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Globalization and Income Inequality in Latin America: A Review of Theoretical Developments and Recent Evidence

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Yoshimichi Murakami*

Abstract

Although Latin American countries (LACs) experienced an increase in income inequality after their integration into global economy in the1980s and 1990s, they experienced a decrease in income inequality in the 2000s. This study attempts to identify the channels through which globalization has affected the increase and decrease in income inequality in LACs, based on a review of theoretical developments and empirical evidence. This study finds that the Stolper–Samuelson effects, within-industry skill-biased technological change, offshoring from developed countries, and technology or quality upgrading of high-productivity firms are the major channels for the increasing income inequality. This study

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also finds that the reduction in inequality in the 2000s can be mainly explained by an increase in the relative supply of skilled workers in Mexico, while it can be explained by the Stolper–Samuelson effect in South American countries such as Brazil and Chile.

Keywords: commodity boom, firm heterogeneity, global value chains, offshoring of tasks, skill-biased technological change, Stolper–Samuelson effect

JEL codes: F16, F66, O15, O54

1. Introduction

Latin America is known as the region with the highest level of income inequality in the world. Some studies find that inequality is associated with poor economic growth performance due to political instability, including distributional conflicts, various constraints on human capital accumulation, or bad institutions (e.g., Galor & Zeira, 1993; Alesina & Rodrik, 1994; Persson & Tabellini, 1994; Acemoglu, Johnson, & Robinson, 2001; 2002; Easterly, 2007). In the region's specific context, structuralist economists argued that the income inequality in the region, largely due to historical factors such as colonialization and land tenure systems, was the driving force behind the region's chronic inflation, thereby harming economic growth. Especially, they argued that the chronic inflation was caused by rising domestic food prices resulting from the supply rigidities of agricultural sectors and rising imported goods prices resulting from the high propensity to consume of the rich (Prebisch, 1950, 1961; Sunkel, 1958; Hirschman, 1963). Recent empirical evidence also suggests that a decrease in inequality and an increase in income level are mutually reinforcing in LACs (Murakami & Hamaguchi, 2017).

LACs are also known to drastically convert from state-led, inward-looking development strategies to market-based, outward-looking ones. Despite some differences in initiation period and implementation speed (i.e., early versus late reformers and aggressive versus cautious reformers) in the region, LACs have undertaken far-reaching economic liberalization (i.e., structural reforms) since the 1980s (Stallings & Peres, 2000). Undoubtedly, integration into the global economy is one of the most important changes that LACs have experienced during the past few decades. However, many studies have revealed that globalization was accompanied by a further increase in inequality within most LACs in the 1980s and 1990s, as discussed in more detail in Section 2. Importantly, the observed distributional changes in this period are inconsistent with what the traditional trade theory, that is, the Heckscher-Ohlin (H-O) theory, predicts. This is because the theory predicts that globalization would increase the relative wages of unskilled workers in LACs, which are considered to be relatively well endowed with unskilled labor, as discussed in greater detail in Section 2. Thus, reconciling the empirical findings observed in LACs with the traditional theory has been an important area of research (Atolia, 2007; Goldberg & Pavcnik, 2007).

In contrast, inequality has unambiguously declined in almost all LACs in the 2000s.[1] The reduction in inequality in LACs in this period is a highly important area of research, because it is in clear contrast with not only the region's previously increasing trend of inequality in the 1980s and 1990s but also the increasing trends of inequality in other developing countries, including emerging Asian countries in the same period. Indeed, recent studies such as Corina (2010, 2014), López-Calva and Lustig (2010), Gasparini, Cruces, and Tornarolli (2011), Lustig, Lopez-Calva, and Ortiz-Juarez (2013), and Székely

and Mendoza (2017) analyze the detailed trends and determinants of inequality in LACs in the 2000s, showing the reduction is robust irrespective of the choice of comparison periods, inequality measures (i.e., Gini coefficient or skill premium), and income variables (wage income or total income). Thus, the determinants of the reduction in inequality in this period need to be also analyzed in relation to globalization. Therefore, the objective of this study is to identify the channels through which globalization has affected the increase and decrease in income inequality in LACs since the 1980s, based on a review of theoretical developments and empirical evidence. Note that since this study focuses on wage income inequality, the impacts of globalization on non-labor income such as asset income are outside the scope.[2]

This study makes a contribution to the existing literature on globalization and inequality in developing countries in the following two ways. First, this study's analysis concentrates into LACs, covering both increasing and decreasing periods of income inequality. Although some researchers have surveyed globalization and inequality in LACs (Thorbecke & Nissanke, 2008; Nissanke & Thorbecke, 2010) and in developing countries in general (Winters, McCulloch, & McKay, 2004; Anderson, 2005; Goldberg & Pavcnik, 2007; Harrison, McLaren, & McMillan, 2011), they attempt to identify the channels only in the period when inequality increased. Second, this study reviews empirical studies with a strong theoretical background. This study identifies four main channels through which globalization has affected income inequality in LACs: the Stolper–Samuelson effects, within-industry skill-biased technological change, offshoring from developed countries, and technology or quality upgrading of high-productivity firms. Although Goldberg and Pavcnik (2007) and Harrison et al. (2011) proposed several possible channels through

which globalization affects inequality in developing countries, it has not been clear which are relevant to LACs. Third, this study takes into account the differences in types of integration into global trade in its analysis of the reduction in inequality in the 2000s. This is because LACs have established at least two types of integration into global trade since the 1990s; one has been typically observed in Mexico and some Central American countries, while the other has been typically observed in South American countries (Kuwayama, 2009; Székely & Mendoza, 2017). However, existing survey articles on globalization and inequality in LACs such as Thorbecke & Nissanke (2008) do not take this difference into account.

This paper is organized as follows. Section 2 reviews the theoretical frameworks of globalization and inequality and discusses whether empirical studies analyzing LACs in the 1980s and 1990s have supported the arguments. Section 3 discusses the main channels for the reductions in income inequality in the 2000s in the two types of integration into global trade (i.e., the Mexico and Central American type and the South American type). The final section concludes by summarizing the findings and providing some policy implications.

2. Review of empirical studies on globalization and inequality in LACs in the 1980s and 1990s

Until the 1990s, the leading framework for understanding relationships between globalization and inequality in international economics was the H-O model (Harrison et al. 2011). The key idea of this model is that each country has a comparative advantage in a good that intensively uses a production factor with which the country is relatively well

endowed. Thus, the Stolper–Samuelson theorem, which is derived from this model, predicts that trade liberalization will increase the real return to the factor used intensively in the production of the good in which the country has a comparative advantage, while it will decrease the real return to the other factor that is not used intensively in the production. Therefore, the theorem predicts that in developing countries, including LACs, which are assumed to be relatively well endowed with unskilled labor, trade liberalization is expected to induce an increase in the relative wages of unskilled labor, thereby decreasing wage inequality between skilled and unskilled workers. The opposite should happen in developed countries, which are assumed to be relatively well endowed with skilled labor.

However, Winters et al. (2004), Anderson (2005), Atolia (2007), and Goldberg and Pavcnik (2007) find, in their reviews of empirical studies on individual LACs, that trade liberalization was accompanied by an increase in inequality in the 1980s and 1990s. Only a few empirical studies on Brazil find the opposite trend (e.g., Gonzaga, Menezes-Filho, & Terra, 2006; Ferreira, Leite, & Wai-Poi, 2007). Some studies based on cross-country panel data analysis covering all LACs also support the finding that trade liberalization was accompanied by an increase in inequality.[3] For example, Morley (2000), using reform index developed by Morley, Machado, and Pettinato (1999), finds that trade liberalization is associated with higher Gini coefficients in 16 LACs from 1970 to 1996. Székely and Sámano-Robles (2014) and Székely and Mendoza (2017), using tariff rates as an indicator of trade liberalization, find that lower tariff rates are associated with higher Gini coefficients in 18 LACs from 1980 to 2009 and from 1980 to 2013. Moreover, Székely and Sámano-Robles (2014) and Székely and Mendoza (2017) conclude that the tariff rate is the variable that most explains the changes in Gini coefficients during the period under analysis.

Therefore, the findings of these empirical studies are inconsistent with the prediction of the Stolper–Samuelson theorem. Thus, new theoretical frameworks have been developed to reconcile this inconsistency. In this section, we review these theoretical developments and discuss whether empirical studies analyzing LACs in the 1980s and 1990s have supported the arguments.

2-1. Studies based on traditional trade theory

This line of explanations considers that the H-O model's assumptions are inconsistent with the realities in LACs, although the model in itself may be still valid. These arguments can be summarized into the following three groups. The first group argues that the production factor that is the most abundant in LACs may not be unskilled workers. If we consider land (or natural resources) as an additional production factor, it may be the most abundant production factor in LACs. Moreover, it is likely that land is complementary to skilled labor or less equally distributed than other assets (Anderson, 2005; Goldberg & Pavcnik, 2007; Perry & Olarreaga, 2007). In this case, trade liberalization is expected to increase the prices of land-intensive goods and the wages of skilled workers and land owners. For example, Leamer, Maul, Rodriguez, and Schott (1999) find that the export shares of raw materials and tropical permanent crops are positively correlated with Gini coefficients in LACs in 1980 and 1990, because the production of such products requires a good deal of physical capital that is complementary to skilled labor.

The second group contends that unskilled labor-intensive sectors had been heavily protected prior to trade liberalization in LACs. Under this circumstance, trade liberalization caused larger price reductions in those sectors. Thus, the decrease in the wages of unskilled

workers is exactly what the Stolper–Samuelson theorem predicts (Winters et al. 2004; Atolia, 2007; Goldberg & Pavcnik, 2007; Perry & Olarreaga, 2007; Thorbecke & Nissanke, 2008). The major studies supporting this argument are Beyer, Rojas, and Vergara (1999) for Chile from 1960 to 1996; Hanson and Harrison (1999) for Mexico from 1984 to 1990; Robertson (2000) for Mexico from 1987 to 1995; Feliciano (2001) for Mexico from 1984 to 1990;[4] Attanasio, Goldberg, and Pavcnik (2004) for Colombia from 1984 to 1998; Goldberg and Pavcnik (2005) for Colombia from 1984 to 1998; Galiani and Porto (2010) for Argentina from 1974 to 2001; and Murakami (2014) for Chile from 1974 to 2007. However, an important exception is observed for the case of trade liberalization in Brazil after 1988, where the skilled labor-intensive sectors had been protected with higher tariffs prior to trade liberalization (Gonzaga et al. 2006; Ferreira et al. 2007). Gonzaga et al. (2006) find that tariff reductions were larger in the skill-intensive sectors from 1988 to 1995 and Ferreira et al. (2007) also find that they are associated with declines in industry wage premiums from 1988 to 1995. Thus, the findings are also consistent with the Stolper–Samuelson theorem, although the observed inequality trend in Brazil during this period is different from that in other LACs.

The third group points to the possibility that middle-income LACs may have a relative abundance in (medium) skilled labor in comparison with other low-income developing countries such as Bangladesh, China, and India (Winters et al. 2004; Anderson, 2005; Atolia, 2007; Goldberg & Pavcnik, 2007). Indeed, Spilimbergo, Londoño, and Székely (1999) show that the factor endowments of LACs are close to the average for the world, and the region is relatively well endowed with capital and skilled labor, compared to Africa and Asia (except for high-income countries in East Asia). Moreover, Wood (1997)

points out that one reason for the increase in inequality in LACs in the 1980s and 1990s can be attributed to the entry of large, low-income countries into the world market. This is because this entry shifted the comparative advantage of middle income LACs into more skill-intensive goods. With regard to studies on individual countries, Robertson (2000) shows that an increase in the relative prices of skilled labor-intensive goods in Mexico after trade liberalization in the mid-1980s, as represented by its accession to the General Agreement on Tariffs and Trade (GATT) in 1986, is consistent with the Stolper–Samuelson theorem because Mexico is likely to become a country relatively well-endowed with skilled labor, as a result of the entry of China and other low-income countries into the world market. Moncarz (2012), analyzing Argentina from 1992 to 1999 to test the hypothesis that the country is relatively well endowed with semi-skilled labor, finds that industry-level export shares are positively associated with wage premiums of semi-skilled labor relative to unskilled labor.

However, Goldberg and Pavcnik (2007) argue that these three explanations are not sufficient for reconciling the above-mentioned contradiction. For example, if the first explanation had been the most plausible, wages in the land- or natural resource-intensive sectors should have risen; thus, labor reallocation to those sectors should have occurred. However, there has been no evidence supporting this argument in LACs. As for the second explanation, a few studies such as Robertson (2000) and Gonzaga et al. (2006) have precisely analyzed the relationships between changes in relative prices of goods and changes in the relative wages of skilled and unskilled workers. Moreover, some studies find no significant relationship between tariff reductions and wage inequality. For example, Pavcnik, Blom, Goldberg, and Schady (2004), analyzing Brazil from 1987 to 1998, and

Murakami (2013), analyzing Chile from 2000 to 2006, find that wage premiums tend to be lower in industries that employ higher shares of low-skilled workers. However, they find no significant relationship between tariff reductions and industry wage premiums during the period under analysis. Thus, those findings suggest that the inconsistencies between the assumptions of the H-O model and the realities in LACs were not the unique channel through which trade liberalization affected inequality in LACs in the 1980s and 1990s.

2-2. Studies based on skill-biased technological change (SBTC)

Furthermore, the most important limitation of studies based on the framework of the H-O model is that the model's inter-industrial nature cannot explain an increase in demand for skilled workers within industries (Harrison et al. 2011). Importantly, Berman and Machin (2000) find that a rapid increase in the wage shares for skilled workers within manufacturing industries occurred not only in developed countries but also in middle-income countries, including LACs, during the 1980s. One plausible explanation for this increase is that globalization induced the adoption of skill-biased technologies. This stream of studies argues that technological progress, such as personal computers and automated assembly lines, has promoted the substitution of skilled workers for unskilled workers; thus, it has increased the employment of skilled workers while decreasing employment of unskilled workers within all industries.

The employment share or relative demand for skilled workers within industries increased in LACs after the implementation of trade liberalization, according to some empirical studies, including Robbins (1994) for Chile from 1975 to 1991; Cragg and Epelbaum (1996) for Mexico from 1987 to 1993; Robbins and Gindling (1999) for Costa

Rica from 1975 to 1993; Green, Dickerson, and Saba Arbache (2001) for Brazil from 1981 to 1991; and Gasparini and Cruces (2010) for Argentina from 1974 to 2006. These studies commonly argue that the H-O model apparently cannot explain the observed increase in demand for skilled workers within industries.

Moreover, other studies find that only the technology variables are significant explanatory variables, when both technology variables such as the share of royalty payments and the share of imported machinery as well as trade liberalization variables are simultaneously included in the relative wage regression function. The major examples are Harrison and Hanson (1999) for Mexico from 1984 to 1990, Mazumdar and Quispe-Agnoli (2002) for Peru from 1994 to 1997, Acosta and Gasparini (2007) for Argentina from 1991 to 2001, Gallego (2012) for Chile from 1960 to 1996.

Moreover, Esquivel and Rodríguez-López (2003) find that technology variables contributed to increasing inequality but trade liberalization variables indeed contributed to decreasing wage inequality in Mexico from 1988 to 1994. Additionally, IMF (2007), analyzing panel data of 51 developed and developing countries for the period 1981 to 2003, finds that technological change, measured by the share of ICT capital stock, and financial liberalization, measured by the ratio of inward FDI stock to GDP, contributed to an increase in inequality, while trade-related variables, such as the share of exports to GDP and the reduction of import tariffs, contributed to a decrease in inequality in both developed and developing countries, including LACs.

However, one restrictive assumption of this stream of studies is that they treat technological change as a variable arising independently from globalization. Indeed, Acemoglu (2003) theoretically shows that trade liberalization induces SBTC in developing

countries, because skill-biased technologies occur endogenously, on account of an increase in cheaper imports of machinery or intermediate goods that are complementary to skilled workers. Thus, further theoretical frameworks need to be constructed to explain how trade liberalization could cause within-industry SBTC and rising wage inequality in developing countries.

2-3. Studies based on within-industry offshoring

Theoretical developments regarding within-industry offshoring are highly relevant to explaining why globalization can induce SBTC in developing countries. Although the traditional H-O model assumes that only final goods can be traded, some segments of production processes (namely tasks) increasingly have been separated between countries, based on the skill intensities of the production processes. Typically, a part of unskilled labor-intensive tasks such as assembly has been offshored from developed to developing countries, taking advantage of the low labor costs. Some theoretical models have been developed to analyze the impacts of within-industry offshoring on wage inequality in developing countries. Note that the term “outsourcing,” used by Goldberg and Pavcnik (2007) to refer to this channel, may not be suitable. This is because outsourcing refers to shifting some segments of production processes to a third party outside of the organization. However, the channel in question is shifting some tasks to different countries rather than different organizations. Thus, this study proposes using the term “offshoring.”

A representative theoretical model of this channel is Feenstra and Hanson (1997). The model assumes that the production of final goods consists of a continuum of production processes (i.e., tasks) with different skill intensities. In this model, cost

minimization can be achieved by offshoring some parts of tasks that are less skill intensive than a cutoff from developed to developing countries. In addition, the model predicts that when capital movement from developed to developing countries, such as FDI, is promoted, a wider range of tasks is offshored from developed countries. However, importantly, the newly offshored tasks from developed countries are skilled labor-intensive, compared to existing production activities operating in developing countries. Thus, the model predicts that offshoring from developed countries will increase the average skill intensity of production and wages of skilled workers in developing countries. Indeed, their own empirical analysis demonstrates that the growth in FDI inflows from the US (that is, the index of offshoring from the US) is positively associated with changes in the share of skilled workers' wages within manufacturing industries in Mexico from 1975 to 1988.

Although offshoring from developed countries is an important channel through which trade liberalization would cause within-industry SBTC, few empirical studies have focused on this channel in LACs, except for Mexico. One reason is that the degree of value chain integration among LACs has been relatively low, as evidenced for example by the small share of intermediate goods in intra-regional trade, as discussed in Section 3.[5] Another issue may be related to data availability. Since data on foreign outsourcing to third-party providers are hardly available, FDI data have been the only means to measure offshoring. However, it is certain that this channel can be important not only in Mexico and the Central American countries but also in other LACs. Thus, there is a need for further empirical analysis on this channel.

2-4. Studies based on firm heterogeneity

In addition to offshoring, a new approach to international trade based on firm heterogeneity has also become influential in the literature on globalization and inequality. The theory undying this approach is the "new-new" trade theory, pioneered by Melitz (2003). The basic idea of this model is that only highly productive firms can engage in export activities. This model predicts that trade liberalization (i.e., reductions in trade costs) will induce an increase in the aggregate productivity of a given industry or country by forcing the least productive firms to exit, encouraging previously non-exporting firms to enter into export markets, and expanding the export growth and profits of continuing exporters (Melitz, 2003). However, the model, per se, does not focus on distributional aspects; thus, it does not provide a relevant theory for analyzing the impacts of trade liberalization on income inequality (Harrison, et al. 2011). Accordingly, some studies have developed theoretical models that incorporate the inequality issue into the framework of firm heterogeneity. Representative examples are Egger and Kreickemeier (2009) and Helpman, Itskhoki, and Redding (2010), both of which develop their theoretical models by introducing labor market frictions into the Melitz's (2003) model. They predict that trade liberalization will increase wage inequality between workers employed in high-productivity firms and those employed in low-productivity firms. Moreover, since these models predict that trade liberalization will force the least productive firms to exit, inequality can grow further, if we consider the existence of unemployed workers displaced from such closed-down firms.

We have already obtained the findings of empirical studies focusing on this channel in several LACs such as Brazil, Argentina, Chile, and Mexico. With regard to studies on Argentina, Bustos (2011a) develops a model predicting that trade liberalization not only induces non-exporting firms to enter export markets but also promotes exporting firms

previously using low technology to adopt high technology. Based on this theoretical model, she shows that trade liberalization (here defined by the reduction in Brazil's tariffs levied on exports from Argentina owing to the enforcement of Southern Common Market (MERCOSUR) is positively associated with investments in technology at large-sized firms in manufacturing sectors in Argentina from 1992 to 1996. Additionally, Bustos (2011b), using a similar model and analyzing manufacturing firms in Argentina in the same period, finds that trade liberalization positively affects within-industry demand for skilled workers by increasing the employment share of skilled workers in large-sized firms. Brambilla, Lederman, and Porto (2012) show that manufacturing firms exporting to high-income countries are likely to employ more skilled workers and to pay higher wages than firms exporting to low-income countries and only participating in domestic markets in Argentina from 1998 to 2000.

Even before Melitz's (2003) path-breaking study, Robertson (2000) found, for the period from 1991 to 1995, that exporting firms in Mexico were more likely to introduce advanced new technology that is complementary to skilled workers than domestic firms, thereby contributing to an increase in demand for skilled workers within industries.[6] Verhoogen (2008) constructed a model based on firm heterogeneity, which predicts that higher-productivity firms produce higher-quality goods, pay higher-wages to retain higher-quality workers, and are more likely to enter export markets. Moreover, the model predicts that the country's exchange-rate depreciation will only induce higher-productivity firms to increase exports, upgrade the quality of their products, and increase the relative wages of skilled workers, thereby contributing to an increase in within-industry as well as within-firm wage inequality. The empirical analysis on Mexico during the peso-crisis period (from

1993 to 1997), marked by sharp depreciations in the currency, supports the models' predictions exactly. In addition, Frías, Kaplan, and Verhoogen (2012), analyzing firm-level data on Mexico for the years from 1993 to 1997 and 1997 to 2001, find that export increases in the latter period further pushed up the wages of relatively high-wage workers but had no effects on the wages of relatively low-wage workers, thereby increasing within-firm inequality between low- and high-wage workers.

We also have evidence on this channel for Brazil and Chile from recent studies. Helpman, Itskhoki, Muendler, and Redding (2017) find that between-firm wage inequality is responsible for a substantial part of the within-occupation-and-sector inequality, which accounts for much of the overall inequality in Brazil from 1986 to 1998. On the basis of the extended model, based on Helpman et al. (2010), incorporating three dimensions of firm heterogeneity, that is, productivity, human resource management, and fixed exporting costs, they show that trade liberalization initially raised wage inequality by inducing exporting firms to pay higher wages. Namini and López (2013), analyzing manufacturing plants in Chile for 1990 to 1999, also find that more productive, larger, and exporting plants, tend to employ more skilled workers and pay higher wages for them.

Therefore, those studies based on firm heterogeneity commonly show that trade liberalization contributes to an increase in within-industry as well as within-firm wage inequality by inducing exporting or large-scale firms with high productivity to adopt advanced technologies that are complementary to skilled workers, although the assumptions and theoretical models differ in some ways. Further empirical studies based on this channel can be carried out because useful firm-level data are available in several LACs.

Table 1: Summary of empirical studies on globalization and income inequality in LACs in the 1980s and 1990s.

Theoretical frameworks	Main channels	Representative studies (study name: country analyzed, analysis period)
Inconsistencies between the assumptions of the H-O theory and the realities in LACs	1. Existence of natural resources complementary to skilled workers 2. Protection for unskilled labor-intensive sectors prior to trade liberalization 3. Relative abundance of skilled labor compared to low-income countries	1. Leamer, Maul, Rodriguez, and Schott (1999): LACs, 1980,1990 2. Beyer et al. (1999): Chile, 1960-96; Hanson and Harrison (1999): Mexico, 1984-90; Robertson (2000): Mexico, 1987-95; Feliciano (2001): Mexico, 1984-90; Attanasio et al. (2004): Colombia, 1984-98; Goldberg, and Pavcnik (2005): Colombia, 1984-98; Galiani and Porto (2010): Argentina, 1974-2001; Murakami (2014): Chile, 1974-2007 3. Robertson (2000): Mexico, 1987-95; Wood (1997): LACs, 1980s and 1990s; Moncarz (2012): Argentina, 1992-99
Skill-biased technological change (SBTC)	Increase in demand for skilled workers within industries	Robbins (1994): Chile, 1975-91; Cragg and Epelbaum (1996): Mexico, 1987-93; Harrison and

		Hanson (1999): Mexico, 1984-90; Robbins and Gindling (1999): Costa Rica, 1975-93; Green, et al. (2001): Brazil, 1981-99; Mazumdar and Quispe-Agnoli (2002): Peru, 1994-1997; Esquivel and Rodríguez-López (2003): Mexico, 1988-2000; Acosta and Gasparini (2007): Argentina, 1991-2001; Gasparini and Cruces (2010): Argentina, 1974-2006; Gallego (2012): Chile, 1960-96
Within-Industry Offshoring	Unskilled labor-intensive tasks offshored from developed countries appear skilled labor-intensive from the developing countries' point of view.	Feenstra and Hanson (1997): Mexico, 1975-88
Firm Heterogeneity based on new-new trade theory	Increase in within-firm demand for skilled workers due to the technology or quality upgrading of exporting or large-scale firms with high productivity	Verhoogen (2008): Mexico, 1986-2001; Bustos (2011a; 2011b): Argentina, 1992-96; Brambilla, et al. (2012): Argentina, 1998-2000; Frías et al. (2012): Mexico, 1993-2001; Namini and López (2013): Chile, 1990-99; Helpman et al. (2017): Brazil, 1986-98

Source: Authors' own elaboration.

3. Reduction in inequality in the two types of integration into global trade in LACs in the 2000s

In this section, we analyze the determinants of the reduction in inequality in LACs in the 2000s in relation to globalization. As discussed in the introduction, an important aspect to be considered in this context is that the heterogeneity in the structural characteristics related to the integration into global trade has emerged across the region since the 1990s (Kuwayama, 2009; Székely & Mendoza, 2017).

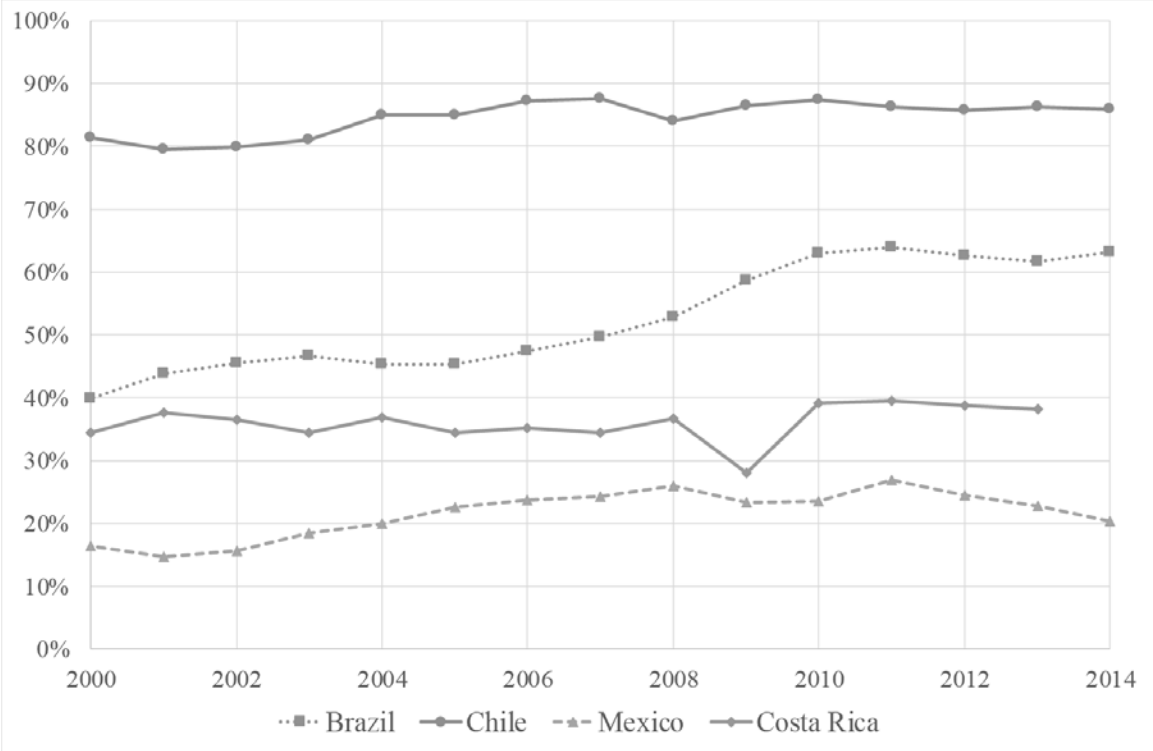
Although traditional structuralist economics, which has basically developed in the United Nations Economic Commission for Latin America and the Caribbean (ECLAC), emphasized primary commodity dependence as the peripheral characteristic of LACs (Prebisch, 1950), the subsequent ECLAC (the neo-structuralist position) has argued that LACs' peripheral characteristics are not only primary commodity dependence but also low levels of technological progress (ECLAC, 1990) and low levels of value chain integration (ECLAC, 2014). In other words, neo-structuralists consider the current peripheral characteristics of LACs to be deficits in the endogenous technological progress and the weak presence of global value chains (GVCs), in addition to primary commodity dependence (ECLAC, 2014; Murakami & Hamaguchi, 2017).

Figures 1 to 3 represent the evolution of the indicators of the three peripheral characteristics—that is, the share of primary commodity in the total exports, the number of patent applications per thousand population, and the share of intermediate goods trade (the sum of exports and imports) in the total trade in four LACs (Brazil, Chile, Costa Rica, and

Mexico). Evidently, the share of primary commodity exports is relatively low in Costa Rica and Mexico, while it is relatively high in Brazil and Chile (see Figure 1). The number of patent applications is not significantly different among these four countries, but are substantially lower than Asian countries with the same or a slightly lower levels of per capita GDP (namely, China and Malaysia) (see Figure 2). The share of intermediate goods trade is relatively high in Costa Rica and Mexico, while it is relatively low in Brazil and Chile (see Figure 3). The findings are summarized in Table 2.

Thus, this study argues that LACs have established at least two types of integration into global trade.[7] The first type is characterized by the integration into manufacturing value chains and a low level of commodity dependence, owing to the *maquila*-type export processing zones, but a low level of technological progress, as observed in Mexico and some Central American countries such as Costa Rica. The second type is characterized by a high level of commodity dependence, a low level of GVC integration, reflecting the abundant natural resources, and a low level of technological progress, as typically observed in South American countries such as Brazil and Chile. In the following parts of this section, we discuss the possible channels through which globalization affected the reductions in inequality in the 2000s.

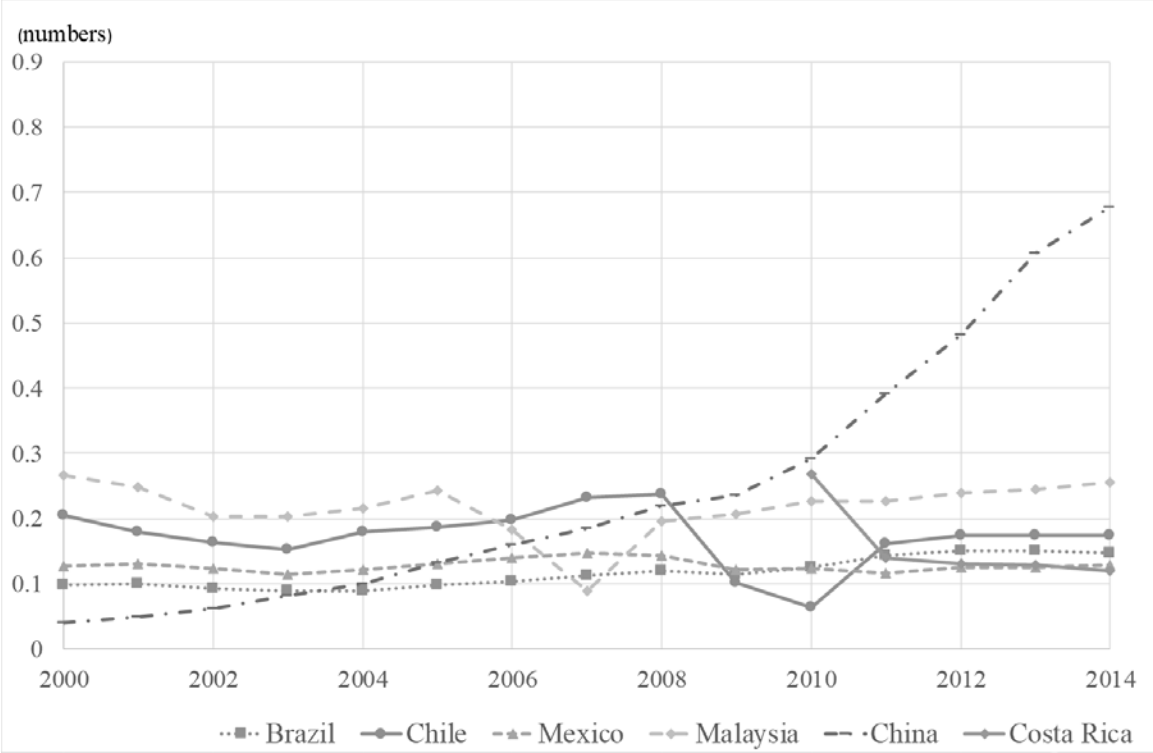
Figure 1: Evolution of the share of primary commodities in the total exports in four LACs during 2000 to 2014



Source: UN-COMTRADE (https://comtrade.un.org/data/).

Note: Primary commodities are defined by the sum of Standard International Trade Classification (SITC) Rev. 1 codes 0, 1, 2, 4, 667, and 68, in line with the UNCTAD product groupings and composition.

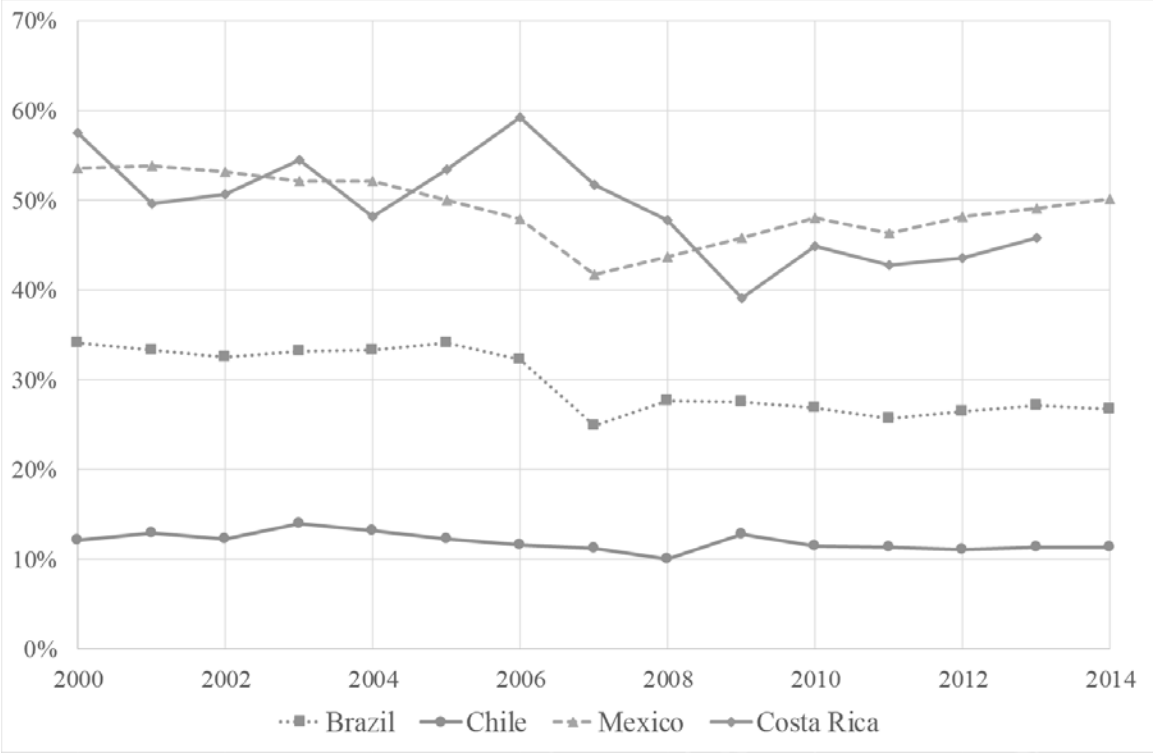
Figure 2: Evolution of the number of patent applications per thousand population in four LACs, China, and Malaysia during 2000 to 2014



Source: World Intellectual Property Organization (WIPO) Statistics Database (http://ipstats.wipo.int/ipstatv2/index.htm?tab=patent).

Note: The number includes residents and non-residents.

Figure 3: Evolution of the share of intermediate goods trade (the sum of exports and imports) in the total trade in four LACs during 2000 to 2014



Source: UN-COMTRADE (https://comtrade.un.org/data/).

Note: Intermediate goods only include parts and components, defined by the sum of Broad Economic Categories (BEC) codes 42 and 53.

Table 2: Two types of integration into global trade in LACs

	Type of integration into global trade	
	Mexico and Central American countries	**South American countries**
Peripheral Characteristics		
Commodity dependence	Low	High
Technological progress	Low	Low
GVC integration	High	Low

Source: Author's own elaboration.

3-1. Mexico and Central American type

The distributional impacts of offshoring in the countries of this type depend on what types of workers (i.e., skilled or unskilled works) are intensively used for performing the tasks offshored from developed countries such as the US, that is, the skill intensity of the offshored tasks (Székely and Mendoza 2017). According to Feenstra and Hanson (1997), integration into North American supply chains has contributed to an increase in income inequality in Mexico and Central American countries because offshoring from the US has caused an increase in the demand for skilled workers.

We also need to consider the impacts of the increasing supply of skilled workers in Mexico. For example, Campos-Vázquez, Esquivel, and Lustig (2014) show that Mexico experienced a rapid increase in the relative supply of skilled workers (i.e., high-school and college graduates). Importantly, according to the Feenstra and Hanson's (1997) model, the increase in the relative supply of skilled workers in developing countries is likely to change the range of offshored tasks from developed countries toward more skill-intensive work, thereby contributing to an increase in the demand for skilled workers in developing countries. Thus, this prediction is basically similar to the findings that developing countries relatively well endowed with skilled labor tend to receive high-skill-intensive tasks from developed countries (Khalifa and Mengova 2010) and that the productivity catch-up of developing countries can induce a shift in their exports toward more skill-intensive goods (Zhu and Trefler 2005).

However, Mexico also experienced a decrease in wage inequality since around the mid-1990s, which is not consistent with the predictions of these models. One plausible explanation is that the downward pressure on the wages of skilled workers, due to the

increase in the relative supply, exceeded the upward pressure caused by the increase in demand for them caused by the above-mentioned skill upgrading of offshored tasks. Indeed, Campos-Vázquez et al. (2014), decomposing the reduction in the wage premiums of skilled workers (high school graduates and workers with more education) from 1994 to 2006 into demand-side and supply-side factors, find that the supply factor has a decreasing effect and the demand factor has an increasing effect, with the former exceeding the latter, although the magnitude depends on the assumed elasticity of substitution between skilled and unskilled workers. Lustig et al. (2013) also conclude that the decrease in the wage premiums in Mexico was mainly driven by a rapid increase in the relative supply of skilled workers, because demand for skilled workers may have even continued to increase, and that institutional factors such as the minimum wages and unionization rates were not important.

3-2. South American type

Since South American countries have largely been involved in traditional inter-industry trade (i.e., exporting commodities and importing manufacturing goods), the H-O model has still been a useful framework for understanding the impacts of trade liberalization on inequality in the countries of this type. It is worth noting that those countries experienced a surge in international commodity prices because of continued strong demand, especially during a period from 2003 to 2008. The simple average of the terms of trade of the nine South American countries was 38.8% higher in 2008 than in 2002.[8] Thus, the impacts of trade on inequality during the period of the commodity boom in the 2000s mainly depend on the skill intensity of export goods (Székely and Mendoza 2017). In other words, since

the protection for unskilled labor-intensive sectors had already been eliminated in this period, the observed reduction of inequality can be attributed to the Stolper–Samuelson effect, as long as the export sectors are unskilled labor-intensive in the countries of this type.

Some studies have analyzed the skill intensity in the exporting sectors in LACs. Wood (1997) points out that exporting sectors were more skill intensive than import competing sectors in Brazil, Chile, Colombia, and Uruguay in the 1970s and 1980s. Perry and Olarreaga (2007) show that exports of mining and agricultural raw material are correlated with capital, while exports of foodstuffs are correlated with unskilled labor in LACs. Székely and Mendoza (2017) also point out that oil extraction and mining sectors are usually capital and skilled labor-intensive in LACs.

Other studies have analyzed the impacts of the commodity boom on income inequality in specific countries. Pellandra (2015) finds that prices of tradable goods are positively associated with average wages of unskilled workers at regional level in Chile from 2003 to 2011. Murakami and Nomura (2016) find that the reductions in wage inequality in Chile from 1996 to 2006 are attributable to a decrease in wage premiums for skilled workers (particularly university graduates) and an increase in the industrial wage premiums for unskilled labor-intensive natural resource sectors such as agriculture. Thus, these studies conclude that the observed reductions in wage inequality in Chile can be explained by the demand-side factor caused by the Stolper–Samuelson effect, because the unskilled labor-intensive exporting sectors experienced a rise in prices due to the commodity boom.

Additionally, reductions in inequality may be a result of reductions in regional

inequality, especially in Brazil. This is because income gaps between urban and rural areas are likely to decrease in countries with a comparative advantage in natural resources, because trade liberalization is able to discourage a concentration of economic activities in particular urban areas and increase returns to natural resources, usually located in rural areas, in line with the predictions of the Stolper–Samuelson theorem (Anderson, 2005). Indeed, Barros, De Carvalho, Franco, and Mendonça (2010) find that wage differentials between metropolitan areas and non-metropolitan municipalities sharply decreased in Brazil from 2001 to 2007. Interestingly, Castilho, Menéndez, and Sztulman (2012) find that trade liberalization, measured by tariff reductions, is associated with decreasing inequality in rural areas, but increasing inequality in urban areas, in Brazil from 1987 to 2005. Moreover, they find that export exposure is associated with decreasing inequality in both urban and rural areas, but the impact is greater in the sub-period from 1997 to 2005, which includes the period of the commodity boom. Thus, the findings indicate that trade liberalization is likely to increase the relative wages of rural areas in Brazil, which have strong comparative advantages in agricultural sectors, thereby narrowing the wage gaps with urban areas and contributing to decreasing wage inequality at the national level in this country.

Moreover, studies based on cross-country panel data analysis covering all LACs conclude that the improvement in the terms of trade resulted in decreasing inequality in the period including the commodity boom. For example, Corina (2010) finds that improvement in the terms of trade is associated with lower Gini coefficients in 18 LACs from 1990 to 2007. Gasparini, Galiani, Cruces, and Acosta (2011) also find that improvement in the terms of trade is associated with lower wage premiums of skilled workers (tertiary educated

workers) in 16 LACs from 1989 to 2009. They also find that the negative relationships between terms of trade and wage premiums are evident in South American countries, while there are no clear relationships in some Central American countries such as Nicaragua, Panama, and El Salvador.[9] Székely and Mendoza (2017) also find that improvement in the terms of trade are associated with lower Gini coefficients in 18 LACs from 1980 to 2013. Importantly, they find that the effects of terms of trade are larger in South American countries than Mexico and Central American countries. Thus, this finding is again consistent with the Stolper–Samuelson effect, because the rise in export prices contributed to the reductions in inequality in South American countries. However, since the skill intensity of the export sectors is likely to vary among countries and across periods, the skill intensity of each country and the relationships between the relative prices of goods and relative wages of skilled and unskilled workers need to be analyzed in detail.

In addition to exporting sectors, the dynamics of import-competing sectors is likely to affect the observed reductions in inequality in the 2000s. For example, Gasparini and Cruces (2010) argue that the large devaluation of the national currency, caused by the abandonment of the currency board system in Argentina in 2002, benefited the country's unskilled labor-intensive import-competing sectors such as textile industries from 2002 to 2009. Gasparini, Cruces, and Tornarolli (2011) also point out that devaluations caused relative price changes that favored unskilled workers in Argentina and Uruguay. Thus, they argue that the recovery of import competing sectors has also contributed to the reductions in inequality in the 2000s. Additionally, the expansion of service sectors due to the income effects resulting from the commodity boom has probably contributed indirectly to the reductions in inequality in South American countries in this period, as long as such service

sectors are unskilled labor intensive. Thus, this channel (i.e., the impacts on import-competing sectors and service sectors) needs to be further researched.

4. Conclusions

This study attempted to identify the channels through which globalization has affected the increase and decrease in income inequality in LACs since the 1980s, reviewing theoretical developments and empirical evidence.

We identified four major channels through which globalization affected the increase in income inequality in the 1980s and 1990s. The first channel is the inconsistencies between the assumptions of the traditional H-O theory and the realities in LACs, such as the existence of natural resource sectors complementary to skilled workers, the protection for unskilled labor-intensive sectors prior to trade liberalization, and the relative abundance of skilled labor compared to low-income countries. This stream of studies argues that the Stolper–Samuelson effects can explain the observed increase in income inequality if the assumptions of the model are modified in line with the realities of LACs. We found that although empirical studies have supported this argument in LACs, this stream of studies was not able to explain the increase in demand for skilled workers within industries, widely observed in LACs. The second channel is SBTC. This stream of studies argues that technological progress promoted the substitution of skilled workers for unskilled workers within all industries in LACs after their integration into global trade. We found that although empirical studies have supported this argument in LACs, their important limitation was that they treated technological changes as a variable arising independently from globalization. The third channel is offshoring from developed countries. This stream

of studies argues that tasks offshored from developed countries appear to be skilled-labor intensive from the developing countries' point of view, thereby contributing to a within-industry increase in demand for skilled workers. We found that although this channel was relevant to increasing inequality in Mexico from the mid-1980s to the mid-1990s, few empirical studies have been carried out in other LACs. Finally, the fourth channel is technology or quality upgrading of exporting or large-scale firms. This stream of studies argues that trade liberalization contributes to an increase in within-industry as well as within-firm wage inequality because it induces such high-productivity firms to upgrade their technology or product quality. We found that several recent empirical studies have supported this argument in LACs.

Subsequently, we discussed the main channels through which globalization affected reductions in inequality in the two types of integration into global trade in LACs in 2000s. In Mexico and some Central American countries, which have been highly integrated into North America supply chains, we found that within-industry offshoring from the US has been an important factor for determining inequality. We conclude that the reduction in inequality can be mainly explained by an increase in the relative supply of skilled workers in Mexico, because the relative supply of skilled workers is likely to induce an increase in the skill intensity of offshored tasks. Thus, we conclude that the downward pressure on wages of skilled workers due to the increase in the relative supply exceeded the increasing demand for skilled workers due to the skill upgrading of offshored tasks in Mexico. We argue the need for further analysis on the impacts of the increasing relative supply of more educated workers on the demand- and supply-side factors.

Since South American countries are characterized by a high level of commodity

dependence and traditional inter-industry trade, we found that the distributional impacts of integration into global trade have significantly depended on the skill intensity of the primary commodity sectors. We conclude that the reductions in inequality in South American countries such as Chile and Brazil in the 2000s can be largely explained by the demand-side factor caused by the Stolper–Samuelson effect, because the export sectors such as agricultural sectors were basically unskilled labor intensive and they experienced a rise in prices due to the commodity boom. We argue that since it is likely that the skill intensity of export sectors has varied depending on the country and the period, there is a need for detailed analysis on this trend and the relationships between the relative prices of export goods and the relative wages of skilled and unskilled workers in individual countries.

From a policy perspective, the relevance of this study is that it pointed out key factors explaining the dynamics of inequality in the countries of each type of integration into global trade in the both increasing and decreasing periods of income inequality. The findings of this study offer the following policy implications. In Mexico and Central American countries where the supply-side factor (i.e., the increase in the relative supply of skilled workers) has played an essential role in the reductions in skill premiums, the continued expansion of education, especially higher education, needs to be ensured; otherwise the increasing demand for skilled workers caused by the integration into GVCs would easily dominate the supply-side factor. In South American countries where the demand-side factor (i.e., the increase in demand for unskilled workers caused by the commodity boom) has been the major driving force, countercyclical policies mitigating negative shocks on export prices will be essential to ensure that the reductions in inequality will not be easily reversed. Finally, this study argues that the policymakers in those

countries need to design and implement appropriate social policies, including progressive government transfers, taking into account such key factors determining the changes in labor income inequality.

[1] The simple average of Gini coefficients of household per capita income of 17 LACs decreased from 0.513 in 2000 to 0.475 in 2014. The data are sourced from Socio-Economic Database for Latin America and the Caribbean (SEDLAC)(http://sedlac.econo.unlp.edu.ar/eng/).

[2] Regarding the impacts of globalization on asset inequality and redistribution, Anderson (2005) provides a brief literature review on the theories and empirical studies. It is certain that the development of cash transfers made substantial contributions to the reductions in inequality in LACs in the 2000s. Regarding this channel, López-Calva and Lustig (2010), Lustig, Lopez-Calva, and Ortiz-Juarez (2013), and Corina (2014) provide detailed literature reviews on individual countries.

[3] However, other studies based on cross-county panel data analysis find no significant relationships between trade liberalization and inequality. For example, Behrman, Birdsall, and Székely (2007), using the reform indices developed by Lora (1997), find that trade liberalization is not a significant variable with respect to the wage inequality between skilled workers (workers with higher education) and unskilled workers (workers with only secondary or primary education) in 18 LACs from 1977 to 1988. Similarly, Bucciferro (2010), using the same reform indices, finds that trade liberalization is not a significant variable, while financial liberalization is associated with higher Gini coefficients in 19 LACs from 1985 to 2000. Moreover, Székely (2003), using the reform indices developed by Lora (1997) and extended by Morley, Machado, and Pettinato (1999), finds that trade liberalization is associated with lower inequality, though its impact was minor, while financial liberalization is associated with higher inequality in 17 LACs from 1977 to 2000. Indeed, Anderson (2005) argues that the inconsistency between the findings of studies based on time-series analysis in individual developing countries and those based on cross-county panel data analysis is a puzzle.

[4] Feliciano (2001) finds that the decline in import licenses rather than tariff reductions is associated with higher wage inequality in Mexico from 1986 to 1990.

[5] The share of intermediate goods, defined as parts and components, account for only 10% of total intra-regional exports in LACs and more than 30% in East Asian countries during the 2000s. See Figure III 5 of ECLAC (2014: 42)

[6] As mentioned in Section 2-1, Robertson (2001) finds that unskilled-labor-intensive industries were protected with higher tariffs prior to trade liberalization and experienced larger tariff reductions, and the relative prices of skill-intensive goods are positively correlated with the relative wages of skilled workers in Mexico from 1987 to 1995. Thus, he argues that the increase in wage inequality in this period is exactly consistent with the prediction of the Stolper–Samuelson effect. However, the decomposition of the increase in the demand for skilled workers into changes within industries and changes between industries reveals that the former had a larger contribution than the latter in the period from 1987 to 1994. Thus, he also analyzes the possible reasons for the increase in the within-industry inequality during this period.

[7] This classification follows Kuwayama (2009), who classifies the trade structure of the Latin American and Caribbean region into three types, based on the extent of primary commodity dependence and the extent of GVC integration. Note that in addition to the two types mentioned in the text, Kuwayama (2009) presents a third one, which is characterized by a high proportion of service exports including tourism, finance, and transport services, observed in some Caribbean countries and Panama. Since the Caribbean countries fall outside the scope of this study, the third one is not taken into consideration here.

[8] The nine countries consist of Argentina, Bolivia, Brazil, Chile, Colombia, Paraguay, Peru, Uruguay, and Venezuela. The data are sourced from the Statistical Yearbook for Latin America and the

Caribbean 2015 of ECLAC (http://interwp.cepal.org/anuario_estadistico/anuario_2015/en/index.asp).
[9] See Figure C6 of Gasparini, Galiani, Cruces, and Acosta (2011: 51).

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