of intermediates are largely dominated by the extensive margin (in particular the extensive origin margin).

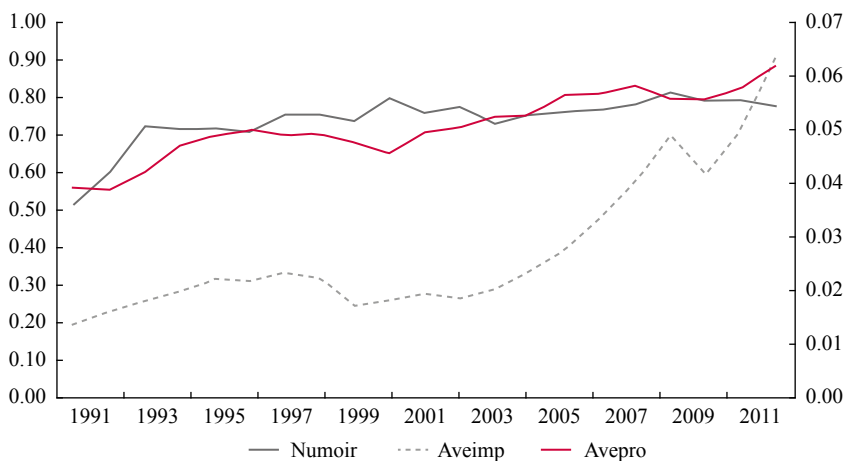
In the case of capital goods, the change in the extensive product margin is well above the total import average with a 1.4 percentage point increase. The change in the extensive origin margin is set consistently below the average with a 26.8 percentage point increase, and the change in the intensive margin is situated substantially below the average with a 45% increase. Therefore, the extensive origin margin plays an important role in determining the behaviour of imports during the period.

As for consumption goods, the picture that emerges also favours the role of the extensive margin. The evolution of the extensive product margin is above the figure for total imports and the extensive origin margin is below. There are increases in

the order of 4.3 and 28 percentage points for the product and origin margins, respectively, and the intensive margin increases just 6.7%. This result is partly due to the relatively wide fluctuations in the average value of imports for this product group.

### Graph 5.

#### Import Margins from the Origin Viewpoint



Avepro: read on right scale.

Source: Author's calculations based on DIAN/DANE data.

It follows from the above that, even though in the aggregate the intensive margin dominated changes in imports throughout the period, the extensive origin margin plays a more significant role than in the case of exports. Furthermore, when observed at product group level, the significance of the extensive origin margin is enhanced. This indicates that its relatively less important role at the aggregate level is determined by a composition effect and that, overall, trade diversification is more significant for imports than it is for exports.

Additionally, Table 3 shows changes in the trade margins when imports are disaggregated by type of country of origin. It then follows from there that import trade with UMIs determines the aggregate behaviour of imports. The intensive margin plays a very important role in the evolution of imports from UMIs, and this reflects the increase in trade with these types of countries. Nonetheless, the role of the extensive margin is also relevant: the average number of imported products increased almost 5 percentage points (about 233 products) and the number of countries of origin increased 29.1 percentage points (about 16 countries). HIs are similar in that the intensive margin dominates, although significantly less than for total imports. Additionally, the pace of change in the extensive margin, both in

terms of the product and origin dimensions, is less than in the case of UMIs. Import behaviour from LMIs is somehow midway between UMIs and HIs with respect to the extensive margin. It is, however, substantially below them with respect to the intensive margin. Therefore, in the relatively modest increase in import share for these types of countries, the extensive origin margin plays an important role. The same can be said for import trade with LIs.

**Table 3.**

Changes in Margins of Trade for Colombian Imports Between 1991 and 2011, Origin Perspective

Partner Type	Extensive Margin <sup>a</sup>		Intensive Margin <sup>b</sup>
	Product	Origin	
High Income	2.9	16.7	286.5
Low Income	0.3	46.3	117.2
Lower-Middle Income	2.4	25.4	126.5
Upper-Middle Income	4.7	29.1	511.2

<sup>a</sup> Percentage point changes. <sup>b</sup> Percentage change.

Source: Author's calculations based on DIAN/DANE data.

We have so far examined the evolution of exports and imports from the perspective of trade diversification as defined by trade partners and then disaggregated them based on the products and countries categories. We will now do the same from the perspective of products. In this case, for exports, equation (1) becomes:

$$T_i = numpro_i * avedes_i * aveexp_i \quad (5)$$

The intensive margin is now defined as the average value of exports to the average destination of a given product (*aveexp*, read on the left scale in the graph), while the extensive margin has two components. The extensive destination margin is the average number of destination countries to which a product is exported (*avedes*, read on the right scale in the graph) and the extensive product margin is the number of products exported by the country (*numpro*, read on the right scale in the graph). Graph 6 shows the evolution of the margins of trade for exports from the product viewpoint.

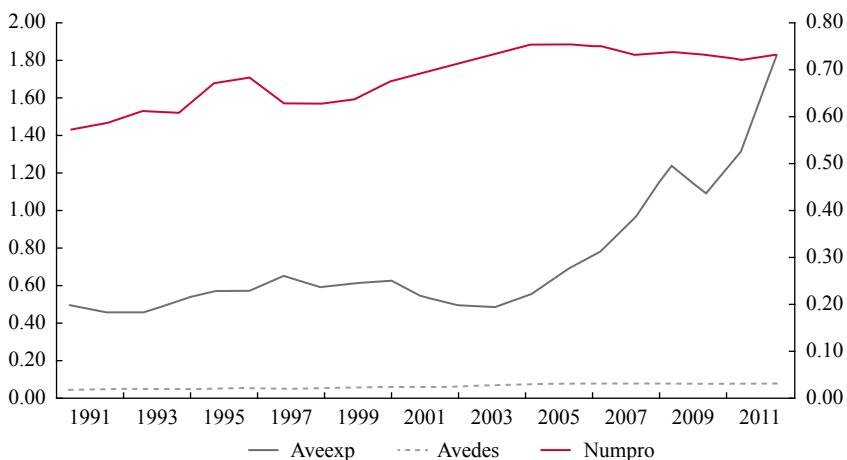
As can be seen in the graph, the extensive product margin increased 15.9 percentage points, equivalent to 789 new products exported throughout the period, and the extensive destination margin increased 1.4 percentage points. This is equivalent to an increase of 3.5 destinations for the average product<sup>15</sup>. As the behaviour of the

<sup>15</sup>Net churn.

intensive margin is the same under both approaches, there is no need to comment on it. Nonetheless, it should be noted that the extensive product margin increases slightly more than the extensive destination margin, while the average number of destinations increases slightly less than the average number of products.

### Graph 6.

#### Export Margins from the Product Viewpoint



Avedes and numpro: read on right scale.

Source: Author's calculations based on DIAN/DANE data.

When analysing the export margins when classifying products according to the BEC nomenclature, the extensive product margin increases 17.2 percentage points for intermediates, 17 percentage points for capital goods, and 11.5 percentage points for consumption goods. As for the extensive destination margin, the corresponding percentage increases are 1.2, 1.3, and 1.2 for intermediates, capital, and consumption goods. Hence, in all cases the largest diversification effect comes from the extensive product margin.

When classified by country type, the trade margins show the changes presented in Table 4. Changes in the intensive and extensive destination margins for HIs are close to those corresponding to the total number of exports, while the change in the extensive product margin is more than four percentage points below. This indicates that trade with this type of country is not the most dynamic force behind product diversification. This role corresponds to trade with UMIs, which not only shows a relatively dynamic intensive margin, but specifically a relatively high



extensive product margin (the percentage point increase for this country type represents a rise of 908 products). LMIs show a large increase in the intensive margin and lower than average changes in the extensive margins, which marginally contribute to the general behaviour of exports.

**Table 4.**

Changes in Margins of Trade for Colombian Exports Between 1991 and 2011, Product Perspective

Partner Type	Extensive Margin <sup>a</sup>		Intensive Margin <sup>b</sup>
	Destination	Product	
High Income	1.2	11.2	287.0
Low Income	0.4	4.3	92.7
Lower-Middle Income	1.2	15.7	1,456.8
Upper-Middle Income	3.5	18.3	366.6

<sup>a</sup> Percentage point changes. <sup>b</sup> Percentage change.

Source: Author's calculations based on DIAN/DANE data.

Graph 7 shows the evolution of trade margins for imports. In this case the intensive margin is coded as *aveimp* (read on the left scale), the extensive origin margin is coded as *aveori* (read on the right scale), and the extensive product margin is coded as *numpro* (read on the left scale)<sup>16</sup>. The extensive origin margin increased 2.8 percentage points throughout the period, while the extensive product margin increased by 8.4 percentage points. Hence, compared with exports, in this case the extensive margin is less important to explain the behaviour of trade. However, it is important to note that this result is influenced by the fact that import product diversification is already high. The relative number of products imported increased from 83.8% in 1991 to 92.2% in 2011 and, hence, import growth should very likely be accommodated either through the extensive origin margin or the intensive margin (or both).

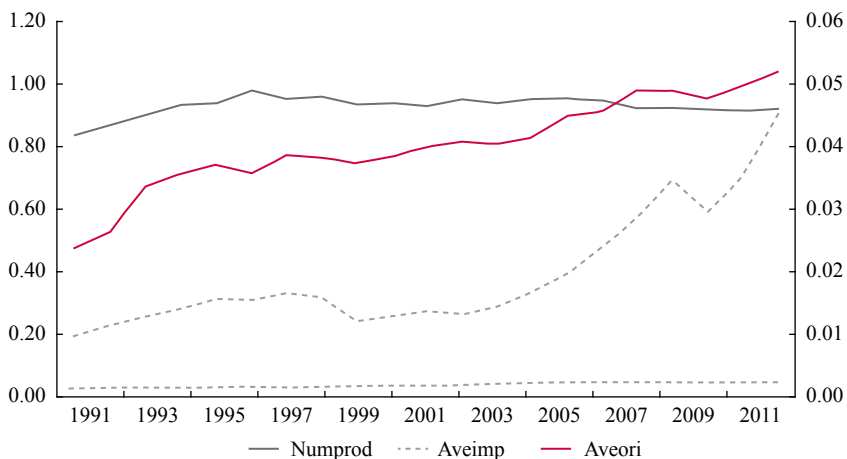
If imports are classified according to product type, intermediates and consumption goods show the largest changes in the extensive product margin (4.6 and 3.7 percentage points increases, respectively). They are, however, still below the result found for the total number of imports. In contrast, there is no change in this margin for capital goods, the increase of which is 0.3 percentage points over the period. The behaviour of the extensive origin margin is relatively more homogeneous among product types: it increases 2.3, 3.4, and 3.7 percentage points in the cases of intermediates,

<sup>16</sup>Therefore, in this case equation (1) reads:  $T_i = numpro_i * aveori_i * aveimp_i$ .

capital and consumption goods. As for the intensive margin, for intermediates there is an increase of 317% the number is 551% for capital goods, and 407% for consumption goods. Therefore, the two major divergences between the result for all imports and the results at the product group level lie in the extensive product margin in all cases and in the intensive margin for capital and consumption goods.

### Graph 7.

#### Import Margins from the Product Viewpoint



Aveori and numprod: read on right scale.

Source: Author's calculations based on DIAN/DANE data.

When imports are classified according to the type of country of origin, the most striking result, as shown in Table 5, is the large contribution to all margins of import trade with UMIs. The extensive origin margin increases almost 1.7 times more than the general result. The extensive product margin increases almost 4 times more, and the intensive margin increases 1.4 times more. In the case of HIs, the extensive margin changes are relatively close to the general values, while the intensive margin increases are just 0.8 times the value corresponding to the general case. These results are consistent with the relative decline in import trade with HIs in a fashion that does not imply a shift in the trade pattern in the sense of altering its product or country of origin composition. In terms of LMIs, changes in the extensive origin and intensive margins are below the general result: the first in a relatively moderated manner and the second in a very significant one. The extensive product margin shows the highest dynamics among all cases (implying that, on average, import trade with LMIs grows importantly through new product lines).

**Table 5.**

Changes in Margins of Trade for Colombian Imports Between 1991 and 2011, Product Perspective

Partner Type	Extensive Margin <sup>a</sup>		Intensive Margin <sup>b</sup>
	Origin	Product	
High Income	3.4	7.6	286.5
Low Income	0.9	9.1	117.2
Lower-Middle Income	2.0	39.8	126.5
Upper-Middle Income	4.7	33.1	511.2

<sup>a</sup> Percentage point changes. <sup>b</sup> Percentage change.

Source: Author's calculations based on DIAN/DANE data.

### Evolution of Margins in the Cross-Section

Results arising from equation (3) complement the findings presented above in the sense that they explore the intensive and extensive margins of trade across trade partners or products. They also help in assessing the importance of trade diversification. Using equation (3) allows us to calculate the contribution of each margin of trade to explain the variation in trade values across trade partners or products for a given year. Therefore, low contributions to the extensive margin imply that either the number of products traded with a trade partner or the number of countries with which a product is traded, explain a small percentage of the variation in trade across countries or products. This implies that the extensive margin is of low importance.

When trade partners is the criterion to observe the evolution of trade, the number of exported products to a destination is the extensive margin (*i.e.* trade diversification), and the average value of exports per product is the intensive margin. In the case of exports, the relative contributions of the intensive and extensive margins were notably stable during the period, yielding an overall average of 77.9% for the intensive margin (with a coefficient of variation of 1.33) and of 22.1% for the extensive margin (with a coefficient of variation of 4.7). Hence, the average value exported explains more than three quarters of the variation in exports among destinations, while the number of products exported explains less than a quarter. This is a value that is indicative of the relatively modest weight of trade diversification. Nonetheless, the extensive margin shows a modest trend that gains importance along the period, increasing on average 0.14% per year. This means that despite the intensive margin being able to explaining most of the variation in exports across destinations, there is evidence of a slightly more dynamic role of the extensive margin over time.

If countries are classified by type, it turns out that HIs and UMIs show the largest declines in the contribution of the intensive margin. In the case of HIs, the average annual decrease is 0.18% and 0.15% for UMIs. However, it must be noticed that the contribution of the intensive margin is larger in the case of HIs (77.6% in

average) than in the case of UMIs (74.1% in average). LMIs and LIs differ in two respects. First, the contribution of the intensive margin is larger for LMIs than for LIs (average of 79.7% and 89.9%, respectively), and second, the increase in the importance of the extensive margin is higher in the case of LMIs. Therefore, even though the share of the intensive margin is relatively high, export diversification tends to be more significant among exports to HIs and UMIs.

The contribution of trade margins to the variation of imports across origins does not differ much from the exports case. The intensive margin averages 74.6% during the period while the extensive margin averages 25.4%. Both have relatively low coefficients of variation (1.42 and 4.17, respectively). As with the exports case, there is a modest trend towards the decrease in the contribution of the intensive margin at an annual average rate of 0.14%. Hence, although imports are more diversified than exports, the difference is less significant and the dynamics of trade diversification does not differ from the exports case.

Observation of imports by country type shows that HIs and UMIs have lower than average contributions for the intensive margin (a respective 2.9 and a 1.6 percentage point difference between their averages over the period and the general average). They have a marked stability and slightly increasing shares for the extensive margin. However, while in the case of HIs the increase is nil (0.06% per year), in the case of UMIs the increase is moderately above the general result (0.15% per year). The two remaining country categories, LMIs and LIs, show higher contributions for the intensive margin and stronger trends towards the increase in the share of the extensive margin. Taking into account the important shuffle in import shares that took place over the period, the above figures indicate that in the increase of UMIs as an import source, the extensive margin played an interesting role: it explains a bigger and increasing proportion of the variation across countries of origin than imports from HIs.

The other way to make use of equation (3) is to define the margins of trade in terms of products. This implies that the number of countries to which a product is exported, or from which it is imported, measures the extensive margin, while the average value of trade with a country is the intensive margin. The situation in the exports case indicates that the intensive margin explains, on average over the period, 86.7% of the variation of export values across products. The extensive margin explains the remaining 13.3%. Also, there is a slight downward trend in the importance of the intensive margin, the contribution of which decreases at an annual compound rate of 0.18%. Therefore, compared with the case of partner countries, export diversification is both less significant and tends to gain importance at a higher rate.

Exports of intermediate goods show an above average contribution of the intensive margin, while showing the same average downward trend that was found for the whole set of products. In the case of consumption goods, there is a below average contribution of the intensive margin (2.5 percentage points lower) and an

above average diminishing trend (at a rate of 0.19% per year). Lastly, in the case of capital goods, we found the highest contribution of the intensive margin (1.5 percentage points above the standard) and the strongest rate of decrease for its importance (0.2% per year).

We obtained similar results for imports, with the intensive margin explaining 84.6% of the variation in imports across products (2.1 percentage points less than in the case of exports). It also had a decreasing trend (0.11% per year). Both of the intensive and extensive margins contributions to variation in product imports are relatively stable during the period, and have coefficients of variation of 1.03 and 5.7, respectively. Hence, the importance of the extensive margin is greater for imports, but the increase in its significance over time is lower.

Comparing the results at the product group level, intermediates have the highest importance of the intensive margin, with an average contribution of 85.1% to import variation across products. In the cases of consumption and capital goods, the contribution of the intensive margin is lower than in the standard case; the value is higher for consumption goods (1.1 percentage points versus 0.6 percentage points). In all cases, there is a downward trend in the contribution of the intensive margin, which has the same annual average rate.

## CONCLUDING REMARKS

We have described the behaviour and evolution of international trade diversification in Colombia during the 1991-2011 period. Trade flows were decomposed into the intensive and extensive margins, the latter being a measure of trade diversification. From the empirical analysis, the following series of stylized facts can be identified:

- The overall behaviour of goods exports is dominated by the well-known rise of intermediate goods (essentially primary –extractive– goods).
- On the goods imports side, there are three noticeable characteristics: a) the growth of primary goods within the intermediate goods category, b) the sizeable increase of high technology capital goods between 1993 and 2002, and c) the relative increase of consumption goods.
- As for partner countries, trade with UMIs is the most dynamic. There is a moderate shift in exports to this country type, which is led by intermediate goods. On the import side, however, there is a systematic and sustained shift to increased trading with them; this is accompanied by an increase in consumption and capital goods imports and a reduction of intermediate goods.
- Overall, from both a partner country and a product perspective, the contribution of trade diversification to trade growth, when considering the whole period, is relatively large (37% in the case of exports and 36% for imports). Its role during 1991-2001 was even more important, with figures in the order of 83% and 65% respectively.

- However, when considered not in terms of its contribution to trade growth but in terms of the year-to-year changes in the margins of trade, diversification is scant throughout the period, although its importance increases moderately.
- Therefore, the pattern of trade throughout this period shows a higher number of changes on the import side from both the goods and partner countries perspectives, the latter being of greater importance.

The big picture that emerges from the examination of the evolution of trade margins and the results from the cross-sectional analysis, indicates that, from a partner country perspective, trade diversification is higher for imports (both in terms of number of partner countries and average number of products imported). However, goods perspective trade diversification is higher for exports (but only in terms of the number of goods exported, as the average number of partners is higher for imports). In both cases, the most important driver is trade with UMIs. However, the importance of trade diversification is limited, as the figures corresponding to percentage changes from the decomposition suggest. Results from the cross-section confirm this as the contributions of the extensive margins to trade variation are low. Nonetheless, the relative importance of trade diversification is higher for exports and imports when a partner perspective is adopted than it is when a goods perspective is used.

Therefore, trade diversification in Colombia seems to follow a pattern according to which exports mainly diversify through increases in the number of products rather than in the number of partners, while imports tend to diversify mainly by increases in the number of countries of origin rather than by the number of products. Variation in the number of goods traded explains a large share of the differences in trade flows with partner countries, while variation in the number of trading partners is less able to explain differences in trade flows for goods. This implies that regardless of the type of trade flow (exports or imports) trade tends to grow first by increasing the number of trading partners and then by increasing the number of products. To provide an example, geographical trade diversification contributes nine percentage points more to trade variation than product diversification.

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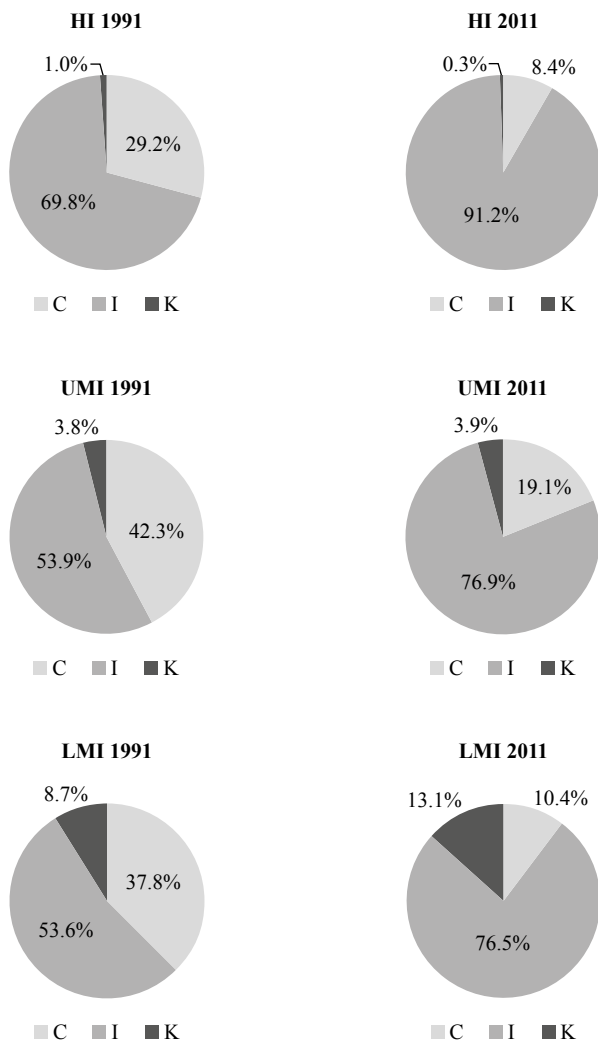


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## APPENDIX

### Graph A1.1.

Composition of Colombian Exports to Main Types of Trade Partners, According to the BEC Classification

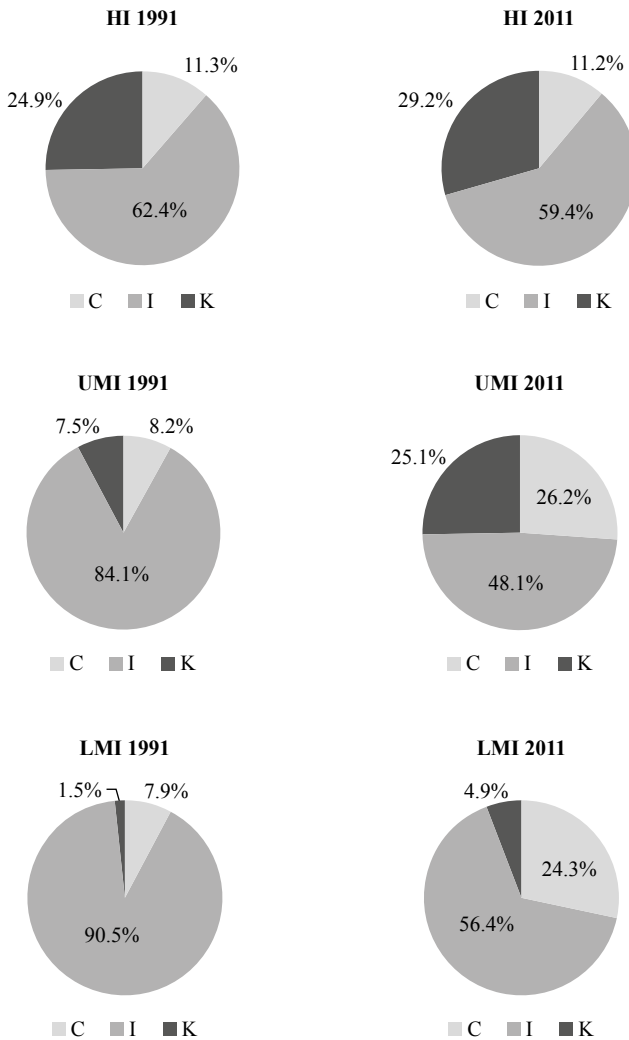


HI: high income countries; UMI: upper middle income countries; LMI: lower middle income countries; C: consumption goods; I: intermediate goods; K: capital goods.

Source: Authors' calculations based on DIAN/DANE data.

**Graph A1.2.**

Composition of Colombian Imports Based On Main Types of Trade Partners, According to the BEC Classification



HI: high income countries; UMI: upper middle income countries; LMI: lower middle income countries; C: consumption goods; I: intermediate goods; K: capital goods.

Source: Authors' calculations based on DIAN/DANE data.

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