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Essay on Income Inequality, Trade Openness, and Life Satisfaction in Latin America

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Essay on Income Inequality, Trade Openness, and Life Satisfaction in Latin America

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January 2021

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Summary

This doctoral dissertation focuses on different topics related to income inequality in different geographic regions of the world. Income inequality is a multidisciplinary concept, not only studied in economics but also by other social sciences, such as sociology and psychology. Income inequality and its effects for human wellbeing have been widely debated, having reached inconclusive findings regarding its causes and consequences. This dissertation consists of three different essays. The first section tests how the nature of trading partners and products affects income inequality in Latin America over the period 1989-2015. The second study provides an explanation for the nexus between income inequality and life satisfaction in low- and middle-income countries through delving into the role of opportunity. The last part examines the psychological role of the palliative function of system justification theory in the link between inequality and life satisfaction link in Europe.

The first essay takes into account several theoretical developments regarding the relationship between trade openness and income inequality, accounting for trade flows' direction, skill-biased technological change, countries' factors abundance relative to other countries, and the nature of products (primary products, intermediate products, equipment products, and consumption products). Based on a panel dynamic approach to take into account the high persistence of income inequality, the findings show a more apparent role of exports, in particular the exports of primary commodities (agriculture and oil goods), in reducing income inequality in Latin American countries, while the role of high skill-intensive goods is less clear. Overall, the study concludes that the relationship between trade openness and income inequality is significantly influenced by how countries are integrated into the international economic system.

Keywords: Trade openness; trade direction; income inequality; Latin America

JEL: F14; O54; E25

The second essay draws on the role of opportunity to explain the relationship between income inequality and life satisfaction in low- and middle-income countries. This essay seeks to identify the reason why people living in unequal countries are satisfied with their lives through considering different political and social aspects, such as personal rights, personal freedom and choice, and access to education. Estimating multilevel models to explain cross-country differences in individuals' life satisfaction, the study evidences that income inequality is

irrelevant for individuals' subjective wellbeing when the level of opportunity is high, while income inequality becomes more salient when the level of opportunity is low. Thus, the research suggests that the stability of social and political system of the country plays an important in the nexus between income inequality and life satisfaction. That is, when people are granted the possibility to take their chances, inequality becomes tolerated and hence people become more satisfied with their lives.

Keywords: Life satisfaction; subjective well-being; income inequality; opportunity

JEL: I31; D31; D63; Z13

The last essay inquiries into the palliative function of system justification. We seek to explain how people respond to inequality and to identify the consequences for life satisfaction in 27 European countries. The empirical approach accounts for the potential indirect effects by estimating mediation model using Structural Equations Modeling. The results emphasize the importance of subjective attitudes toward inequality in explaining life satisfaction and support for redistributive policies. On the one hand, the estimations reveal that people with high system justification are less inequality averse and oppose redistributive policies, and are more satisfied with their lives. The positive direct effect of system justification on life satisfaction is reinforced through the indirect effects via inequality aversion and support for redistribution. On the other hand, individuals with high inequality aversion are less satisfied with their lives and support government intervention to eliminate social disparities. Thus, the results give support for the 'palliative function' hypothesis.

Keywords: Palliative function of system justification; psychological well-being; life satisfaction; intergenerational mobility

JEL: I31; D63; J62

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Chapter 1: Introduction

Income inequality is a complex and contentious term that has been widely discussed and debated not only from the economic perspective but also in all areas of social sciences. Its complexity emanates from the diversity and interconnectedness of its arguments about what the causes and consequences of income inequality are, despite the extensive scholarly attention. To date, there exists a rich body of theoretical works seeking to identify the causes of income inequality. Globalization lies at the heart of the controversy around income inequality. Particularly, globalization is often blamed for promoting income inequality, even if it also brings other positive outcomes, such as technological progress and competitiveness. One of the earliest works on trade-inequality link is the one of Stolper and Samuelson (1941) based on the 'Heckscher-Ohlin' model that suggests that opening to trade increases income inequality in developed countries and decreases it in developing countries. However, recent theoretical developments argue that this model is a simplification of an intricate phenomenon. They provide alternative explanations for the nexus between trade and inequality, including the shift of production from the North to the South (Feenstra and Hanson, 1996), skill-biased technological change (Acemoglu, 2003), trade direction (Gourdon, 2011), and country's factors abundance relative to other countries (Davis, 1996). This argument thus reflects the complexity of the drivers of inequality arising from the multiple interaction at stake.

The dissertation's first essay, entitled '**Inequality in Latin America: The Role of the Nature of Trade and Partner'** carries out an analysis of the relationship between trade and income inequality in 11 Latin American countries from 1989 to 2015. More specifically, the essay delves into the potential channels through which trade openness has affected income inequality within these countries. As a matter of fact, Latin America gradually underwent structural trade reforms since the early 1990s, when most countries of the region adopted more open trade policies toward the integration into the international economy. Accordingly, these trade reforms resulted in a remarkable increase in privatization, investment, foreign capital flows, and sharp tariff reductions. Although the empirical work provides evidence indicating that trade openness has contributed to improve growth and efficiency, there is also a raising concern about whether trade openness may have contributed to an in increase income inequality. Therefore, this debate seems even more relevant to test how trade openness has affected inequality in Latin America.

The empirical literature on Latin America does not lead to decisive conclusions regarding the link between trade and inequality. Some authors point out a positive association (Attanasio et al., 2004; Hanson and Harrison, 1999), while others evidence a negative link (Ferreira et al., 2007) or others find no effect of trade on inequality (Pavcnik et al., 2004). A salient shortcoming in the studies focusing on Latin America is that they usually deal with country case studies. This approach allows them to use detailed measures, such as wage (instead of income) to tackle inequality and tariff changes (instead of trade flows) to approximate trade reforms, but present the disadvantage to reach conclusions that are less universal. The reason for this usually stems from the lack of adequate and comparable data. This essay relies on a detailed database for trade flows from CHELEM database, CEPII, which covers almost all of our Latin American countries' trade flows detailed by trading partners (around 200 countries and territories) from 1989 to 2015. As well as this, the database that we used for income inequality guarantees a high comparability a wide time-coverage, taken from the Standardized World Income Inequality Database (SWIID). In this study, we use a dynamic panel approach with fixed effect that ensures robust and efficient estimators of the effect of trade openness on income inequality.

Furthermore, the essay provides a deeper insight into the impact of trade on income inequality in Latin America by tackling the diversity of trade flows (nature of partners and trade flows). This allows us to account for: (1) the role of regional integration in this process through dividing partners into inside vs. outside Latin America. (2) The relative factors abundance of Latin American countries relative to their trading partners, as suggested by Davis (1996), by grouping them into higher, similar and lower-income countries. In addition, the empirical analysis disaggregates trade flows according to the stage of production, namely agriculture goods, oil and mining goods, consumption goods, intermediate goods and equipment goods in order to examine whether the 'skill-biased technological change' hypothesis holds for Latin America and to which extent its comparative advantage in the production of primary commodities contributes to reaching a more equal distribution of income.

The results suggest that overall trade flows do not have a significant effect on income inequality. The disaggregation of trade flows according to trade direction indicates a decreasing-inequality effect of trade with higher-income countries and an increasing-inequality effect of trade with similar- and lower-income countries. The results for trade flows according to the stage of

production reveal that trade in agriculture goods, oil and mining goods and consumption goods play a significant role in explaining the relationship between trade and income inequality, while trade in equipment and intermediate goods do not play any role in the countries of our sample. We also observe that income inequality is more affected through the export channel than the import channel, mainly through the exports of primary commodities, which lessen inequality. Taken as whole, the findings give importance to Latin America's comparative advantage in explaining income inequality, while high skill-intensive goods are less important in determining income inequality, corroborating the view that the abundance in natural resources and primary products lowers the motivation for transition toward modern industries and enhances traditional production patterns.

Income inequality and its social consequences for human subjective wellbeing are of ongoing discussion. In general, economists criticize social disparities and the concentration of wealth and income in few hands (see Capital in the Twenty-First Century (2013) by Thomas Piketty; The Price of inequality (2012) by Joseph Stiglitz). Pickett and Wilkinson, in their book 'The Spirit level (2009), further argue that income inequality arouses anxiety, crime, social discord, and illness, and reduces human wellbeing (i.e. life satisfaction) and social mobility. This argument is empirically corroborated by Delhey and Dragolov (2014), Oishi et al. (2011), and Roth et al. (2017), who find that income inequality is associated with increased status anxiety, distrust, perceived unfairness and economic worry, all of which reduce the sense of satisfaction with life.

However, the existing literature does not lead to robust conclusions regarding the inequality-life satisfaction link. A strand of literature suggests that income inequality may not necessarily harm life satisfaction and could even contributes to its improvement. Indeed, some degree of inequality may provide people the motive to challenge, struggle, compete, and go in for life. Hence, people may see inequality as a signal of opportunity to climb the socioeconomic ladder, hypothesis known as the 'tunnel effect' or 'hope factor' (Hirschman and Rothschild, 1973; Kelley and Evans, 2017). The relevant literature suggests that the intensive focus on the direct consequences of inequality *per se* for human wellbeing would be at the cost of neglecting 'other promising paths and significant mechanisms' (Schneider, 2016). In line with this notion, the link between inequality and life satisfaction may well depend on other factors, such as economic development level, the quality of institutions, societal mobility, and political and cultural factors.

The second essay of this dissertation entitled **'Inequality and Life Satisfaction in Low- and Middle-Income Countries: The Role of Opportunity'**, embraces this argument. In particular, it seeks to answer the question of why people living in unequal societies are satisfied with their lives, all else equals. To answer this question, we draw on the role of opportunity. Indeed, people may exhibit higher distaste for inequality if they suffer from it or when they perceive that their outcomes do not meet their own merits and efforts, but they may tolerate inequality if they have the potential to improve their living conditions. Hence, this essay argues that income inequality may have a positive effect on subjective wellbeing for individuals residing in countries with high opportunity level. To test this proposal, we use the 'opportunity index' provided by the Social Progress Imperative, which includes several aspects of social and political aspects, including personal rights, personal freedom and choice, inclusiveness, and access to advanced education. This index allows us to better account for the relationship between inequality and life satisfaction. Unlike most studies, we focus on developing countries in general, and, more specifically, on poor countries, using a large sample (25 low- and middle-income countries). This study estimates multilevel models to explain cross-country differences in individuals' life satisfaction using data from the World Value Survey.

The analysis indicates that the interaction between opportunity and income inequality has an enhancing impact on LS and thus it explains the puzzling positive effect of income inequality on life satisfaction. In particular, income inequality reduces life satisfaction if opportunities are low, while income inequality does not influence life satisfaction if opportunities in the country are high. With respect to other aspects of the opportunity index, the results show that inclusiveness and access to advanced education play a more significant role than political freedom or personal rights. In other words, these findings confirm that people may exhibit higher tolerance towards income inequality if they have the potential of improving their own social outcomes.

Although there is a plenty of research concerning the relationship between income inequality and life satisfaction, recent arguments challenge the existing literature on the topic. The main concern is about the extent to which (real) inequality measures accurately capture the impact of inequality on human welfare, as they are an 'even more abstract phenomenon' (Schneider, 2016: 1731). In other words, people have, in general, no exact knowledge about their actual standing in the income distribution. Research by Fatke (2018) and Kuhn (2011) show that individual

perceptions of inequalities differ from the actual levels. That is, people's unawareness of the actual levels of inequality makes them either overestimate the rise in inequality (Chambers et al., 2014) or underestimate the level of inequality (Norton and Ariely, 2011). In addition, the taste for inequality differs among people, depending, for instance, on their own rooted cultural and social values (Loveless and Whitefield, 2011) or on their own merits, efforts, and social status.

Accordingly, recent empirical work has considerably conveyed to the role of social psychology in the nexus between inequality and subjective wellbeing (i.e. life satisfaction and happiness). The concept of 'subjective evaluation of income inequality' has played a key role in the social psychological theoretical discussion because they explain 'why people perceive the world the way they do and how they then respond to those perceptions' (Jetten and Peters, 2019: 4). Thus, the third part of this dissertation entitled '**The Palliative Function of System Justification and Life Satisfaction: Evidence from Europe**', goes in line with this argument. More specifically, the third essay draws on the social psychological role of the palliative function of system justification to explain how and why justifying the *status quo* enhances people's life satisfaction.

The theory suggests that people are psychological inclined to justify, defend and support the *status quo* despite inequalities because they have psychological needs to fulfill (Jost and Banaji, 1994; Jost and Hunyady, 2002). In other words, they seek stability and certainty about social arrangements 'epistemic need', to feel less threated and unsecured 'existential need', and to fulfill shared reality with others 'relational need'. Furthermore, people's justification of the *status quo* is manifested through their adherence to dominant ideological beliefs (Jost et al. 2008), such as the 'power of meritocratic ideology' through which hard work and efforts lead to success. That is, adherence to inequality-justifying beliefs provide sights about how the society should function and build up the basis of the system's legitimacy. Accordingly, system justification leads to psychological positive impacts on human wellbeing, such as increasing satisfaction with job, social standing, financial situation, and life in general (Jost et al., 2003; Kay and Jost, 2003).

The third essay contributes to the literature through casting light on Europeans' subjective attitudes toward inequalities. Indeed, the literature provides evidence suggesting that (real) income inequality is negatively associated with Europeans' life satisfaction (Alesina et al. 2004; Delhey and Dragolov, 2014; Schneider, 2019), while in this essay we build on the argument

suggesting that inequality-LS link may be better identified when accounting for subjective attitudes toward inequality rather than for the direct impacts of (real) inequality measures (Schneider, 2016). Thus, this essay does not follow a strict economic rational but instead explains the impact on life satisfaction based on a psychological perspective. To do so, we conduct a mediation model using Structural Equation Modelling and employ data from the ninth round of European Social Survey to examine how and why Europeans are satisfied with inequalities.

The results show that system-justifying beliefs decline inequality aversion and support for redistribution, and raises life satisfaction, while inequality aversion enhances support for redistribution. Accordingly, there is a positive direct effect of system justifying beliefs on life satisfaction that is exacerbated via the indirect effects through inequality aversion and support for redistribution. Thus, the results for the indirect effects are consistent with the 'palliative function' of system justification theory, even if their quantitative impacts are very small.

The doctoral dissertation is outlined as follows: the second chapter examines the trade-inequality link in Latin America. The third chapter tests the role of opportunity in the inequality-life satisfaction nexus in low-and middle-income countries. The fourth chapter tests if the palliative function holds for Europe. The fifth chapter concludes and raises questions for future research.

Chapter 2: Inequality in Latin America: The Role of the Nature of Trade and Partners[1]

[1] Teresa María García Muñoz, Juliette Milgram Baleix, and Omar Odeh Odeh (2020). Inequality in Latin America: the role of the nature of trade and partners. *Economics: The Open-Access, Open-Assessment E-Journal*, 14 (2020-25): 1–35. http://dx.doi.org/10.5018/economics-ejournal.ja.2020-25

1. Introduction

The question of how trade openness affects income inequality is still a matter of controversy. Theoretical predictions from the standard trade theory (Stolper and Samuelson, 1941) emphasise that trade openness would be beneficial to unskilled-labour in developing countries. However, they are not fully backward by empirical evidence (Goldberg and Pavcnik, 2007; Pavcnik, 2017). Accordingly, the literature insights into other mechanisms to resolve the contradictions between the theoretical predictions and the empirical findings, such as skill biased technological change (SBTC) induced either by technology transfer from North to South (Acemoglu, 2003), or by the production shift of unskilled-labour activities to the South (Feenstra and Hanson, 1996), or by Southern technological catch-up via the growth in the export of skill-intensive goods (Zhu and Trefler, 2005).

There exists an ongoing debate about whether income inequality is affected by trade flows in general or rather by specific aspects of openness (IMF, 2017). For instance, Jaumotte et al. (2013) find a more robust impact of technological progress than globalization on income inequality in a sample of 51 developed and developing countries. In Latin America, the region with the highest level of inequalities around the world, this debate seems even more relevant. The role played by trade partly depends on the extent to which trade reforms have affected the economy's productivity-enhancing structural change in the region. Wood (1997) argues that trade openness has shifted the production toward more skill-intensive goods in Latin America due to the integration of low-income exporters into the global economy, i.e. China and India. This argument is in line with the 'defensive innovation' term introduced by (Wood, 1995a), which states that the increased foreign competition provides incentives for firms to invest in new technologies. However, Mcmillan et al. (2014) argue that an "economy's overall productivity depends not only on what is happening within industries, but also on the reallocation of resources across sectors". They show that opening up to global economy impedes the movement toward more productive industries and strengthens traditional patterns of production in natural resource-based commodities countries. Thus, in this paper, we attempt to identify the possible channels through which trade openness would have affected income inequality in Latin America.

The empirical literature has reached inconclusive findings on the relationship between trade and inequality in Latin America. Some authors confirm a positive association (Attanasio et al., 2004

for Colombia; Hanson and Harrison, 1999 for Mexico), while others report a negative association (Ferreira et al., 2007 for Brazil), or others point out no effect of trade on inequality (Pavcnik et al., 2004 for Brazil). A common shortcoming in these studies is the focus on trade reforms, embodied in tariff changes, to explain inequality. These studies, hence, adopted *de jure* indicators of openness and ignored *de facto* flows. Moreover, studies on Latin America have neglected the role played by the aforementioned mechanisms (Acemoglu, 2003; Feenstra and Hanson, 1996; Zhu and Trefler, 2005) in the relationship between trade openness and income inequality (see Székely and Mendoza, 2015; 2017 for Latin America). This paper, therefore, aims to fill these gaps. More specifically, we go deep into the relationship between trade openness and income inequality by adopting a more disaggregated analysis of trade, exports and imports. Building on the idea that trade in manufactured products and, in particular imports of intermediate and capital products from developed countries, may induce technology transfers, we disaggregate trade flows by type of trading partners and type of products to isolate their potential impacts on income inequality. The analysis covers a sample of 11 Latin American countries over the 1989–2015 period. We also account for the fact that inequality is a heavily persistent phenomenon, which is not accurately tackled in the literature except by Meschi and Vivarelli (2009). For this purpose, we use a dynamic panel approach that ensures robust and efficient estimators of the effect of trade openness on income inequality. As the number of period is large, we use panel data estimators with fixed effect.

The results suggest that overall trade do not have a significant effect on the dispersion of income in Latin American countries. However, the nature of trading partners matters more for inequalities. When we disaggregate trade according to partners' relative income level, we find a decreasing-inequality effect of trade with higher-income countries, while if the trading partner is similar-or lower-income countries, inequality tends to worsen. Once trade flows are disaggregated by stage of production, it appears that trade in agriculture goods, oil and mining goods and consumption goods play an important role in explaining the relationship between trade openness and income inequality, while trade in equipment and intermediate goods do not play any role for the countries of our sample. We also observe that income inequality is more affected through the export channel than the import channel, mainly through the exports of primary commodities, which lessen inequality.

The study proceeds as follows: Section 2 describes the literature, which is followed by the data and empirical strategy in Section 3. Section 4 presents the results, after which the discussion of the results and concluding remarks are given in Section 5.

2. Literature Review

According to standard trade theory (Stolper and Samuelson, 1941), trade openness would reduce the wage gap among skilled and unskilled workers in developing countries, since trade opening would lead to a rise in the relative price of unskilled-labour intensive goods in a low-skilled developing country and to an increase in the demand of unskilled-labours. This effect could be delayed according to Atolia (2007), who suggests that inequality could decline only in the long-term due to asymmetries in the speed of contraction in the import sector relative to the expansion in the export sector and the capital-skill complementary in production. This argument is empirically validated by cross-studies on Latin America, which indicate an initial disequalizing effect of trade openness on income inequality, but this effect considerably appears to fade away over time (Behrman et al., 2007; Székely and Mendoza, 2015). On the other hand, Davis (1996) puts forwards the hypothesis that the effect of trade openness on inequality depends on the reference sets, factor abundance of a country is compared to. He shows that a developing country, which is unskilled-labour abundant by global standards, might experience an increase in wage inequality if it is abundant in skilled-labour within its own reference set. Hence, the distributional consequences of trade may not reconcile with the Stolper-Samuelson's prediction for developing countries. Wood (1997) echoes this argument and attributes the rising income inequality in Latin America in the 80s and 90s to the emergence of large low-income exporters, such as China and India, which shifted their comparative advantage toward intermediate skill-intensive goods.

The literature on the topic has underlined several mechanisms through which trade openness may affect inequality in developing countries in an intent to reconcile theoretical predictions and empirical findings. The first mechanism introduced by Feenstra and Hanson (1996) links the rising wage inequality in the South to the reallocation of the production of intermediate goods from the North to the South. By increasing the production of these goods, which are unskilled labour-intensive relative to Northern standards and skill-labour intensive relative to Southern standards, the relative wages of skilled-labour increases and consequently wage inequalities worsens in both regions. The role played by imported intermediate inputs is backed up by empirical evidence, which shows that intermediate goods can indeed foster quality upgrading and shift the production towards more skill-intensive goods, which would increase the demand of

skilled workers (Crinò, 2012; Fernandes and Paunov, 2013; Kasahara et al., 2016). Based on the perspective of Feenstra and Hanson (1996), Zhu and Trefler (2005) argue that trade shifts can be also induced through Southern technological catch-up, which moves the production of unskilled-intensive goods from the North to the South. These products would correspond to the most skill-intensive according to Southern standards and this, in turn, would foster wage inequality in both regions.

Another mechanism suggests that trade openness can indirectly worsen wage inequality through technology transfer from the North to the South, which, in turn, fosters SBTC in developing countries because these technologies are more skill-biased than pre-trade local technologies (Acemoglu, 2003). Robbins (2003) introduces the 'skill-enhancing trade hypothesis' to explain the nexus between trade openness and wage inequality in developing countries, which predicts that trade openness accelerates the imports of capital goods and of new technologies in the South. This would, in turn, increase the demand for more skilled labours in the South and widen the unskilled-skilled wage gap. More recently, Wang and Yin (2016) find that technology transfer from the developed countries propels wage inequality in the host country. The empirical studies by Conte and Vivarelli (2011), and Sánchez-Páramo and Schady (2003) offer evidence supporting this argument for low- and middle-income countries, and Latin America, respectively, whereby the imported technologies from developed countries increase the demand for skilled-labour in these countries. In contrast, Gourdon (2011) finds that South-South trade leads to technical change that is more biased toward more skill-intensive sectors and this, in turn, would fuel wage inequality in lower-middle and low-income countries more than North-South trade does. In contrast, Meschi and Vivarelli (2009) conclude that only trade with developed countries leads to technological change in developing countries, hence boosting income inequality.

Other studies have underlined that technological change in developing countries is not only driven by imports but also by exports. This stems from the fact that access to export markets generates an increase in revenues for exporting-firms, making it profitable for them to invest in technology (Bustos, 2011a) and thereby increasing the demand for skilled-labour (Bustos, 2011b). Matsuyama (2007) provides another explanation of why the act of exporting *per se* favours skilled labours. He argues that exporting requires activities that are biased in favour of skilled-labours, such as language knowledge and marketing. However, Brambilla et al. (2012)

lend partial support for this argument in Argentina. Alternatively, other authors have suggested that exporting *per se* does not necessarily stimulate the demand of skilled labours and the use of new technologies. Rather, the destination of exports would matter more. Verhoogen (2008) emphasises a mechanism where exporting to high-income countries allows for quality upgrading in Mexico. According to this author, the production of goods to serve high-income markets requires more skilled labours than producing for home or low- and middle-income countries because individuals in high-income countries have a higher income level and valuate high-quality products. Brambilla and Porto (2016) and Brambilla et al. (2012) lend support for the 'quality upgrading' mechanism in a panel of developing countries and Argentina, respectively. A different argument is provided by Brambilla et al. (2019), which points out that exporters do not equally expand their demand for all type of skilled labours because exporting requires tasks that demand a specific type of skills. They empirically find that exporting-firms in Chile have shifted the labour demand in favour of engineers over skilled administrative workers and managers.

In view of the foregoing, the relationship between trade openness and income inequality in Latin America may indeed be influenced in different ways by the nature of its exports and of its import structures. As intermediate countries (in terms of development level), the relative abundance in production factors may vary depending on the trading partners considered and trade flows could also have different impacts on inequality depending on the destination and origin of these flows.

On the exporting-side, Rodríguez-Pose and Gill (2006) suggest that trade composition may influence regional inequality. According to these authors, when manufacturing exports gain in importance over primary exports, regional inequality tends to ascend. However, in a region where the relative size of primary sector exports is still considerable in the exports basket, the distributional consequences of exports on income inequality may follow a different trajectory, which depends on the relative skill composition used in the production of primary goods. Székely and Mendoza (2017) argue that, in this vein, the world demand for primary goods may either improve or worsen the distribution of income, depending on whether their production is relatively intensive in skill and capital (e.g. oil extraction and mining) or relatively intensive in unskilled-labour (e.g. foodstuffs). On the importing-side, the literature widely confirms that imports from North deteriorate both wage and income inequality in the South due to technological differences between the two regions (Acemoglu, 2003; Meschi and Vivarelli,

2009). Imports from middle-income countries may also cause inequality to grow. As noted by Gourdon (2011), trade within developing countries leads to technological skill-biased toward more skill-intensive sectors and hence widening inequality. Imports from low-income countries may include standard technology and, in turn, would not induce any effect on inequality (Gourdon, 2011; Meschi and Vivarelli, 2009).

As shown before, the empirical studies have alternatively focused on the effects of trade on wage inequalities or on income inequalities, while most theoretical trade models focus on the effect of trade on wage inequalities. This requires a more detailed attention. In the mid-90s, there was a critical need to identify alternative mechanisms of how trade openness can affect inequalities in developing countries since the facts did not fit the prediction of the Heckscher-Ohlin trade model, assuming that income inequality evolves in the same manner as skill premia. As explained before, a plausible conjuncture for that is the role played by technology transfer and innovation, production shift and investments. Harrison et al. (2010) argue that these new theoretical developments explain, "How trade could contribute to rising within-industry inequality as well as rising inequality in countries at all income levels".

We argue that it is more interesting to focus on income inequality, which has a clearer socio-economic meaning than on wage inequality, despite some drawbacks discussed in the Methodology section. There are several reasons for that. Firstly, wage inequality is sector-specific and would not account for indirect effect of trade on wages in other sectors. Trade of goods from a specific sector is expected to have a direct effect on wages of the exporting sector, as well as on wages of the import-competing sector of these goods. Secondly, the literature also suggests trade indirectly drive effects on the other sectors they provide inputs to, or they are clients of. Then, trade affects wage gaps within sector, but also between sectors. These effects are not captured by wage inequalities at the sector level. Thirdly, the overall effect on households' income also depends on changes in labour supply (Gasparini et al. 2011; Gasparini and Lustig 2011), fiscal policies, number of wage earners in the household, and additional income sources (Wood, 1995b). In this regard, tax revenue is low in Latin America and mainly comes from indirect taxation, thus exacerbating income inequalities (World Bank, 2014). Lopez-Calva et al. (2015) provide some clues on the relationship between labor and income inequality for Latin America: "The decline in inequality in the region has been mostly driven by a fall in labor

income inequality—explained by a reduction in the returns to education—and by more progressive and better-targeted government transfers (Lopez-Calva and Lustig 2010; Lustig et al. 2013; Gasparini et al. 2011). The reduction in skill premiums, in turn, tends to reflect a combination of enhanced access to education, rising the relative supply of skilled workers". In sum, focusing on wage inequalities leads to a more straightforward verification of the direct effects of trade flows, but do not account for all the indirect effects induced by trade, which is in our opinion, are more meaningful. Besides, studies focusing on income inequality in a panel of countries are scarce (see for instance Székely and Mendoza, 2015; 2017), so we consider that our study could fill this gap.

Based on the previous literature, changes in the distribution of wages and income in developing countries can be driven by standard explanations as well as by new trade theories. Traditional explanations suggest that trade openness would decrease inequality in country unskilled-labour abundant. However, Davis (1996) nuances this conclusion by underlining that factors abundance of one country varies according to the reference set. Thus, inequality could grow in a Southern country unskilled-labour abundant by global standards but skilled-labour abundant relative to other Southern countries. On the other hand, more recent theories suggest that trade openness allows for technology upgrading in developing countries either through the import channel (capital goods and outsourcing of "intermediate goods") or through the export channel (quality-upgrading mechanism), which is conditional upon partners' income levels. Thus, the effect of trade on income inequality may vary depending on the nature of the product traded and the nature of the trading partners.

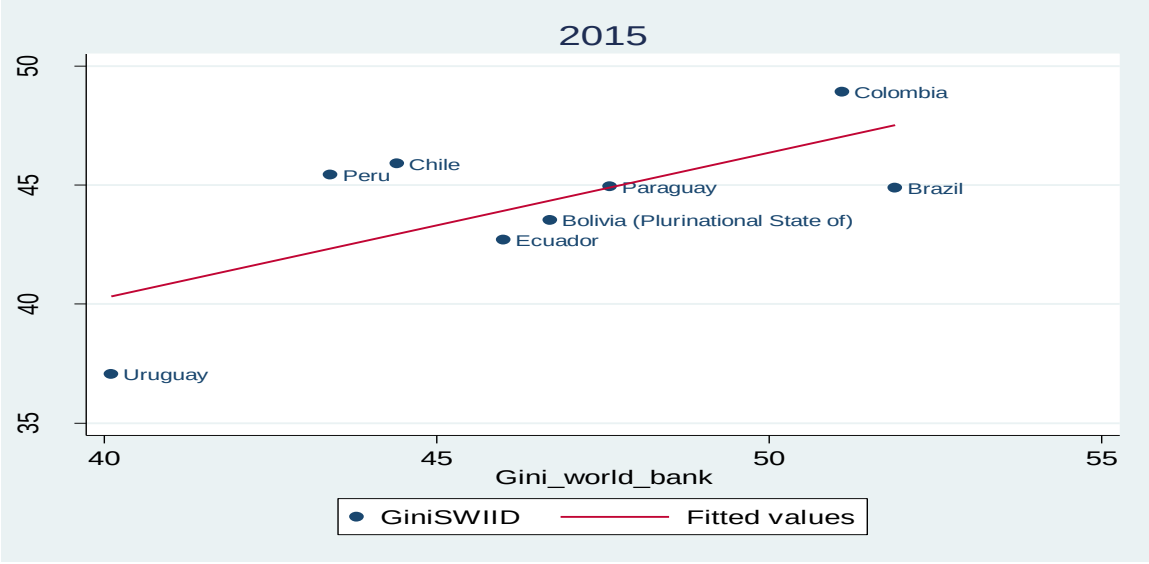
3. Methodology

To assess the nexus between trade openness and income inequality in Latin America, we face the problem of the accurate measure to account for inequality. As pointed by Thomas Piketty, Emmanuel Saez, or Gabriel Zucman, Gini indicators that measure income inequality based on household surveys suffer from several drawbacks. In particular, Alstadsæter et al. (2018) consider how much wealth is held in tax havens and who owns the wealth in tax havens to construct top income and wealth shares for different countries. Moreover, rich people often do not report their correct income or do not respond at all, and income inequality is measured with error (see Anand and Segal 2015: 945–948). Following the seminal works by Piketty (2001) and Piketty and Saez (2003), many scholars used official tax records and computed pre-tax top income shares for a number of countries. The collection is compiled in the WID - World Wealth and Income Database (Atkinson et al. 2011). Unfortunately, the main limitation of alternative inequality measures, such as the ones provided by the World Inequality Database (WID) is the lack of data, especially for developing countries (see Alvaredo et al., 2017). For the purpose of our study, WID covers only the following Latin American countries: Argentina, Brazil, Chile, Colombia and Uruguay at different time spans and for different indicators, such as average income, average wealth, income shares and wealth shares. This heterogeneity does not allow us to perform panel estimations.

The Standardized World Income Inequality (SWIID), which standardizes the United Nations University database (UNU-WIDER 2008) minimise reliance on problematic assumptions by using as much information as possible from proximate years within the same country. According to Solt (2016), the creator of SWIID, the best source in terms of comparison is the Luxembourg Income Study but it is only available for developed countries. The World Bank and EHII (Estimated Household Income Inequality) provide also GINI measures for Latin American countries but the time coverage is lower than SWIID. Comparing Gini index from SWIID and Gini index from the World Bank, we observe also a high correlation of 0.84 when using the whole information available for the period 1989–2015. Graph 14 illustrates this relationship for 2015. For all these reasons, we chose to rely on Gini indicators from SWIID since the data comparability is considered as much as maximum and maintain the widest possible coverage across countries and over long periods.

Moreover, we chose to focus on income inequality instead of wage inequality. First, it is important to note that wage inequality data available for Latin America come from national household surveys, which are not uniform across, and even within countries, in terms of geographical coverage and questionnaires over time. Thus, studying wage inequalities in a panel of countries, leads to comparability problems and loss of accuracy. That is why most previous studies on wage inequality in Latin America have only dealt with country case studies (e.g. Attanasio et al, 2004 for Colombia; Galiani and Porto, 2010 for Argentina; Gonzaga et al., 2006 for Brazil). Apart from these methodological problem, we consider that income inequality better accounts for all the effects driven by trade that wage inequalities as discussed in the previous section.

Graph 1: Gini SWIID and Gini index from the World Bank in 2015



Source: Standardized World Income Inequality (SWIID) and World Bank

Another decision concerns how to measure trade integration. Gross trade may not accurately reflects the net value added incorporated in trade flows due to the integration in Global Value Chains. However, Latin American countries (except Mexico) have forward linkages with the rest of the world since they are natural resources abundant countries. By the same token, the degree of openness per se does not fully reflect countries' trade connections with the rest of the world. Regarding the measurement of connectedness, Arribas et al. (2009) propose indicators that take

into account the architecture of trade connections, the weight of trading flows compared with partners' sizes. They highlight that South America appears as not highly integrated in global trade by highly connected. Based on a network approach, Reyes et al. (2010) propose relevant indicators (e.g. first-and higher-order connectivity and clustering measures) to examine the evaluation of international economic integration in East Asia and Latin America. They find that both regions experienced an increase in their degree of openness, while there is a considerable difference in their integration levels into the world economy. In particular, according to these authors, Latin America has a lower integration degree in the world trade network, standing in contrast with the case of East Asia, which has a higher integration degree in the world trade network. In fact, Latin America's economic integration is impeded by its comparative advantage (natural resources-based commodities), which is one of the main limitations of its participation in the global value chains (except Mexico). To take into account these considerations, we use measures of trade openness expressed in terms of GDP rather than trade openness in absolute terms and we also disentangle trade flows in order to take into account the geography of trade.

Regarding the estimation method, we consider a dynamic panel approach, which enables us to account for the high persistence of income inequalities. As a matter of fact, there are a range of factors that may affect long-term trends of the distribution of income, such as reductions in fertility, education, use of human capital (see Székely and Mendoza, 2017 for instance), type of growth and institutions (see Hartmann et al. 2017 for a survey), fiscal and labour policies (Papanek and Kyn, 1986), and structure of ownership and structure of production. Thus, it is beyond the scope of our study to gauge the long-term determinants of income inequality. Instead, we focus on middle- and short-term impacts of trade on within-country income inequality. Then, the chosen specification controls for the long-term determinants of inequality, even if we are not able to precise which factors there are.

Generalized least squares, Within Groups (WG) and Ordinary Least Squares (OLS) estimators are biased when lagged dependent variable is included as explanatory variable. A suitable dynamic panel data technique to overcome this problem is the difference Generalized Method of Moments (GMM) estimation (Arellano and Bond, 1991). However, when the number of period is large, as it is our case, dynamic bias becomes insignificant (Roodman, 2009) and panel data estimators with fixed effect estimator is another good option to tackle the estimation of dynamic

models. This method also allows to control for the unobserved heterogeneities within countries and to take into account the quasi-fixed country structural factors that affect the level of income inequality but do not change over time, such as institutional context, factor endowments and economic size.

Another important consideration to discuss is the one of Kuznets (1955), who emphasises that income inequality steeply augments at the early stages of development, reaches a peak, and then supposedly commences to decrease, as the economy gets through an industrialization process. Then, Kuznets's prediction concerns long-term change in inequality that are already controlled for by our dynamic approach. However, Latin America is a region that suffers from an inadequate development of the manufacturing sector (except Mexico) and where natural resource-based commodities are still dominant in its production and export basket. Hence, there are doubts whether Kuznets curve holds for Latin America. Nevertheless, a correct validation of the Kuznets's hypothesis would require a large sample of countries at different stages of the development process or to focus on one country that went through an industrialization process as proposed by Barro (2000, 2008). Then, our study aims at examining the role played by trade in the year-to year changes in income inequality within countries.

The model includes year fixed effects that control for all the events affecting in a similar manner the countries of our sample, such as the 2008 financial crisis. According to trade reforms, these countries have followed different trade liberalisation processes during the first part of the period analysed. Starting from the end of the 1990s, little changes have been introduced in this regard and trade policies may well be accurately controlled for, by year fixed effects. The dynamic specification, which includes the level of income inequality in the previous year, already account for the long term determinants of inequality, even if we are not able to precise which factors there are. Bearing in mind these circumstances, accurate additional control would be the variables that may influence trends in income inequality in the mid- and short term. For instance, it would be accurate to control for fiscal and labour policies but these data are difficult to gather in an accurate manner for our sample. We include GDP growth and the net barter terms of trade,

defined as the ratio of exports to import prices, to account in particular for the expansion in the price of commodities after 2000.[2]

Our empirical baseline model takes the following form:

$$INEQ_{it} = \alpha_{it} + \beta INEQ_{i,t-1} + CTRADE_{it} + DT_t + \sum \delta X_{it} + \mathcal{E}_{it} \quad (1)$$

where $INEQ_{it}$ denotes the distribution of income measured by Gini coefficient in country *i* where *i* is one of the 11 LA and *t* indicates the year, while $INEQ_{i,t-1}$ is the lagged Gini coefficient in country *i*; $TRADE_{it}$ represents trade expressed as a share of GDP of country *i* in year *t*; T_t denotes year dummies, X_{it} is a vector of control variables in country *i* and year *t*, including GDP per capita and its square, GDP growth, FDI net inflow (% of GDP) and terms of trade defined as the ratio of exports to import prices.

To obtain a deeper insight into the relationship between trade openness and income inequality in Latin America, we adopt a more disaggregated analysis of trade using several classifications of trade partners and nature of products. To this end, we distinguish among partners inside and outside Latin America to check the role of regional integration in this process. To account for the relative abundance in factors of LA countries compared with their trade partners, as suggested by Davis (1996), we also classify partners as higher, similar and lower-income countries according to the relative levels of income of the trading partners compared with the reporting income levels of Latin American countries.[3]

In a second step, we disaggregate trade flows by stage of production, namely agriculture goods, oil and mining goods, consumption goods, intermediate goods and equipment goods in order to test if the SBTC hypothesis holds for Latin America and to which extent its comparative advantage in the production of primary commodities contributes to a reduction in income inequality. SBTC indeed arises from the increase in trade in final goods and technology transfer

[2] We have also tested the influence of inflation, real exchange rate and a dummy variable for the period 2000–2014 to account for commodity booms. Results are similar.

[3] Our income level classifications are based on the difference between the GDP per capita (GDP*pc*) of country *i* and the GDP per capita (GDP*pc*) of country *j* in year *t*, where *i* is a Latin American country and *j* is a trading partner. Considering the percentiles 33 (p33) and 66 (p66) of the difference GDP*pcit* – GDP*pcjt*, we define *j* as a higher-income partner *if* GDP*pcit* - GDP*pcjt* < p33, we define *j* as a lower-income partner if GDP*pcit* - GDP*pcjt* > p66 and we consider *j* as a similar-income partner if p33≤GDP*pci*t - GDP*pcjt*≤p66.

(in the form of capital and intermediate goods) (see Acemoglu, 2003; Feenstra and Hanson, 1996; Murakami, 2014). Hence, we conjecture a negative impact of trade in consumption, intermediate, and equipment goods on inequality, conditional upon the technological differentials between trading partners. Regarding the region's comparative advantage in primary commodities, we predict two conflicting effects on inequality. Trade in agriculture goods reduces inequality as they are unskilled-labour intensive, while trade in oil and mining goods may worsen inequality as these goods are complementary to capital and skills (Székely and Mendoza, 2017).

Then we disaggregate all trade flows into export and import to check if they have an asymmetric influence on inequalities as suggested by the literature review. In particular, the hypothesis of SBTC is mainly induced by the import channel. We predict overall exports to have an equalizing effect on inequality due to the region's concentration in the export of unskilled-labour intensive activities, or an increasing effect if technology catch-up hypothesis holds for Latin America through the exports of more skill-intensive goods (see Zhu and Trefler, 2005). Hence, we predict a deteriorating-inequality effect of the exports of intermediate and equipment goods, while the effect of the exports of consumption goods on inequality is not clear, depending on the skill intensity used in their production. We also conjecture that the exports of oil and mining goods worsen inequality due to complementary to capital and skills, while the exports of agriculture goods reduce it because they are unskilled-intensive. On the importing-side, we expect the effect of overall imports on inequality to depend on the technological level of trading partners, as discussed in the literature review section. We also predict that the imports of consumption (see Ffrench-Davis, 2010), intermediate and equipment goods raise inequality, depending on the technological level of trading partners. The imports of agriculture goods may boost inequality, as it would decline the demand for domestic unskilled labours, whereas the imports of oil and mining goods induce the opposite effect.

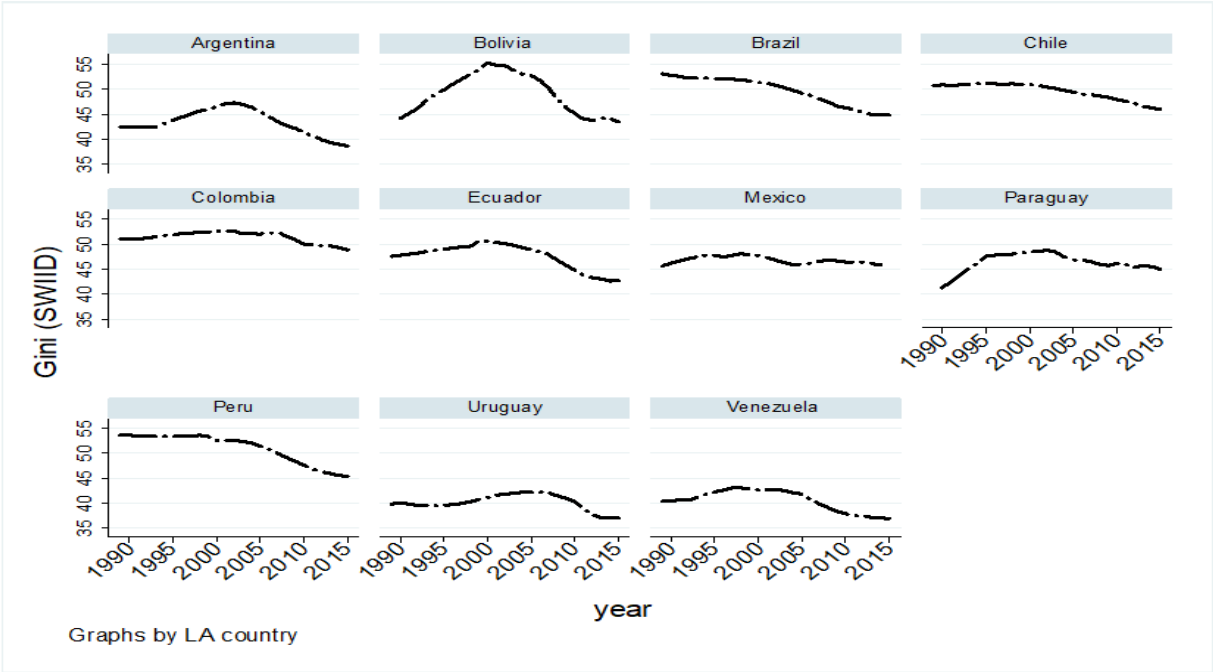
4. Data

Our sample accounts for 11 Latin American countries (Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, Uruguay and Venezuela) and covers the 1989–2015 period. Summary statistics for all variables in study are in Table A.1 (Appendix).

Data on income inequality are imported from the Standardized World Income Inequality Database (SWIID). The control variables, including FDI inflow, GDP per capita, GDP growth, and net barter terms of trade are retrieved from the World Development Indicators, the World Bank. Trade/export/import variables and GDP are taken from Comptes Harmonisés sur les Échanges et l'Économie Mondiale (CHELEM) of the Centre d'Études Prospectives et d'Informations Internationales (CEPII).

Income inequality has experienced significant changes in Latin America during the last three decades as shown in Figure 1, which displays its evolution measured by Gini coefficient from 1990 to 2015. As can be observed, although there are considerable differences across countries, all Latin American countries have witnessed apparent declines in their inequality levels, starting from 2000 onwards. The countries with the highest income inequalities at the end of the period are Colombia (48.91), Chile (45.91), Mexico (45.87) and Peru (45.44). However, although the considerable reductions in income inequality, the average of Gini index in Latin America (46.8) is still higher than the average of Gini index in high-income countries (45.3) and low- and middle-income countries (41.5) during the late 2000s (UNDP, 2013).

Figure 1: The evolution of Gini coefficient

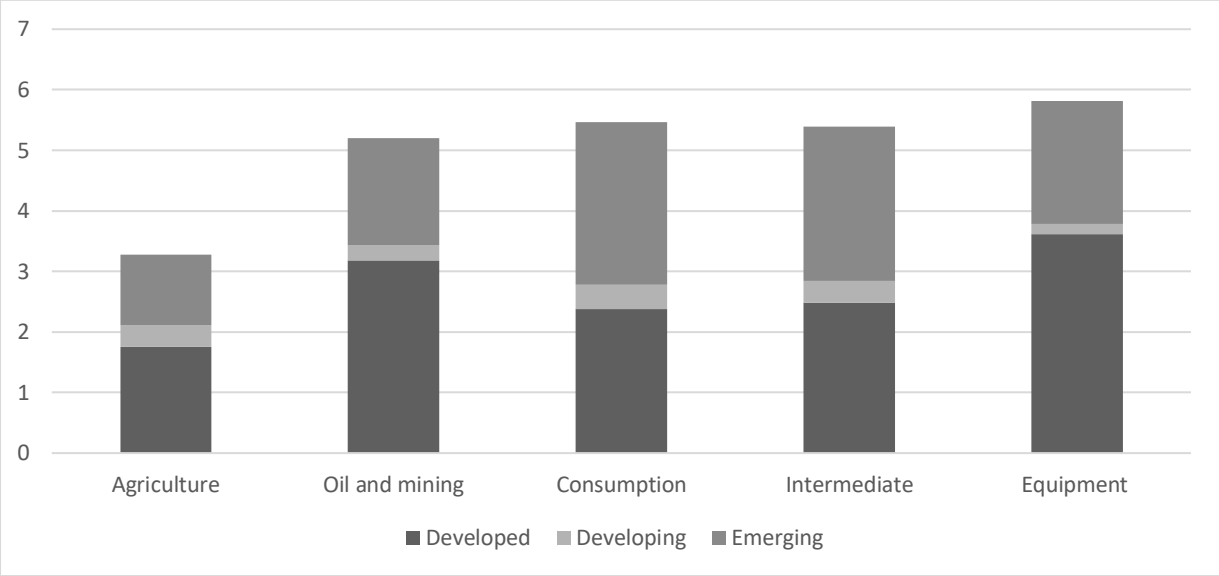


Source: the Standardized World Income Inequality Database (SWIID).

As can be gathered from Figure 2, Latin America trades mainly with countries with higher-income than themselves and, to a lesser extent with similar-income countries. More specifically, as shown in figure 3, trade with developed countries accounts for the largest share of Latin America's trade in equipment, oil and mining and agriculture products. In contrast, the weights of emerging and developed countries are almost balanced for intermediate and consumption goods.

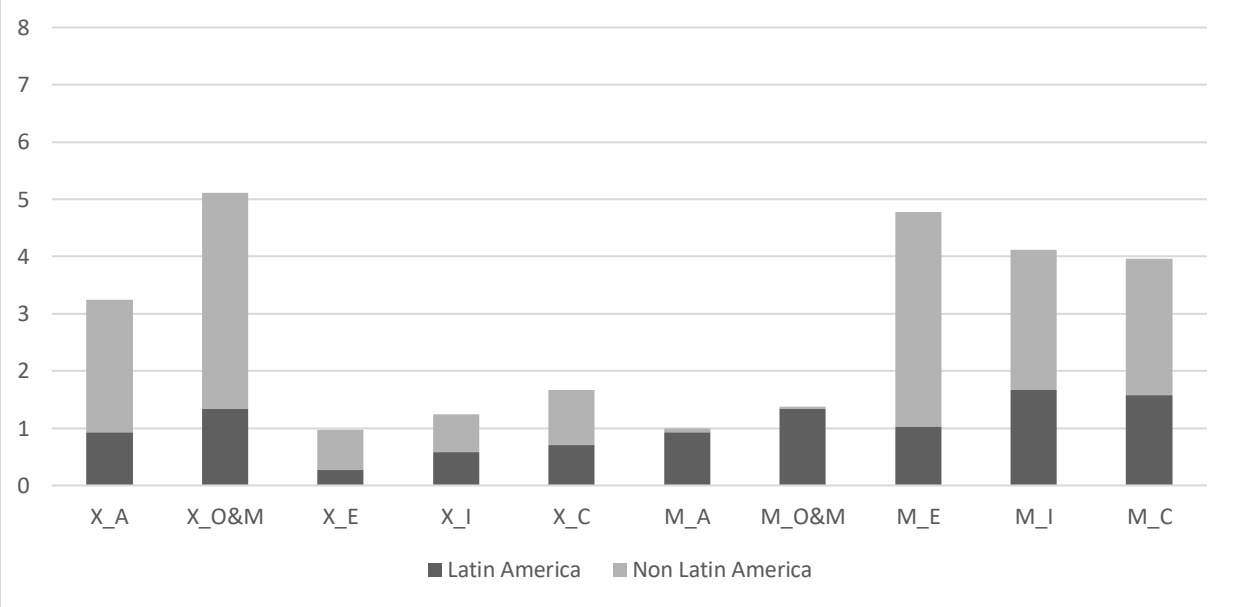
Regarding the profiles of exports and imports, we disentangle in Figures 3 and 4, exports and imports of Latin American countries by products and groups of trading partners. Turning to intra-regional trade (Figure 3), exports to other Latin American countries account for a lower share than exports to non-Latin American countries. Similarly, the region is not the main source of imports of manufactured products. In contrast, almost all the primary products are imported from other Latin American countries.

Figure 2: Latin America: trade by products and group of trading partners (% of GDP), average 1989–2015.



Source: CHELEM database, CEPII

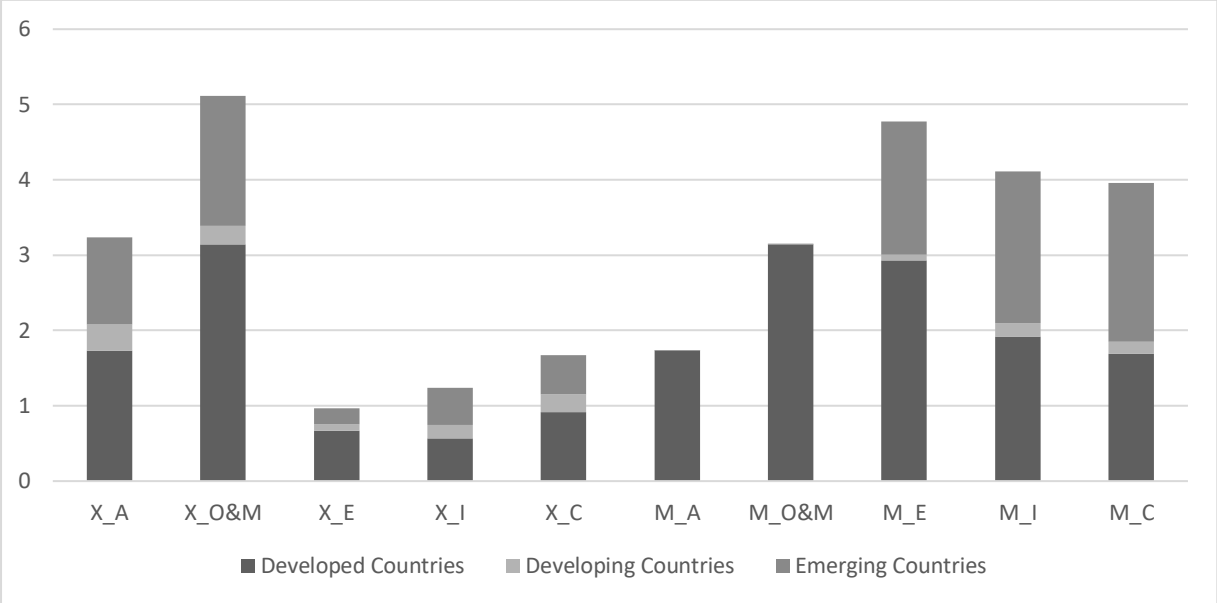
Figure 3: Latin America: intra and extra-regional exports and imports by products (% of GDP), average 1989–2015



Source: CHELEM database, CEPII. Note: X_A: Agriculture exports; X_O&M: Oil and mining exports; X_E: Equipment exports; X_I: Intermediate exports; X_C: Consumption exports. M_A: Agriculture imports; M_O&M: Oil and mining imports; M_E: Equipment imports; M_I: Intermediate imports M_C: Consumption imports.

To complete the picture, we detail exports and imports by products and group of trading partners (Figure 4). Figure A.1 displays the same information as Figure 4 for each Latin American country. The exports of oil and mining and agriculture products account for the largest share of the exports of Latin American countries. These primary products are sold mainly to developed countries and to a lesser extent to emerging countries (Figure 4). In particular, oil and mining exports are especially relevant (in terms of their GDP) for Venezuela, Bolivia, Ecuador and to a lesser extent for Colombia, Chile and Peru. The small countries of Paraguay and Uruguay export nearly agricultural goods. These products are also essential in the exports of Ecuador, Chile and to a lesser extent Argentina. The exporting patterns of Chile, Argentina, Brazil and above all Mexico are more diversified. In contrast of the other Latin American countries, exports of equipment, intermediates or consumption goods account for a significant share of their exports and GDP. Due to the polarization of the production and of the exports in the primary sector, the import basket of Latin American countries mainly include manufacturing goods they lack of, consumption, intermediates and equipment goods. Imports of consumption and intermediate goods come mainly from emerging countries and developed countries in similar shares while they purchase a larger share of equipment goods, more intensive in technology and skilled, in developed countries. Mirroring the specificities of Chile, Argentina, Brazil and Mexico underlined above, the weight of equipment goods in their imports is higher for these countries with a more diversified production. For every of these Latin American countries, imports come mainly from countries with higher income than themselves, while the destinations of exports are more diversified.

Figure 4: Latin America: exports and imports by products and group of trading partners (% of GDP), average 1989–2015



Source: CHELEM database, CEPII; Note: X_A: Agriculture exports; X_O&M: Oil and mining exports; X_E: Equipment exports; X_I: Intermediate exports; X_C: Consumption exports. M_A: Agriculture imports; M_O&M: Oil and mining imports; M_E: Equipment imports; M_I: Intermediate imports M_C: Consumption imports.

5. Results Analysis

All models have been estimated using panel data estimators with fixed effects and using difference GMM estimators (available upon request). Since both methodologies lead to similar results, we focus on the first one. In each table, there are 3 models: Models 1 report the results for trade flows *regardless the partners*, Models 2 display the results for trade flows within and outside Latin America and Models 3 contain the results for trade flows with higher-, similar- and lower-income countries).

The results of our baseline model (the effect of overall trade and trade by partners) are presented in Table 1. Results for control variables are standard and similar in all the estimations. The lagged Gini index is highly significant mirroring the fact that inequality is a highly persistent phenomenon. Income inequality decreases with GDP *per capita* (statistically significant in Models 1 and 3) while the effect is lower for higher income (the squared value of GDP *per capita* displayed a negative coefficient). Our models point out a U-shaped relationship between inequality and the logarithm of per capita GDP. The minimum of this curve for all the models is approximately 10. For our sample, the logarithm of per capita GDP ranges from 7.18 to 9.61. This means that the GDP of the countries in the sample are situated in the decreasing part of the curve. During the last years, inequality has declined in most of the countries of our sample in a period of significant growth. This empirical evidence is coherent with the negative sign obtained for GDP per capita when explaining income inequality. As argued in the Methodology section, our sample does not allow us to perform a test of Kuznets curve hypothesis (1955). Nonetheless, our results would be compatible with a situation where LA countries are situated in the second part of the inverted U shape Kuznets's curve, where the increase in income per capita translates into a decrease in the income dispersion. These results are consistent with the findings of Meschi and Vivarelli (2009), and Dreher and Gaston (2008).

As expected, GDP growth contributes to a reduction in income inequality (statistically significant in Models 3 and 4). FDI is statistically significant in all models and points out that openness to capital flows would accentuate income inequality, corroborating the empirical studies on Latin America (Herzer et al., 2014; Suanes, 2016). Terms of trade display a non-significance effect on income inequality in all models. This has an important meaning since it ensures us that the trend in prices, and in particular of commodity prices, are controlled for and

do not exert a significant impact on GINI. Then, results are not an artefact of commodity boom that take place during the 2000–2014 period. Since these control variables have almost the same effects in all estimations, we only comment on the impact of trade variables in the following.

Table 1: Effects of overall trade and trade by partners (% of GDP) on income inequality

Dependant variable: Gini$_{it}$	Model (1)	Model (2)	Model (3)
Gini (t-1)	0.896***	0.913***	0.879***
Overall trade	-0.006		
Trade with (% of GDP):			
Latin America (LA)		-0.03***	
Others than Latin America (non-LA)		0.016***	
Higher income countries (HIC)			-0.013***
Similar income countries(SIC)			0.016*
Lower income countries(LIC)			0.025*
Ln (GDP per capita)	-5.946**	-3.777*	-2.751
Ln (GDP per capita)^2	0.294**	0.172	0.087
GDP growth	-0.011	-0.015**	-0.009
FDI inflow (% of GDP)	0.059***	0.043***	0.050***
Term of trade	-0.000	-0.000	-0.001
N	281	281	281

Significant at * p<0.1; ** p<0.05; *** p<0.01.

When the origin and destination of trade flows are not taken into account (Model 1), we find that trade does not induce any significant effect on income inequality in the region. This finding supports the hypothesis that aggregate trade flows uncover flows with heterogeneous intensities in production factors and would not capture, as argued Meschi and Vivarelli (2009), the role of transmission channels through which trade openness may affect income inequality within countries. Therefore, we split overall trade flows into trade within and outside Latin America (Model 2 in Table 1) and find that all the benefits in terms of reduction of inequality come from regional trade. On the opposite, trade with countries that do not belong to Latin America would worsen income inequality. In fact, Latin American countries trade more with partners located outside the region than within due to the relative similarities in the production structure and hence relative similarities in their comparative advantages (IMF, 2017). However, trade with partners located outside LA uncover very heterogeneous flows in terms of skill abundance intensities that prevent us to conclude that whether trade with all the partners outside the region would increase the income dispersion.

To fix this issue, we turn to a disaggregation of trade partners according to their income per capita level, used as a proxy of their capital intensity and relative abundance in human capital. We find that trade with higher-income countries attenuates inequality, whereas trade with both lower and similar-income countries accentuates income differences. This evidence corroborates the predictions of Davis (1996) concerning trade and inequality for developing countries: middle-income countries can see a rise in inequality, if they are unskilled-labour abundant by global standards and skilled-intensive abundant by Southern standards. This outcome is in line with Gourdon (2011), who evidences that South-South trade increases wage inequality, while trade with Northern countries leads to decreases it. The author ascribes his findings to the view that middle-income countries are considered as relatively skill-labour abundant in the South-South relationship (as suggested by Davis, 1996); and secondly, to the fact that South-South leads to technological change that is biased toward more skill-intensive sectors, which brings about a larger impact on wage inequality, especially for lower-middle and low-income countries.

In Table 2, aggregated trade is split into exports and imports, regardless partners (Model 1) and by destination/origin (Models 2 and 3). Our results tend to show that the mechanism through which trade decreases inequality transits through exports more than through the import channel and indicate that the destinations of exports matter for inequalities. This is an important result because the literature has focused more on the latter more than on the former, based on the idea that foreign competition could boost productivity through a more efficient assignation of resources among sectors, but also because access to a wide variety of capital and intermediate products boosts technology transfers. We find that exports to other LA countries or to partners with higher income per capita would contribute to a reduction of income inequality. In contrast, the exports to other destination have no significant effect. More interestingly, none of these flows exacerbates inequalities. Remarkably, imports have no significant effect on inequality overall. However, imports from LA countries are found to tighten inequality, while imports from non-LA and similar-income countries would contribute to a more polarized distribution of income.

Table 2: Effects of overall exports and imports (% of GDP) on income inequality

Dependant variable: $Gini_{it}$	Model (1)	Model (2)	Model (3)
Gini (-1)	0.896***	0.916***	0.880***
Exports	-0.015***		
Imports	0.010		
Exports (LA)		-0.029***	
Exports (non-LA)		0.003	
Imports (LA)		-0.039***	
Imports (non-LA)		0.037***	
Exports (HIC)			-0.017***
Exports (SIC)			-0.002
Exports (LIC)			0.017
Imports (HIC)			-0.002
Imports (SIC)			0.033**
Imports (LIC)			0.036
Ln (GDP per capita)	-5.538**	-3.154	-2.577
Ln (GDP per capita)²	0.268**	0.140	0.080
GDP growth	-0.013*	-0.017**	-0.012
FDI inflow (% of GDP)	0.055***	0.041***	0.047***
Term of trade	-0.000	0.000	-0.000
N	281	281	281

Significant at * p<0.1; ** p<0.05; *** p<0.01.

A possible explanation for the negative nexus between imports from LA countries and inequality comes from the similarities among these partners in their endowments and technologies. In fact, regional trade among LA countries is shaped by trade agreements (Acosta and Montes-Rojas, 2008), such as Mercosur between Argentina, Brazil and Uruguay, and Andean, which includes Bolivia, Colombia, Ecuador and Peru, rather than comparative advantages. Trade among these countries consists in similar goods with similar intensities. However, unlike trade with other middle-income countries outside LA, trade among LA countries is not as skill-intensive as with other middle-income countries. Then, the effect of imports from other LA may boost the income of the poorest more than the ones of the richest. On the other hand, the positive association between imports from non-LA and inequality is driven by the influence of imports from other similar countries. Overall, imports from higher income countries have a negative but non-significant effect while the effect of imports from SIC worsens inequality. It stems from the fact that the region's imports basket from outside is mainly concentrated in relatively skill-intensive goods (ECLAC, 2015). This, in turn, favours skilled labours over unskilled labours and thus rises

inequality (Ing, 2009). In the case of similar-income countries, the effect on inequality is expected as imports from these countries may contain skill-enchasing effect on income inequality (see Gourdon, 2011; Meschi and Vivarelli, 2009).

Finally, we analyse trade by type of products (Table A.2 and Table A.3 in Appendix). Trade in oil and mining goods is the only type of trade that really impacts income inequality in the region and this effect is driven by exports of these products, and in particular by exports to other Latin American countries.[4] [5] In the same line, importing these products from countries of the region propel income inequality. In this case, and since these products are mainly traded on an inter-industry basis, the effect may not transit through a decline in the skill premium but mainly represents the important increase in revenue obtained from exports of these primary products even if the pure price effect is controlled for by time fixed effects and terms of trade. There is also another possible channel transiting through FDI. Indeed, oil and mining sector has attracted foreign capital following trade reforms in many countries in the region (Suanes, 2016). According to Jensen and Rosas (2007), foreign capital may have two conflicting influence on income inequality in the host country. First, the competition between foreign capital and local capital increases the wages of local labours and hence reducing inequality. Second, foreign capital may decrease inequality, if foreign firms hire unskilled labours and pay wage premiums for them. Unfortunately, it is beyond the scope of this study to test this indirect effect.

As regards consumption goods, trade of these products within Latin America would be inequality reducing, while trade with third countries would have the opposite effect. In fact, the region implemented significant tariff cuts on consumption goods following trade reforms. The net effect of trade in these goods on the skill premium therefore depends on their skill level or industry affiliation (Porto, 2006 and Ural Marchand, 2017). A conjecture for that finding is that tariff changes induced by Mercosur on consumption goods have contributed to an increase in the relative price of unskilled-intensive goods (mainly the price of "food and beverage" consumption goods). This, in turn, has led to increase the wages of unskilled labours over skilled labours (Porto, 2006). On the other hand, a possible explanation for why trade in consumption goods

[4] All the 11 countries considered export oil or mining products.

[5] Trade in agriculture goods induces decreasing effects on income inequality (trade within Latin America, similar- and lower-income countries,). This can be attributed to the acceleration in the importance of primary goods in global markets, which led to an increase in their relative prices, employment expansion and eventually reduce income inequality (IMF, 2018).

with non-Latin American countries increases income inequality is that the decreases in the region's protection level had a significant impact on the composition of its imports from non-Latin American countries with a shift in the imports of non-traditional products. For example, Ffrench-Davis (2010) observes that trade openness has led to a rapid rise in the imports of "non-food" consumption goods in Chile and Reinert (2007) reports an increase in the import of high-tech durable consumer goods in Peru.

Another important feature of the intra-regional trade is that exports of agricultural products to the region and imports of consumption goods from the region decrease inequalities. We conjecture that the first result is explained by the fact that the production of these goods intensively depends on unskilled-labour (Székely and Mendoza, 2017). In the second case, imports of consumption products from LA countries contribute to reducing disparities in income, which may be explained by the fact that cheaper products alleviate the budget of poor households. In this vein, Marchand (2017) suggests that the distributional effects of the imports of consumption goods depend on the extent to which these goods are important in the budget of poor households and on their prices in global markets. The results also show that the export of consumption goods to lower-income countries (Table A.3, Model 3) aggravates income inequality, while the exports to other partners have no significant effect. Indeed, the distributional effect here on income inequality depends on the type of labour intensively used in the production (low, medium or high-skilled labour). Hence, an increase in the demand for consumption goods by lower-income countries would lead to increase the returns to this factor over others. We hypothesize that exports to these lower-income countries exert a high pressure on unskilled-labour wages, if they compete with local demand, or an upward pressure on the wages of skilled-labour. If in the opposite, LA export goods relatively skill-intensive in line with their intermediate position in terms of endowments.

Notice that trade with a relatively higher-income partner decreases income inequality. The results disaggregated by products displayed in Tables A.2 and A.3 shed some new lights on this result. Neither exports to higher-income countries nor imports from these partners for most products have a significant impact on inequality. This reducing effect on inequality is exclusively explained by trade in oil and mining goods and, in particular, the exports of these goods. Then, trade of manufactured goods with higher-income countries have no effect on inequalities. In

particular, imports of equipment goods or intermediate goods that should bring some important technology transfers have no direct effect on this outcome.

In the manufacture sector, we have already underlined that imports of consumption goods from LA countries decrease inequalities and export to lower income countries would exacerbate this dispersion. Regarding equipment goods, the effects are almost not statistically significant.[6] Apart from this, the only flows that drive some effects on the dispersion of income in Latin America are the exports of intermediate goods to similar-income countries that boost inequalities. The effect of exporting these goods on inequality indeed depend on the skill composition used in their production. Chang (2017) finds evidence indicating that the trade of final products and parts and components inside Latin America and their sophistication levels have improved due to the growth in the importation of machinery parts and components from several regions around the world, especially from North America and East Asia. This, in turn, requires a more intensive use of skilled labours that would explain this effect.

[6] Exports and imports treated separately have no significant effect. Exports of equipment goods to similar-income countries induce a reduction in income inequality but are fairly significant.

6. Conclusion

To assess the effects of trade openness on income inequality, we use a dynamic panel approach to take into account the high persistent behaviour of income inequality for 11 Latin American countries, during the period 1989–2015. Then, unlike most previous studies, we fully account for all the effects that may have influenced income inequality in the past. Our estimates of the effect of trade on income inequality represent only the direct effect of current trade and would, if anything, underrate this effect. We go deep into the nature of trade and partners by considering trade inside and outside Latin America and partners' income levels to take differences in capital intensities into account. Finally, we adopt a more disaggregated analysis of trade, exports and import of production by stages, including agriculture goods, oil and mining goods, consumption goods, intermediate goods and equipment goods, which enables us to identify the different potential channels through which trade may affect income inequality.

We find that overall trade flows do not significantly affect income inequality in Latin America. When we account for the direction of trade taking into account the income level of trading partners, we find that trade with partners that enjoy a higher income per capita reduces the dispersion of income, whereas trade with similar- and lower-income countries leads to a rise in inequality. As regard trade by stage of production, we find that trade in primary goods and trade in consumption have a more obvious effect than trade in intermediate and equipment goods. Trade in primary commodities moderates inequality in Latin American countries in the period analysed, even when the improvement in the terms of trade is controlled for. Regional trade in consumption goods decreases inequality, while trade in consumption goods with non-Latin American countries harms inequality.

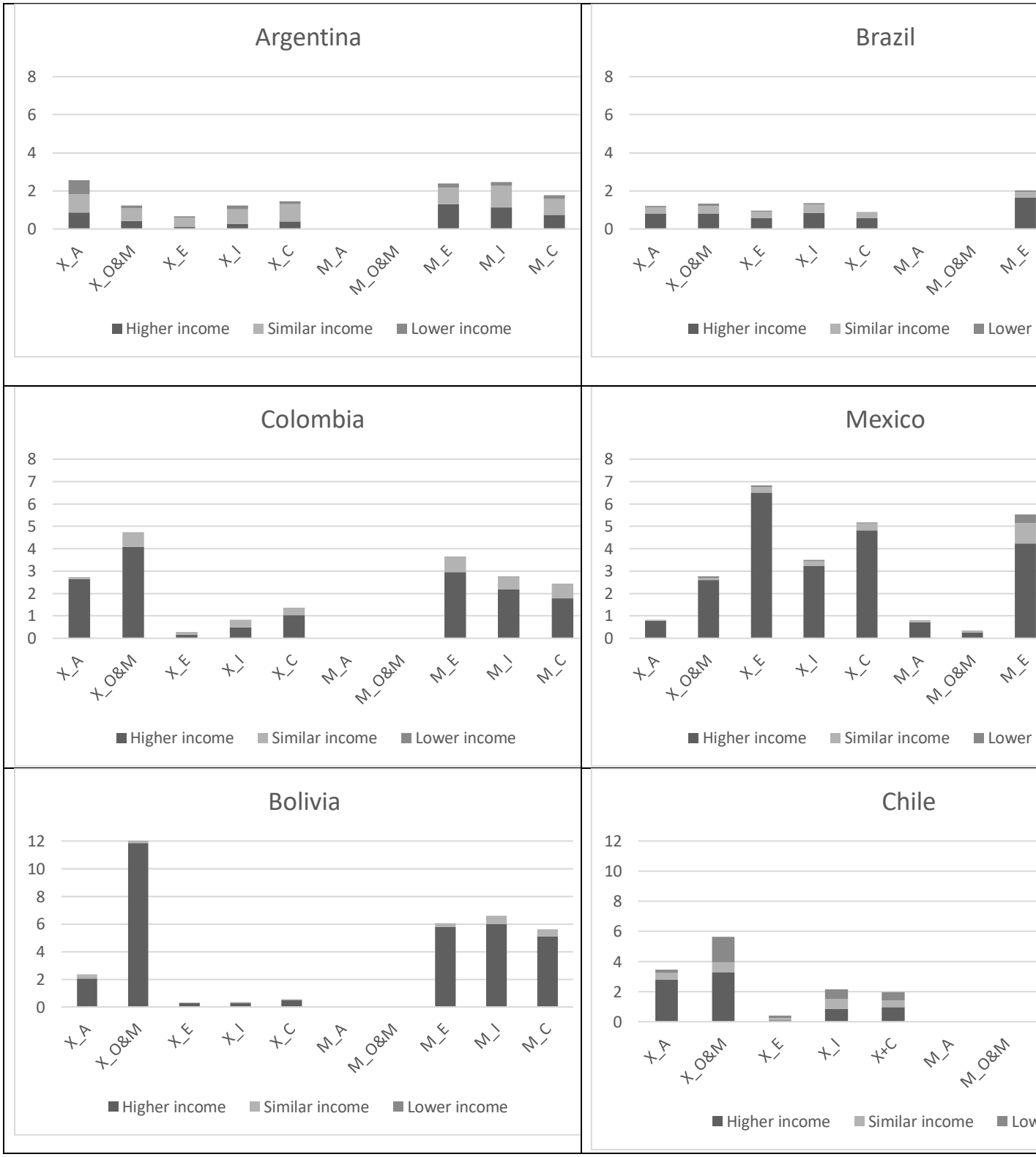
Our empirical analysis highlights a more salient effect on income inequality for, the export channel rather than for the import channel. In general, the exports of agriculture and oil and mining contribute to attenuate income inequality, while imports of these goods enhance the opposite effect. As predicted by the Stolper-Samuelson effect, the specialisation according to comparative advantages that accompany trade openness would raise the return of the factor intensively used. What is more surprising is that our empirical findings emphasise a more significant role of the export channel, while the import channel has received more attention in the literature and raises more expectations in terms of benefits to be obtained from trade. Our results

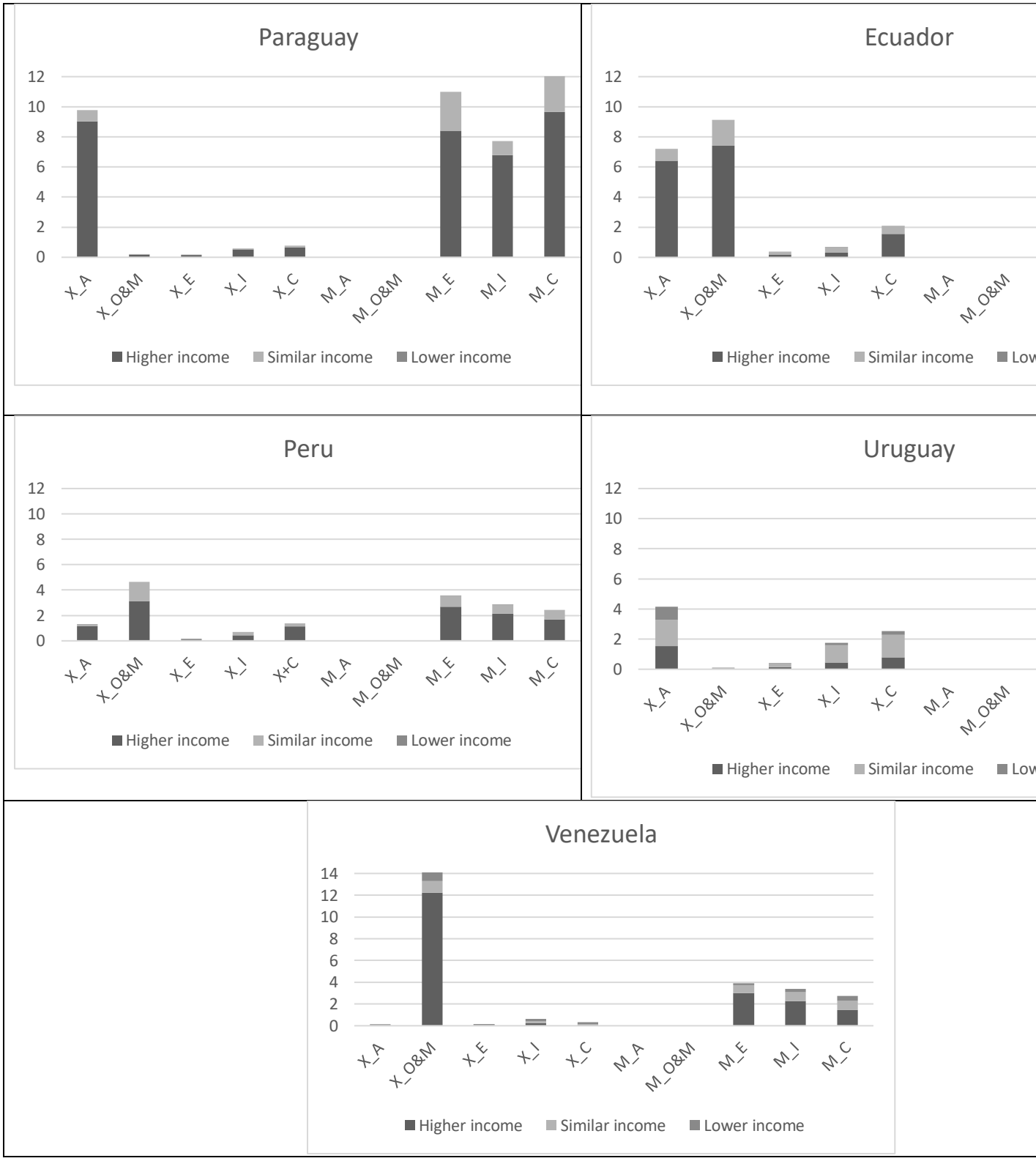
hence confirm that the consequences of trade openness depend on how countries are integrated into the international economic system (Mcmillan et al., 2014). Given the fact that Latin America is abundant in natural resource-based commodities, Mcmillan et al. (2014) suggest that the abundance in natural resources and primary products lowers the motivation for transition toward modern industries and enhances traditional production patterns. This argument is linked to the extensive strand of the literature studying the negative effects of substantial natural resources endowment on countries' performance, which may turn the “blessing” of natural resources into a “curse” since productive activities that boost growth decline in favour of natural resources sector for rent-seeking purposes (Sachs and Warner, 2001). This argument mirror the position of IMF (2017) according to which the commodity price boom would have prevented Latin American countries to shift the production of more skill-intensive goods.

From a more general perspective, our results confirm that income inequality which is a highly persistence phenomenon. This calls for other policies more directed through a restructuration of the production but also the need for social and education policies that directly influence income inequality. As far as trade policies are concerned, our study finds no evidence of a detrimental effect of trade on income inequalities. More interestingly, this paper stresses the role of exports to contribute to a reduction of income inequalities, a question that has been largely overlooked by the literature. Then, our findings provide some evidence for the policy debate and promising avenue for future research.

Appendix

Figure A.1: Exports and imports by products and group of trading partners (% of GDP), average 1989–20





Source: CHELEM database, CEPII

X_A: Agriculture exports; X_O&M: Oil and mining exports; X_E: Equipment exports; X_I: Intermediate exports; X_C: Consump

M_A: Agriculture imports; M_O&M: Oil and mining imports; M_E: Equipment imports; M_I: Intermediate imports M_C: Consur

Table A.1: Summary statistic. Trade, Exports (X) and Imports (M) are expressed as % of GDP

Variable	Mean	Std. Dev.	Min	Max	Variable	Mean	Std.
GiniSWIID	46.97	4.36	37.05	55.22	Agriculture goods X	3.43	
GDPgrowth	3.55	3.83	-10.89	18.29	Agriculture goods X (HIC)	2.51	
GDPpercap	7087.20	3633.394	1397.18	14893.88	Agriculture goods X (SIC)	0.50	
FDI inflow (% of GDP)	2.97	2.44	-2.50	12.20	Agriculture goods X (LIC)	0.19	
Term of trade	123.07	59.26	50.98	536.10	Agriculture goods X (non-LA)	2.29	
Trade	41.00	17.40	9.27	92.77	Agriculture goods X (LA)	0.91	
Trade higher-income countries (HIC)	28.22	15.82	5.84	73.37	Agriculture goods M	0.77	
Trade similar-income countries (SIC)	8.02	5.87	0.20	28.01	Agriculture goods M (HIC)	0.06	
Trade lower-income countries (LIC)	2.33	3.93	0	22.46	Agriculture goods M (SIC)	0.01	
Trade Latin America (LA)	14.28	12.94	0.77	57.96	Agriculture goods M (LIC)	0.003	
Trade non-Latin America (non-LA)	24.35	10.76	6.86	56.05	Agriculture goods M (non-LA)	0.07	
Exports	20.82	9.65	5.36	47.50	Agriculture goods M (LA)	0.005	
Imports	20.18	9.99	3.52	57.08	Oil and mining goods X	5.89	
Exports (non-LA)	12.58	7.04	2.54	31.00	Oil and mining goods X (HIC)	4.23	
Imports (non-LA)	11.78	5.38	2.44	31.91	Oil and mining goods X (SIC)	0.67	
Exports (LA)	6.48	6.84	0.33	37.22	Oil and mining goods X (LIC)	0.28	
Imports (LA)	7.80	6.73	0.40	27.40	Oil and mining goods X (non-LA)	3.79	
Exports (HIC)	14.41	8.54	2.00	41.71	Oil and mining goods X (LA)	1.37	
Imports (HIC)	13.81	8.81	2.32	45.22	Oil and mining goods M	1.05	
Exports (SIC)	3.41	2.49	0.02	11.69	Oil and mining goods M (HIC)	0.02	
Imports (SIC)	4.66	3.80	0.18	18.70	Oil and mining goods M (SIC)	0.004	
Exports (LIC)	1.23	2.24	0.00	11.67	Oil and mining goods M (LIC)	0.003	
Imports (LIC)	1.09	1.81	0.00	10.80	Oil and mining goods M (non-LA)	0.03	
Trade in agriculture goods	4.20	3.28	0.59	17.77	Oil and mining goods M (LA)	0.004	
Trade in agriculture goods (HIC)	2.58	2.66	0.01	13.75	Consumption goods X	1.78	
Trade in agriculture goods (SIC)	0.51	0.62	0.001	4.12	Consumption goods X (HIC)	1.14	
Trade in agriculture goods (LIC)	0.19	0.38	0	2.21	Consumption goods X (SIC)	0.44	
Trade in agriculture goods (LA)	0.92	1.57	0.002	9.97	Consumption goods X (LIC)	0.11	
Trade in agriculture goods (non-LA)	2.35	1.95	0.02	9.39	Consumption goods X (non-LA)	0.97	
Trade in oil and mining goods	6.94	7.13	0.36	33.30	Consumption goods X (LA)	0.73	
Trade in oil and mining goods (HIC)	4.25	5.39	0.01	27.74	Consumption goods M	4.11	
Trade in oil and mining goods (SIC)	0.67	0.89	0.00	4.00	Consumption goods M (HIC)	2.76	
Trade in oil and mining goods (LIC)	0.28	0.75	0.00	3.94	Consumption goods M (SIC)	1.00	
Trade in oil and mining goods (LA)	1.38	3.51	0.003	22.82	Consumption goods M (LIC)	0.26	
Trade in oil and mining goods (non-LA)	3.82	4.31	0.00	20.94	Consumption goods M (non-LA)	2.40	
Trade in consumption goods	5.89	3.28	0.91	19.50	Consumption goods M (LA)	1.61	
Trade in consumption goods (HIC)	3.90	2.87	0.66	17.77	Intermediate goods X	1.31	
Trade in consumption goods (SIC)	1.44	1.24	0.05	7.16	Intermediate goods X (HIC)	0.72	
Trade in consumption goods (LIC)	0.37	0.66	0.00	3.38	Intermediate goods X (SIC)	0.39	
Trade in consumption goods (LA)	2.34	1.81	0.09	8.75	Intermediate goods X (LIC)	0.13	
Trade in consumption goods (non-LA)	3.37	2.21	0.68	11.35	Intermediate goods X (non-LA)	0.65	

Trade in intermediate goods	5.52	2.21	1.50	13.04	Intermediate goods X (LA)	0.59
Trade in intermediate goods (HIC)	3.79	2.32	0.82	10.79	Intermediate goods M	4.22
Trade in intermediate goods (SIC)	1.31	0.93	0.04	5.56	Intermediate goods M (HIC)	3.07
Trade in intermediate goods (LIC)	0.29	0.48	0	2.90	Intermediate goods M (SIC)	0.91
Trade in intermediate goods (LA)	2.27	1.77	0.18	8.10	Intermediate goods M (LIC)	0.16
Trade in intermediate goods (non-LA)	3.11	1.94	0.88	12.26	Intermediate goods M (non-LA)	2.46
Trade in equipment goods	5.90	3.51	1.21	18.10	Intermediate goods M (LA)	1.69
Trade in equipment goods (HIC)	4.40	2.99	0.89	13.91	Equipment goods X	1.00
Trade in equipment goods (SIC)	1.18	1.26	0.01	8.07	Equipment goods X (HIC)	0.74
Trade in equipment goods (LIC)	0.22	0.42	0.00	2.63	Equipment goods X (SIC)	0.18
Trade in equipment goods (LA)	1.32	1.00	0.10	4.55	Equipment goods X (LIC)	0.04
Trade in equipment goods (non-LA)	4.47	3.27	0.92	17.12	Equipment goods X (non-LA)	0.69
					Equipment goods X (LA)	0.28
					Equipment goods M	4.90
					Equipment goods M (HIC)	3.66
					Equipment goods M (SIC)	1.00
					Equipment goods M (LIC)	0.16
					Equipment goods M (non-LA)	3.79
					Equipment goods M (LA)	1.05

Table A.2: Effects of trade (% of GDP) by stage of production on income inequality

Dependant variable: Gini$_{it}$	Model (1)		Model (2)	
Gini (-1)	0.890***	Gini (-1)	0.906***	Gini (-1)
Trade in agriculture goods	-0.029	Trade in agriculture goods (LA)	-0.089**	Trade in agriculture goo
Trade in oil and mining goods	-0.029***	Trade in oil and mining goods (LA)	-0.052***	Trade in oil and mining
Trade in consumption goods	-0.003	Trade in consumption goods (LA)	-0.099*	Trade in consumption g
Trade in intermediate goods	0.011	Trade in intermediate goods (LA)	0.083	Trade in intermediate g
Trade in equipment goods	0.013	Trade in equipment goods (LA)	-0.096	Trade in equipment goo
		Trade in agriculture goods (non-LA)	-0.019	Trade in agriculture goo
		Trade in oil and mining good (non-LA)	0.008	Trade in oil and mining
		Trade in consumption goods (non-LA)	0.077*	Trade in consumption g
		Trade in intermediate goods (non-LA)	-0.015	Trade in intermediate g
		Trade in equipment goods (non-LA)	-0.010	Trade in equipment goo
				Trade in agriculture goo
				Trade in oil and mining
				Trade in consumption g
				Trade in intermediate g
				Trade in equipment goo
Ln (GDP per capita)	-3.417	Ln (GDP per capita)	-0.295	Ln (GDP per capita)
Ln (GDP per capita)^2	0.158	Ln (GDP per capita)^2	-0.014	Ln (GDP per capita)^2
GDP growth	-0.013*	GDP growth	-0.014*	GDP growth
FDI inflow (% of GDP)	0.055***	FDI inflow (% of GDP)	0.033**	FDI inflow (% of GDP)
Term of trade	0.001	Term of trade	-0.000	Term of trade
N	281	N	281	N

Significant at * p<0.1; ** p<0.05; *** p<0.01.

Table A.3: Effect of exports (X) and imports (M) (% of GDP) by stage of production on income ine

Dependant variable: Gini$_{it}$	Model (1)		Model (2)	
Gini (-1)	0.874***	Gini (-1)	0.904***	Gini (-1)
Agriculture goods X	-0.038*	Agriculture goods X (LA)	-0.112***	Agriculture goods X (HIC)
Oil and mining goods X	-0.031***	Oil and mining goods X (LA)	-0.037**	Oil and mining goods X (HIC)
Consumption goods X	-0.083	Consumption goods X (LA)	0.062	Consumption goods X (HIC)
Intermediate goods X	0.107	Intermediate goods X (LA)	0.220	Intermediate goods X (HIC)
Equipment goods X	0.012	Equipment goods X (LA)	-0.145	Equipment goods X (HIC)
Agriculture goods M	0.347***	Agriculture goods M (LA)	-3.006	Agriculture goods M (HIC)
Oil and mining goods M	0.064	Oil and mining goods M (LA)	9.654***	Oil and mining goods M (HIC)
Consumption goods M	-0.001	Consumption goods M (LA)	-0.165***	Consumption goods M (HIC)
Intermediate goods M	-0.068	Intermediate goods M (LA)	0.088	Intermediate goods M (HIC)
Equipment goods M	-0.070	Equipment goods M (LA)	-0.094	Equipment goods M (HIC)
		Agriculture goods X (non-LA)	-0.016	Agriculture goods X (SIC)
		Oil and mining goods X (non-LA)	0.006	Oil and mining goods X (SIC)
		Consumption goods X (non-LA)	-0.102	Consumption goods X (SIC)
		Intermediate goods X (non-LA)	-0.042	Intermediate goods X (SIC)
		Equipment goods X (non-LA)	-0.135	Equipment goods X (SIC)
		Agriculture goods M (non-LA)	1.077*	Agriculture goods M (SIC)
		Oil and mining goods M (non-LA)	1.982**	Oil and mining goods M (SIC)
		Consumption goods M (non-LA)	0.143***	Consumption goods M (SIC)
		Intermediate goods M (non-LA)	-0.025	Intermediate goods M (SIC)
		Equipment goods M (non-LA)	-0.006	Equipment goods M (SIC)
				Agriculture goods X (LIC)
				Oil and mining goods X (LIC)
				Consumption goods X (LIC)
				Intermediate goods X (LIC)
				Equipment goods X (LIC)
				Agriculture goods M (LIC)
				Oil and mining goods M (LIC)
				Consumption goods M (LIC)
				Intermediate goods M (LIC)
				Equipment goods M (LIC)
Ln (GDP per capita)	-2.473	Ln (GDP per capita)	-1.649	Ln (GDP per capita)
Ln (GDP per capita)^2	0.105	Ln (GDP per capita)^2	0.080	Ln (GDP per capita)^2
GDP growth	-0.009	GDP growth	-0.012*	GDP growth
FDI inflow (% of GDP)	0.040***	FDI inflow (% of GDP)	0.029**	FDI inflow (% of GDP)
Term of trade	0.000	Term of trade	0.000	Term of trade
N	281	N	281	N

Significant at * p<0.1; ** p<0.05; *** p<0.10

Chapter 3: Inequality and Life Satisfaction in Low- and Middle-Income Countries: The Role of Opportunity[7]

[7] García-Muñoz, T.M.; Milgram-Baleix, J.; Odeh-Odeh, O. Inequality and Life Satisfaction in Low- and Middle-Income Countries: The Role of Opportunity. *Societies* **2019**, *9*, 37. https://doi.org/10.3390/soc9020037

3.1. Introduction

Extant research in recent years has questioned whether inequalities really matter for life satisfaction, apart from ethical reasons. The issue is important because adverse effects of inequality on well-being provide a major rationale for redistribution policies. However, if citizens care more about other factors, then priority should be given to other issues. Empirical studies seem to converge to the conclusion that national income inequality harms (Alesina et al., 2004; Beja, 2014; Oishi and Kesebir, 2015) or is irrelevant (Kelley and Evans, 2017; Zagorski et al., 2014) to individuals' subjective well-being (SWB) in developed countries in ordinary circumstances. Nonetheless, there is recent growing literature focusing on developing countries that suggests that inequality exerts either a neutral effect (Kenworthy, 2017) or a positive effect on SWB (Kelley and Evans, 2017; Berg and Veenhoven, 2010; Haller and Hadler, 2006; Nielsen, 2017; Reyes-García et al., 2018). Other researchers also report a positive relationship in a mixed sample of developed and developing countries (Bjørnskov et al., 2013; Rözer, J.; Kraaykamp, 2013). The empirics for developed countries appear clear enough or, at least, respond to different functioning from the one operating in developing countries. In turn, further research is needed to understand why more inequalities would make individuals living in developing countries more satisfied.

The negative impact of inequality on life satisfaction (LS) has been justified by different approaches, which we will develop further later on. In an economic framework, individuals' income is expected to be inversely related to other individuals' incomes (Easterlin, 1995). In a sociological framework, the deprivation hypothesis suggested that individuals would feel deprived if they observe that others are better off (Runciman, 1966). Additionally, (rising) inequalities would bring about indirect negative effects such as political instability, social distrust, status anxiety, alteration in the perceptions of justice and social status. Notwithstanding, the reason why income inequality would make individuals more satisfied with their lives remains an intriguing issue. An attractive rationale can be found in the "tunnel hypothesis" proposed by Hirschman and Rothschild (1973). The authors argue that societies experiencing rapid development may initially show tolerance for higher inequality, because they interpret it in terms of greater opportunities. Several studies have suggested that income inequality may have a positive effect on LS, in particular if it is perceived as a positive signal of moving up the socio-

economic ladder (Kelley and Evans, 2017; Grosfeld and Senik, 2010; Wang et al., 2015) and for individuals who believe that hard work pays off (Beja, 2014). Therefore, the relationship between income inequality and SWB could be related to perception of social mobility (Alesina et al., 2004; Schneider, 2012) or perception of fairness (Bjørnskov et al., 2013). For Europe, Ravazzini and Chávez-Juárez (2018) tackle the issue more directly by computing an index of inequality of opportunity. The authors stress the positive impact of inequality of opportunity on LS of individuals from the upper class, meaning that equality of chances would threaten their status.

The relationship between inequality and SWB may well be based on perceptions of the environment (Beja, 2014; Bjørnskov et al., 2013; Schneider, 2016; Schneider, 2019; Gehring, 2013) rather than on a rational reaction to economic outcomes precisely assessed. In particular, individuals' SWB may be influenced by social inequalities, that is "socially produced differences in life chances" and not only by income inequalities as suggested by Veenhoven (1990), or by personal freedom as pointed out by Haller and Hadler (2006) and Beja (2014). We take this road and advocate using an indicator that takes into account socioeconomic factors that make it possible for people to meet their potential. Indeed, we argue that the context that enhances people to climb the social ladder based on their own merits is not well accounted for by economic freedom but is more related to social or political aspects, which are better captured by the Opportunity index provided by the Social Progress Imperative. Following Porter et al. (2016), this context refers to different areas: personal rights, personal freedom and choice, inclusiveness, and access to advanced education. People may dislike inequality if they suffer from it, or when they consider incomes are not based on merits, but could be more tolerant if they have prospects of improving their life conditions. This study tackles a similar issue to Ravazzini and Chávez-Juárez (2018) for Europe but for a sample of developing countries. Here, we test how differences in social opportunities between countries explain why individuals living in more unequal countries would be more satisfied. To this end, we estimate multilevel models with data from the last wave of the World Value Survey (WVS) for 25 low- and middle-income countries.

Results confirm that standard individuals' characteristics significantly explain variations in individuals' life satisfaction across countries, while other macro indicators, such as country

income and growth, are not significant. Besides, opportunity and inequality exert significant positive effects *per se* on LS, and their joint effect is highly significant and explains the puzzling positive relationship between income inequality and life satisfaction. More precisely, income inequality reduces individuals' wellbeing if opportunities are low, while inequality is not relevant for life satisfaction, if opportunities in the country are high. Among the aspects of opportunity that really matter, we show that inclusiveness and access to advanced education play a more major role than political freedom or personal rights. Once we take into account these macro indicators, inequality affects, in the same manner, the life satisfaction of individuals from different social status, income groups and education groups.

The study proceeds as follows: section 2 describes the background; the empirical strategy is explained in section 3; section 4 presents the results; and concluding remarks are drawn up in section 5.

3.2. Literature review: Income inequality and subjective wellbeing

In recent years, researchers have paid increasing attention to the factors that may determine individuals' SWB, measured by either life satisfaction or happiness. The empirical literature on the relationship between income inequality and SWB have reached inconclusive findings (see table A.5). Long before, economists questioned whether money brings happiness or not. The Easterlin paradox states that increasing the income of all does not increase the happiness of all, a finding confirmed by Easterlin et al. (2010) for developed and developing countries. As pointed out by Easterlin (1995), what matters for individuals' happiness is the relative terms rather than the absolute terms because happiness is directly determined by one's own income and inversely with others' incomes. The social comparison indeed dominates in individuals' wellbeing and their decisions (Fliessbach et al., 2007), implying that individuals in a society have their own social preferences and compare their utility levels with those of others (Hopkins, 2008). From a sociological perspective, the deprivation theory introduced by Runciman (Runciman, 1966) states that individuals' feelings are determined by their reference groups and thus they may relatively feel deprived when they observe that others have better socio-economic positions than they do. Based on Runciman's perspective, Yitzhaki (1979) assumes the Gini coefficient to be a quantification of the relative deprivation, implying that when inequality goes up, the relative deprivation increases and thus SWB decreases. Morawetz et al. (1977) were the first in empirically testing the inequality-happiness-relation in two communities living in Israel, with different distributions of income but with similar characteristics regarding age structure and per capita income. They found that income inequality was negatively associated with an individual's happiness in the more unequal community. Preference for equality may well be a social norm per se or alternatively, equality could be considered as unfair if "equity or social justice [are] not necessarily tied to economic self-interests" (Schneider, 2016: 13).

Researchers have indeed suggested that higher income inequality may trigger social and economic problems and would eventually damage SWB. For instance, less equalitarian societies would bring about adverse effects in terms of political stability, investment, and economic growth (Alesina and Perotti, 1996; Baten and Mumme, 2013). Moreover, Wilkinson and Pickett (2010) argue that higher inequality leads to increased status competition and status anxiety, an argument confirmed by Delhey and Dragolov (2014), who find that inequality leads to provoking

status anxiety and distrust in Europe, and it hence decreases Europeans' SWB. In the case of USA, Oishi et al. (2011) suggest that inequality induces negative effects on the happiness of lower-income individuals, as it increases the perceived unfairness and lack of general trust. Roth et al. (2017) find that higher inequality provokes economic worries, which, in turn, harm individuals' happiness in Germany. Schneider (2019) argues that the individuals' perception of their social status can explain why individuals are less satisfied in European societies with higher inequality.

On the other hand, the tunnel effect theory proposed by Hirschman and Rothschild (1973) considers the "hope factor" as a key element to determine the effect of income inequality on individuals' SWB. Individuals may tolerate income inequality when they interpret it as an opportunity to climb the socio-economic ladder. However, if people's expectations have not been met, that tolerance fades away and lowers their SWB. Grosfeld and Senik (2010) find that the prediction of the tunnel theory fits well with the case of Poland. During the first stage of the transition period, the increasing income inequality was not translated into lowering individuals' satisfaction, as it signaled hope factor for individuals to move up the socio-economic ladder. However, in the final stage of the transition process, individuals` expectations were not met and they considered the process of income distribution as unfair and corrupted and in turn decreased the overall satisfaction. Wang et al. (2015) find further support for the tunnel theory in China. Their empirical findings underline the inverted U-shaped association between the individual's self-reported happiness and income inequality in both rural and urban China. Kelley and Evans (2017) suggest that the positive effect of inequality exists only in developing countries, as these countries experience rapid institutional and social changes, which in turn could make their individuals interpret inequality as a signal of moving up. On the other hand, income inequality is irrelevant for individuals living in developed countries because of "the relatively stable opportunity structures and existential security".

An important indication from the tunnel theory is that individuals' tolerance toward inequality is contingent upon the individuals' perceptions of the mobility of their society. In the seminal work by Wilkinson and Pickett (2010: 157), the social mobility expresses whether "people can move up or down within their life time" and "the idea that anybody, by their own merits and hard work, can achieve a better social or economic position for themselves and their family".

Inequality can make people more or less satisfied, depending on how they perceive the potential for social mobility from their social positions (Schneider, 2012; 2019). For instance, a study by Alesina et al. (2004) evidences that inequality has no effect on the poor in the USA against a negative effect on the rich, whereas income inequality hampers SWB of the poor in Europe. The authors' interpretation is that Americans believe that their society is mobile and accordingly that they can move upward and downward on the socio-economic scale, while Europeans consider social status as steady, meaning that it is difficult for the poor to improve their situations. Graham and Felton (2006) argue that income inequality signals persistent disadvantage for the poor and persistent advantage for the rich in Latin America. For industrialized and emerging countries, Beja (2014) considers different subjective measures of opportunity to examine their roles in the overall SWB. The findings suggest that the negative effects produced by inequality can be lessened for individuals who believe that hard work brings success and that equal access to opportunities is guaranteed.

Indeed, few studies have really examined the role of actual social mobility in the association between inequality and SWB. In a large panel of countries, Bjørnskov et al. (2013) conjecture that higher SWB is the outcome of the positive interaction between perceived fairness and income inequality and the positive interaction is larger in countries with low actual social mobility and weaker for countries with high actual social mobility. They empirically find support for their perspective. Ravazzini and Chávez-Juárez (2018) study the relationships between SWB and income inequality on the one hand and SWB equality of opportunity on the other hand in Europe. Their measure of inequality of opportunity compares the relative importance of inequality due to circumstances over inequality due to effort. They find that inequality of income negatively affects SWB and the effect is lower for people with low income meaning that a normative distaste for inequality would prevail over the possibility to gain more in case of upward mobility. Inequality of opportunity also hurts the SWB of individuals with lower socio-economic positions but positively influences the SWB of individuals with higher socio-economic positions confirming that inequality of opportunity would mean for the rich a lower risk of losing income. Nikolaev and Bennett (2016) find that individuals who live in countries with greater economic freedom have higher perception of more procedural fairness and chances of upward mobility and the effect of economic freedom on SWB becomes larger in societies where individuals consider that hard work pays off and competition as something good (Gehring,

2013). Hence, individuals' willingness to accept inequality is contingent upon whether their efforts are better-rewarded (Mitchell et al., 1993).

As shown above, the literature has proposed several new mechanisms to explain the relationship between inequality and SWB. According to Schneider (2016), a common caveat of these studies is that they assume that individuals follow a strict economic rationale. According to this author, it is unlikely that individuals have an accurate and precise assessment of income inequalities but instead would be influenced by perceptions of external outcomes based on goals and preferences, as corroborated in studies of (Beja, 2014; Bjørnskov et al., 2013; Schneider, 2019; Gehring, 2013). On the other hand, Haller and Hadler (2004 & 2006) have considered a different perspective and questioned what makes individuals happy in countries with high inequality (Latin American countries), and unhappy in countries with low inequality (Post-Communist countries). They argue that there exists other factors that can explain the SWB of individuals, namely non-material social and cultural factors, and suggest that the situation that influence the personal life context matters more for individuals' SWB than the one influencing the society as a whole. For instance, people become happier when the personal and societal circumstances provide them the feeling of personal freedom. Besides, Veenhoven (1990) points out that happiness and happiness dispersion could also be affected by non-monetary dimensions of inequality (social inequality), such as unequal work chances, inequality in "power, prestige, education", and gender inequality. In fact, Beja (2014) echoes this argument by evidencing that objective and subjective freedom are positively associated with individuals' SWB in both industrialized and emerging countries, and that unequal access to education leads to social cleavages. In contrast, income inequality can be perceived as something acceptable or not, depending on whether it signals chances to move up or down. All in all, there is a need for more studies about the underlying mechanisms linking inequality and SWB. Indeed, SWB may be influenced by social inequality, a broader context evoking fairness in different spheres that are not only related with economic outcomes.

3.3. Empirical strategy

3.3.1. Empirical model

We use multilevel regression analysis to model people's life satisfaction as a function of both individual and country characteristics. Multilevel analysis allows us to control variability from several nested sources (individuals and countries) and to model hierarchical data that do not satisfy the basic assumption of independence of observations (Snijders, 2012).

Individual-level variables include life satisfaction (LS) as our main dependent variable, and a set of control variables (X) to account for individual characteristics (see Table A.4 in appendix). At country levels, we include income inequality measured by Gini and other macro characteristics. Table A.1 (in appendix) presents descriptive statistics.

The following empirical model is estimated:

$$LS_{ij} = \beta_0 + \beta_1 X_{ij} + \beta_2 Gini_j + \beta_3 Z_j + \beta_4 Opportunity_j + \beta_5 Gini_j Opportunity_j + U_j + \varepsilon_{ij} \quad (1)$$

where subscript i is for individual and j for country. Z is a vector of the control variables at the macro level including GDP per capita, GDP growth, inflation, social trust, fairness and opportunity. Lastly, β_0 is the fixed intercept, U_j is a random effect at the country level and ε_{ij} is a random effect at the individual level. β_2 captures the effect of cross-country differences in the average levels of income inequality. β_4 accounts for the effect of Opportunity on life satisfaction, while β_5 reveals whether the role of inequality for life satisfaction depends on countries' degree of opportunity.

3.3.2. Data

3.3.2.1. Individuals' characteristics

As standard in the literature, SWB refers either to happiness or life satisfaction. However, there are some nuances between these two concepts. The latter, according to Haller and Hadler (2006), is more seen as the fruit of an evaluation process including material and social aspirations and achievements, while the former results from positive experiences, particularly close personal relationships. We then focus on Life Satisfaction (LS), which seems more connected to the economic situation of individuals and so more in line with the purpose of the present study.

The analysis is based on cross-sectional data from the sixth wave of the World Values Survey (WVS). We selected the data for the 25 low- and middle-income countries that have been surveyed during the years 2010-2014. For an overview of the countries included in the dataset, see Appendix Table A.2. The dependent variable, LS, is measured with the question: ‘‘All things considered, how satisfied are you with your life as a whole these days?’’ The answers use an ordinal scale ranging from 1 (completely dissatisfied) to 10 (completely satisfied).

The survey provides information about individual characteristics, such as gender, age, education level, employment status, income level, marital status, number of children, subjective social status, religion, trust in other people and thinking about whether most people would try to take advantage of you if they got a chance. We have also included variables that describe in a better way the situation of people in low- and middle-income countries: frequency without enough food, frequency without cash and possibility of saving money. Information about how these variables are coded is reported in the Appendix, Table A.4.

3.3.2.2. Contextual variables

Apart from the individual characteristics, literature on life satisfaction has identified a set of contextual variables that are usually included to explain life satisfaction (Zagorski et al., 2014; Reyes-García, 2018; Delhey and Dragolov, 2014; Sujarwoto et al., 2018; Wu and Li, 2017). It is common to control for wealth and socioeconomic development by including GDP per capita and for conjectural economic context by taking into account GDP growth, unemployment rate, and inflation. All these variables and Gini were obtained from the World Development Indicators for the year 2009.

Following Bjørnskov et al. (2013) and Grosfeld and Senik (2010), the macro variables social trust and social fairness have been included in the models. These are derived from averaging the individual-level variables obtained through the following questions respectively: “Generally speaking, would you say that most people can be trusted, or that you need to be very careful in dealing with people?” and “Do you think most people would try to take advantage of you if they got a chance, or would they try to be fair?”. High levels of both variables indicate more social trust and fairness (see details in Table A.4, in Appendix).

As explained in Section 2, previous studies have suggested that income inequality may have a different effect on SWB depending on social or political contexts. Previous studies have focused

on inequality of opportunities (Ravazzini and Chávez-Juárez, 2018), actual social mobility (Bjørnskov et al., 2013), economic freedom (Nikolaev and Bennett, 2016), and political and civil liberties (Beja, 2014). Rather than focusing exclusively on economic outcomes, individuals are also affected by other social dispersions such as inequalities in work chances, "power, prestige, education" or gender (Veenhoven, 1990) affecting their personal life more directly.

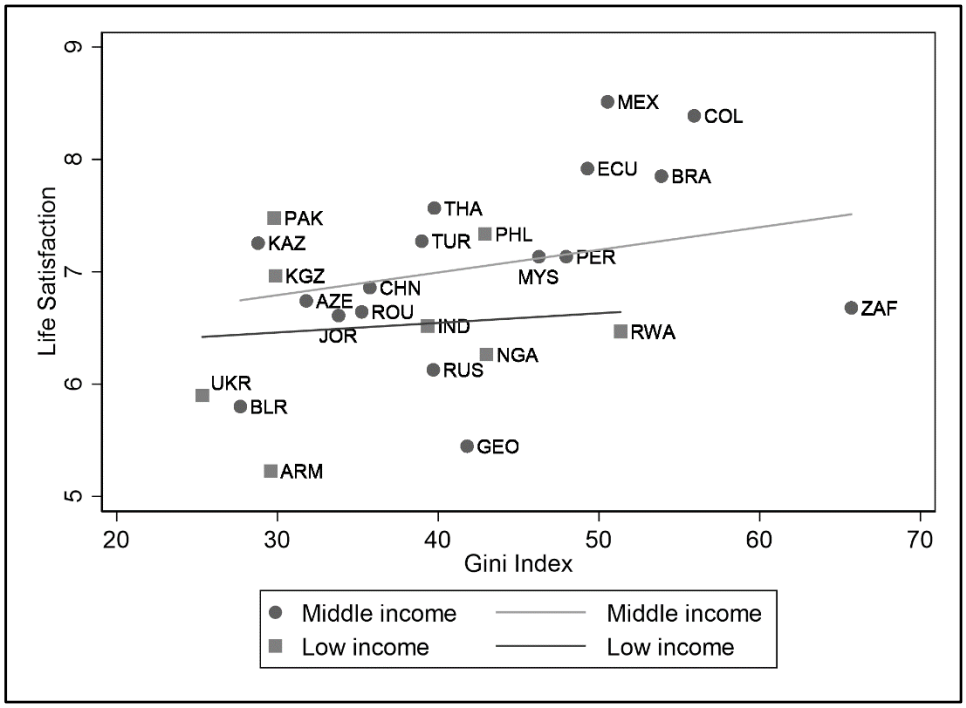
We therefore consider the Opportunity index by Social Progress Imperative. This component of the Social Progress Index reflects how countries "create the conditions for all individuals to reach their full potential" (Porter, et al., 2016: 13). This index provides information on real social progress rather than measuring potential mobility or economic variables such as individuals' basic needs, access to education and health care. Additionally, this index not only measures the ease with which individuals ameliorate their positions based on their merits, but also the social barriers that may limit these efforts.

Opportunity, for the year 2014, has been retrieved from the Social Progress Imperative that provides several indexes measuring Social Progress (see Porter et al. (2016) for the methodology). Opportunity measures to what degree individuals in a country can exercise their own personal rights and freedoms, whether they have control over their own personal decision-making, and to what degree social problems within a society, such as prejudices or hostilities, refrain individuals from achieving their potential. Opportunity also considers whether individuals, who seek to enhance their skills and knowledge, have the possibility to access advanced forms of education. The Social Progress Index provides distinguishing features that often tend to be ignored, considering opportunity as an element of human wellbeing that mirrors the social progress based on social factors rather than economic outcomes.

3.4. Results

Data from the last wave of the World Value Survey (Figure 1) confirm the puzzling positive relationship between inequalities and average Life Satisfaction for low- and middle-income countries. As already stressed by many authors, there is a huge heterogeneity in SWB among countries and an important variance among income inequalities as well. Neither income nor Gini seem to justify these divergent patterns in life satisfaction.

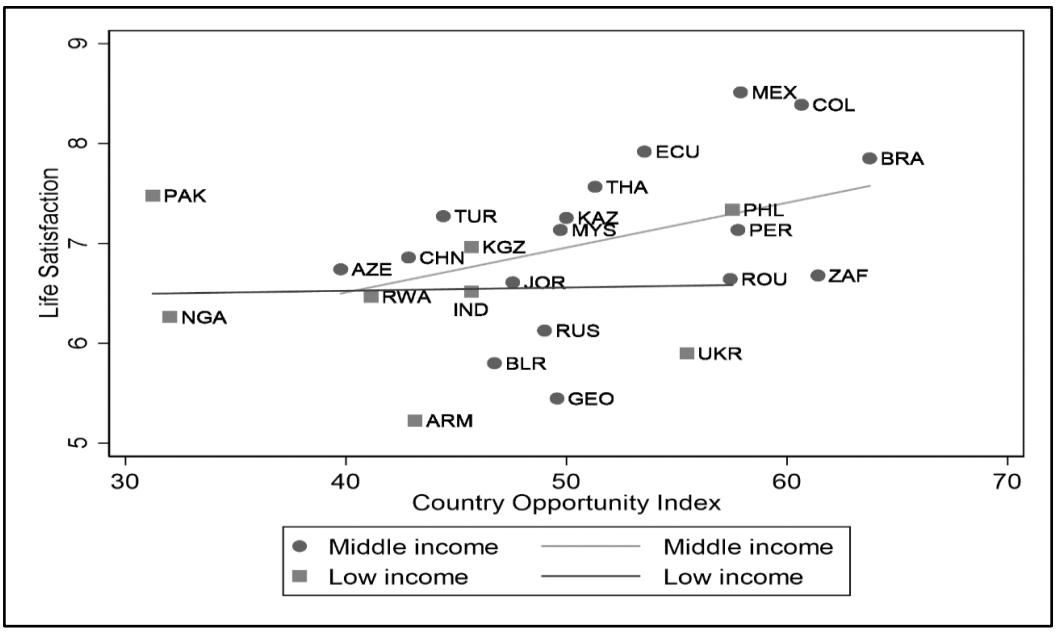
Figure 1. Life Satisfaction versus Gini Index



Source: Authors' calculation. Abbreviation for countries available in table A.2

Figure 2 presents scatterplots of average LS against Opportunity. Opportunity also varies considerably among countries but the relationship with life satisfaction appears clearer. Countries with higher levels of opportunity register higher average levels of LS (in particular Middle Income countries). The relation between opportunity and income levels is less ambiguous than for Gini: low-income countries systematically display lower levels of opportunity while they display more heterogeneous levels of inequalities.

Figure 2. Life satisfaction versus Opportunity index



Source: Authors' calculation. Abbreviation for countries available in Table A.2

Table 1 reports the coefficients and robust standard errors for the individual characteristics and aggregate/macro level variables included. Models 1, 2, 3 and 4 respectively present results of the model with Gini, Opportunity, Gini and Opportunity, and the interaction term between both indicators. We have used robust standard errors because variances of the residual errors have been found different among countries. Levene's tests about equality of variance rejected this hypothesis for the four models (T=37.1, p=0.00). Robust standard errors were calculated using the White estimate of variance (White, 1980). Models without social trust and social fairness (at both macro and micro levels) can be found in the Appendix A, Table A.6.

3.4.1. Individual characteristics

As standard in the literature, most of the individual characteristics that we observed in the analysis, generated significant effects on life satisfaction (e.g. Alesina et al., 2004; Rözer and Kraaykamp, 2013; Powdthavee et al., 2017; Schröder, 2018). Concerning individual's age, we find support for the view that life satisfaction traces a U-shaped curve with age. With regard to having children, we find that children seem to bring about higher satisfaction (Haller and Hadler, 2006; Schwarze and Härpfer, 2007). The results also show that higher income and education leads to higher life satisfaction than those with lower levels of income and education (Rözer and

Kraaykamp, 2013; Schneider, 2012). Results for employment status show that being unemployed, robustly makes individuals less satisfied with their lives than those who are full-time employees. Regarding marital status, we find that individuals who are divorced, separated, widowed or single, are less satisfied than individuals who are married, emerging from the individual's feeling of being lonely, while being married enhances self-esteem and emotional support (Stutzer and Frey, 2006) The higher the subjective social class, the higher the life satisfaction. Individual religiosity does not have a dominant role in determining individuals' life satisfaction. However, we find that being a Protestant or a Catholic makes individuals satisfied with their lives, which is consistent with empirical findings by Ngamaba and Soni (2018). As expected, individuals who believe in others' fairness are more satisfied. Serious economic problems (often without enough food or going without cash) lead to lower life satisfaction. Accordingly, people who have had the chance to save in the last year report higher life satisfaction.

Table 1. Determinants of Life Satisfaction. Multilevel regression models

VARIABLES	Model 1	Model 2	Model 3	Model 4
Individual variables				
Male	-0.012	-0.012	-0.012	-0.012
	(0.024)	(0.024)	(0.024)	(0.024)
Age	-0.031***	-0.031***	-0.031***	-0.031***
	(0.008)	(0.008)	(0.008)	(0.008)
Age squared	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Number of children				
No children	Ref.	Ref.	Ref.	Ref.
1 child	-0.010	-0.010	-0.010	-0.010
	(0.045)	(0.045)	(0.045)	(0.045)
2 children	0.055	0.055	0.055	0.054
	(0.052)	(0.052)	(0.052)	(0.052)
3 or more children	0.121***	0.121***	0.121***	0.120***
	(0.043)	(0.042)	(0.042)	(0.043)
Education				
No formal education	Ref.	Ref.	Ref.	Ref.
Primary	0.230***	0.230***	0.230***	0.230***
	(0.068)	(0.068)	(0.068)	(0.068)
Secondary	0.163	0.161	0.162	0.162
	(0.105)	(0.105)	(0.105)	(0.105)
University	0.191*	0.188*	0.189*	0.189*
	(0.109)	(0.110)	(0.110)	(0.110)
Labor status				
Full time	Ref.	Ref.	Ref.	Ref.
Part time	-0.073	-0.073	-0.073	-0.073
	(0.053)	(0.053)	(0.053)	(0.053)
Self employed	-0.032	-0.031	-0.031	-0.030
	(0.083)	(0.083)	(0.083)	(0.083)
Retired	-0.128	-0.129	-0.129	-0.128
	(0.080)	(0.080)	(0.080)	(0.080)
Unemployed	-0.219***	-0.220***	-0.220***	-0.220***
	(0.065)	(0.065)	(0.065)	(0.065)
Other	0.004	0.004	0.004	0.004
	(0.043)	(0.043)	(0.043)	(0.043)
Household income				
First quartile	Ref.	Ref.	Ref.	Ref.
Second quartile	0.405***	0.405***	0.405***	0.405***
	(0.077)	(0.077)	(0.077)	(0.077)
Third quartile	0.612***	0.612***	0.612***	0.612***
	(0.107)	(0.107)	(0.107)	(0.107)
Fourth quartile	1.018***	1.019***	1.019***	1.019***
	(0.140)	(0.140)	(0.140)	(0.140)
Marital status				
Married	Ref.	Ref.	Ref.	Ref.
Divorced	-0.330***	-0.329***	-0.329***	-0.329***

VARIABLES	Model 1	Model 2	Model 3	Model 4
	(0.107)	(0.107)	(0.107)	(0.107)
Separated	-0.432***	-0.432***	-0.432***	-0.432***
	(0.077)	(0.077)	(0.077)	(0.077)
Widowed	-0.426***	-0.425***	-0.425***	-0.425***
	(0.079)	(0.079)	(0.079)	(0.079)
Single	-0.098*	-0.097*	-0.098*	-0.098*
	(0.050)	(0.050)	(0.050)	(0.050)
Social status				
Lower class	Ref.	Ref.	Ref.	Ref.
Working class	0.278***	0.277***	0.277***	0.277***
	(0.067)	(0.067)	(0.067)	(0.067)
Lower middle class	0.402***	0.401***	0.402***	0.402***
	(0.056)	(0.056)	(0.056)	(0.056)
Upper middle class	0.625***	0.624***	0.625***	0.624***
	(0.073)	(0.073)	(0.073)	(0.073)
Upper class	0.839***	0.838***	0.839***	0.838***
	(0.129)	(0.129)	(0.129)	(0.129)
Religion				
No religion	Ref.	Ref.	Ref.	Ref.
Muslim	-0.023	-0.023	-0.021	-0.017
	(0.148)	(0.147)	(0.147)	(0.147)
Catholic	0.138*	0.139*	0.138*	0.137*
	(0.071)	(0.071)	(0.071)	(0.071)
Protestant	0.113**	0.115**	0.115**	0.115**
	(0.056)	(0.056)	(0.056)	(0.056)
Orthodox	-0.071	-0.079	-0.077	-0.073
	(0.053)	(0.052)	(0.053)	(0.053)
Jewish	0.108	0.107	0.108	0.110
	(0.375)	(0.376)	(0.376)	(0.377)
Other religion	0.090	0.094	0.093	0.089
	(0.080)	(0.080)	(0.080)	(0.080)
Most people can be trusted	0.046	0.046	0.046	0.046
	(0.121)	(0.121)	(0.121)	(0.121)
Most people would try to take advantage of you if they got a chance (1)/try to be fair (10)	0.112***	0.112***	0.112***	0.112***
	(0.012)	(0.012)	(0.012)	(0.012)
Often without enough food	-0.300***	-0.300***	-0.300***	-0.301***
	(0.096)	(0.096)	(0.096)	(0.096)
Often going without cash	-0.555***	-0.556***	-0.555***	-0.555***
	(0.102)	(0.102)	(0.102)	(0.103)
Saved money during past year	0.187***	0.188***	0.188***	0.188***
	(0.035)	(0.035)	(0.035)	(0.035)
Country variables				
Logarithm GDP per capita	0.297*	0.246	0.222	0.155
	(0.178)	(0.157)	(0.161)	(0.166)
GDP Growth	-0.004	0.028**	0.019	0.000
	(0.017)	(0.013)	(0.017)	(0.017)
Unemployment Rate	-0.055***	-0.041**	-0.046**	-0.077***
	(0.020)	(0.019)	(0.020)	(0.024)

VARIABLES	Model 1	Model 2	Model 3	Model 4
Inflation	-0.007	0.010	0.005	-0.003
	(0.027)	(0.025)	(0.025)	(0.024)
Social Trust	-0.583	-0.983	-0.663	-1.014
	(0.785)	(0.741)	(0.740)	(0.711)
Social Fairness	0.237	0.312	0.257	0.330
	(0.244)	(0.235)	(0.227)	(0.206)
Gini Index	0.028**		0.010	-0.177***
	(0.011)		(0.012)	(0.061)
Opportunity Index		0.043***	0.037**	-0.114**
		(0.015)	(0.016)	(0.046)
Gini Index * Opportunity Index				0.004***
				(0.001)
Constant	2.625	1.465	1.880	10.049***
	(2.168)	(1.964)	(1.994)	(2.971)
Observations	35,169	35,169	35,169	35,169
Number of countries	25	25	25	25

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

3.4.2. Inequality

Our results provide evidence that income inequality is an important predictor of life satisfaction (model 1). The strength of the association between inequality and life satisfaction better explains cross-countries differences in life satisfaction than national wealth and growth. The GDP per capita, growth, inflation, and average level of social trust and social fairness are not significant. The estimates point toward unemployment rate as having the largest and most negative effect among all the macroeconomic variables on LS, as widely established in cross-section studies. Indeed, unemployment does not only lead to income loss, but also affects an individual's identity in society and self-esteem, which, in turn, negatively affect SWB (Winkelmann and Winkelmann, 1998).

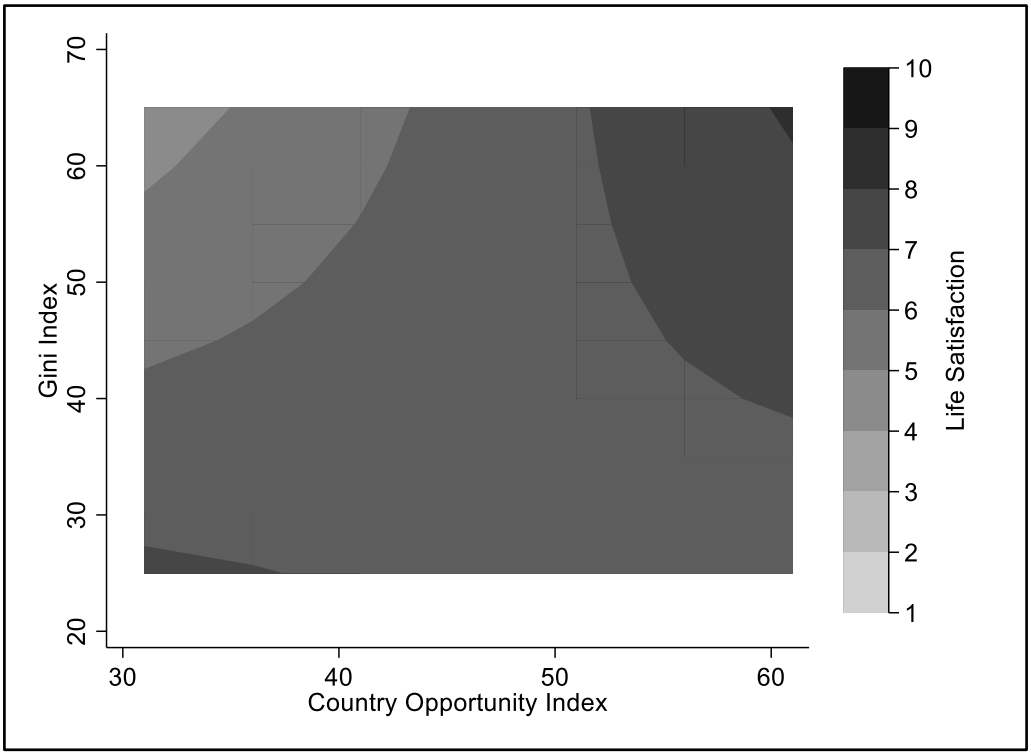
More importantly, income dispersion could either hurt or fuel LS due to the competing mechanisms at stake. Our results lend support to the "tunnel effect" hypothesis and corroborate recent empirical findings of others (i.e. Kelley and Evans, 2017; Berg and Veenhoven, 2010; Reyes-García et al., 2018) for developing countries. Hence, we find that more inequality is associated with higher satisfaction in low- and middle-income economies.

3.4.3. Opportunity

To test if respondents are affected by social inequalities in a broader sense, we include the opportunity index in the model. As can be seen from models 2 and 3, opportunity *per se* is

positively related to life satisfaction and the inclusion of opportunity makes the Gini's coefficient lose significance. Once the interaction term between opportunity and Gini is included (model 4), all three terms appear significant. Hence, the relationship between Gini and LS is contingent upon opportunity. In model 4, the average effects of inequality and opportunity turn out to be negative, whereas the interaction term is positive. This result deserves cautious analysis and Figure 3 provides a useful tool to interpret these findings.

Figure 3. Interaction effect of Gini index and Opportunity index on Life Satisfaction



Source: Based on estimates of model 4 in Table 1.

The picture clearly shows that Gini has a different impact on SWB, depending on the possibilities the society offers to individuals. In countries with a lower level of opportunities, the relationship between inequality and LS is actually negative, while in countries with a higher level of opportunities, people are more satisfied with their lives regardless of the income inequality level. In other words, income inequality reduces individuals' wellbeing if opportunities are low, but inequality is not relevant for life satisfaction if opportunities in the country are high. Our finding is in line with the intuition formulated by several authors (i.e. Berg, 2014; Bjørnskov et al., 2013; Ravazzini and Chávez-Juárez, 2018; Nikolaev and Bennett, 2016,

Haller and Hadler, 2004, Graafland and Lous, 2018) according to which SWB may be influenced by inequality in "life chances" and not only by income inequality.

Moreover, this outcome is independent from subjective perception regarding fairness, thus complementing the view of Bjørnskov et al. (2013) who find that income disparities contribute to the SWB of individuals with high fairness perception. Hence, our results confirm that the actual system of incentives at the country level matters. Life satisfaction does not only depend on subjective perception or individuals circumstances. If people living in more unequal societies are more satisfied, it is only because the socio-political context allows them to take their chance, but not because they prefer inequality. Indeed, another reading of our results is that in low- and middle-income countries with high-income disparities improving the mechanisms that allow people to achieve their personal goals would increase their welfare.

As well as this, information from Figure 3 also puts forward the view that individuals' life satisfaction would be independent of inequality in countries with intermediate levels of opportunity. This is in line with one of the conjectures of Kelley and Evans (2017), who suggest that "the relatively stable opportunity structures and existential security" in developed countries make inequality relatively irrelevant to SWB. They also suggest a positive association between inequality and happiness in developing countries due to the hope factor. We confirm that this positive relationship only holds true in countries where individuals have the chance to reach better social positions based on their own merits. Nevertheless, this is not the case in countries where social positions are not obtained on a fair basis. In this case, inequality is viewed as detrimental.

3.4.4. Components of Opportunity

The opportunity index accounts for distinct but interrelated dimensions. Here, we look further into the indicator to tease out which aspects matter the most for SWB. To this end, we replicate the estimation of model 4 (Table 1), substituting the opportunity index by each one of its components successively. The four components are Personal Rights, Personal Freedom and Choice, Inclusiveness and Access to advanced Education. For an overview of the values of these variables for the countries included in the dataset see Appendix Table A.3. Together, these components shed light on the possibilities and limitations for individuals regarding autonomy,

freedom, and ability to progress. Results for the newly included variables are displayed in Table 2.

Again, the data speak rather clearly: not all the components of opportunity play a part in explaining life satisfaction. Specifically, Personal Rights, and Personal Freedom and Choice do not exert any influence on the inequality-LS nexus. In contrast, Inclusiveness and Access to Advanced Education make significant contributions to SWB. According to Stern et al. (2014), the components Personal Rights and Access to Advanced Education reflect how societies can facilitate individuals to achieve their goals, while Personal Freedom and Choice, and Tolerance and Inclusion measure how societies can limit them. Among the incentives, Access to advanced education seems to matter more for LS than Personal Rights. Regarding the limits, inclusiveness makes more difference than Personal Freedom and Choice.

For the relevant components (columns 3 and 4 of Table 2), the three coefficients of interest have the same significance and signs as in model 4 of Table 1, meaning that they interfere in the relationship between inequality and SWB in the same manner as opportunity measured as a whole. Accordingly, in countries with better universities, where women access education and where access to university is easier, individuals register higher SWB regardless of the level of inequality. Similarly, in countries where there is tolerance towards homosexuals, minorities, and where political power is more equally distributed among genders and socioeconomic positions, citizens are more satisfied with their lives. Likewise, in less inclusive societies or societies where access to advanced education is limited, income inequality damages SWB. In such an environment, there is a threshold level of equality of income that could compensate for the lack of hope and lead individuals to similar LS as individuals living in countries with high prospects of achieving their goals to the best of their ability but with high disparity of income.

Table 2. Determinants of Life Satisfaction. Components of Opportunity Index

Component of Opportunity Index: VARIABLES	Personal rights	Personal freedom	Inclusiveness	Access to advanced education
Individual variables	yes	yes	yes	yes
Country variables	yes	yes	yes	yes
Gini Index	0.002	-0.154	-0.200***	-0.064***
Component of Country Opportunity Index	0.003	-0.105	-0.175***	-0.077***
Gini Index * Component of Country Opportunity Index	0.000	0.003*	0.005***	0.002***
Observations	35,169	35,169	35,169	35,169
Number of countries	25	25	25	25

*** p<0.01, ** p<0.05, * p<0.1. Individual and country variables are the same as in Table 1

3.4.5. Robustness check

To check the robutness of our results we have repeated the estimation of Model 4 (Table 1), splitting the sample successively into: people with low (no formal or primary) versus high (secondary or universitary) education, people with low (below median) versus high (above median) household income and people with low (lower/lower middle/working) versus high (upper/upper middle class) subjective social status. The results are presented in Table 3 and corroborate the relationship found between LS, inequality and opportunity. In general, income inequalitie and lack of opportunities would hurt more people with lower education, lower income and lower status levels but the differences are only significant among the education groups for the opportunity index.

Table 3. Determinants of Life Satisfaction for different groups.

Groups: VARIABLES	Low education	High education	Low income	High income	Low status	High status
Individual variables	yes	yes	yes	yes	yes	yes
Country variables	yes	yes	yes	yes	yes	yes
Gini Index	-0.245***	-0.166***	-0.196***	-0.133***	-0.193***	-0.130***
Opportunity Index	-0.145***	-0.104***	-0.128***	-0.084**	-0.119***	-0.094**
Gini Index * Opportunity Index	0.005***	0.003***	0.004***	0.003***	0.004***	0.003***
Observations	8,014	27,155	22,051	13,118	28,590	6,579
Number of countries	25	25	25	25	25	25

*** p<0.01, ** p<0.05, * p<0.1. Individual and country variables are the same than in table 1

3.5. Conclusion

This study contributes to the research on subjective wellbeing by examining the influence of income inequality on life satisfaction in low- and middle-income countries where people surprisingly seem more satisfied with their lives when income inequality is higher. Our results show that income inequality is a more obvious predictor of life satisfaction than national wealth and growth, and than average trust and fairness perception. Our main contribution consists in corroborating that social opportunities interfere in this relationship.

Our analysis yields a number of interesting results. Opportunity and inequality exert significant effects *per se* on life satisfaction. These effects are positive when considered separately and negative when considered jointly. More interestingly, their joint effect is highly significant, confirming that the impact of income disparities on life satisfaction should be interpreted in light of what possibilities societies offer to individuals to achieve self-improvements. In low- and middle-income countries, inequalities reduce individuals' wellbeing if opportunities are low, while individuals seem satisfied when opportunities are high, regardless of the inequality level. If people living in more unequal societies are more satisfied, it is only because the socio-political context allows them to take their chance, but not because they prefer inequality. Our study also sheds light on the aspects of opportunity that really matter, showing that inclusiveness and access to advanced education play a more major role than political freedom or personal rights. Finally, once opportunity at the macro level is accounted for, we do not find clear evidence that the relationship between income inequality and life satisfaction differs between low- and high-income groups, low and high socio-economic status and educated and less educated people.

From a policy design point of view and focusing on life satisfaction as the ultimate goal, seeking measures that make it possible for individuals to achieve their goals based on their own merits would be a far more sensible strategy than focusing exclusively on redistribution, wealth or growth. In terms of the debate about how much income inequality is acceptable or justified (Sen, 1997) individuals living in countries with accentuated inequality, such as many Latin American countries, and with very low opportunity, such as many low-income countries, would clearly register lower life satisfaction. For this reason, international institutions and governments should ensure that societies never fall under both thresholds at the same time. This strategy is in line with several targets of the 2030 Agenda for Sustainable Development, adopted by all United

Nations Member States in 2015 (UNCTAD, 2015). In particular, achieving jointly target 4 "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" and target 10 "Reduce inequality within and among countries" would constitute effective steps towards more satisfaction in low- and middle-income countries.

Another interpretation of our results is that opportunity has an obvious positive effect on life satisfaction when income inequalities are high. Additionally, these opportunities are not restricted to economic mechanisms, involving labor markets functioning, for instance. On the contrary, people are sensitive to social indicators such as inclusiveness and access to advanced education, aspects in which low- and middle-income countries usually stand far behind the high-income countries. For instance, in 2014 the average opportunity index was 72.54, 51.83, 41.38 for high-, middle- and low- income countries, respectively. Bjørnskov et al. (2013) have mentioned that the importance of subjective fairness justifies the fact that it is not only important to guarantee social mobility but also to communicate these policies accurately to make people aware of it, instead of promoting more redistribution. Our findings suggest that people are quite aware of social opportunities since a high level of opportunities at the macro level would be able to compensate for the negative effects of inequality in terms of life satisfaction. Nevertheless, when opportunities are low, more redistribution and improvement of life chances for all would definitively prove useful for increasing SWB.

In countries with a medium and high level of opportunities, inequality of income seems relatively irrelevant to SWB, all else being constant. This result should be interpreted cautiously. According to the Tunnel effect (Kelley and Evans, 2017; Hirschman and Rothschild, 1973; Grosfeld and Senik, 2010; Wang et al., 2015) this optimistic perception could vanish in a second step if, despite more opportunities, income inequalities do not subside. In this paper, we have focused on cross-national differences in the inequality-Life Satisfaction relationship. Further work is needed to explore the soundness of our results in a more comprehensive panel. Indeed, dynamic patterns may be crucial in emerging countries where social conditions including opportunities evolve quickly while income inequality may temporarily increase. Another limitation of our study is that our data do not allow us to assess predictions at more local levels, which certainly deserves further investigation. Another promising area of future research is to investigate how the broader access to information facilitated by internet access shapes the

perception of inequality. Indeed, there are aspects of globalization that make comparisons easier and accelerate convergence in social values, which may eventually increase individuals' sense of deprivation in poor countries.

Appendix

Table A.1 Summary statistics

Variable	Mean	Standard deviation	Min	Max
Life satisfaction	6.939	2.292	1	10
Male	0.476	0.499	0	1
Age	40.195	15.534	16	98
Number of children				
No children	0.260	0.438	0	1
1 child	0.180	0.385	0	1
2 children	0.249	0.433	0	1
3 or more children	0.311	0.462	0	1
Education level				
No formal education	0.057	0.230	0	1
Primary	0.171	0.369	0	1
Secondary	0.554	0.497	0	1
University	0.218	0.420	0	1
Occupational status				
Full-time employee	0.291	0.454	0	1
Part-time employee	0.078	0.268	0	1
Self-employed	0.158	0.365	0	1
Retired	0.095	0.294	0	1
Unemployed	0.110	0.313	0	1
Other	0.268	0.443	0	1
Household income				
First quartile	0.282	0.450	0	1
Second quartile	0.345	0.475	0	1
Third quartile	0.149	0.356	0	1
Fourth quartile	0.224	0.417	0	1
Marital status				
Married	0.658	0.474	0	1
Divorced	0.028	0.165	0	1
Separated	0.018	0.135	0	1
Widowed	0.056	0.230	0	1
Single	0.240	0.427	0	1
Social status				
Upper class	0.019	0.138	0	1
Upper middle class	0.169	0.375	0	1
Lower middle class	0.351	0.477	0	1
Working class	0.287	0.452	0	1
Lower class	0.174	0.379	0	1

No religious denomination	0.126	0.332	0	1
Muslim	0.201	0.401	0	1
Catholic	0.203	0.402	0	1
Protestant	0.042	0.200	0	1
Orthodox	0.136	0.343	0	1
Jewish	0.007	0.040	0	1
Other religion	0.285	0.451	0	1
Most people can be trusted	0.189	0.392	0	1
Most people would try to take advantage of you if they got a chance /try to be fair	5.741	2.674	1	10
Often without enough food	0.059	0.235	0	1
Often going without cash	0.134	0.341	0	1
Save money during past year	0.226	0.418	0	1

Table A2. *List of countries and their macroeconomic variables.*

Country	ID	Survey year	Sample Size	Logarithm of GDP per capita	GDP Growth	Unemployment rate	Inflation	Social trust	Soc fairn
Azerbaijan	AZE	2011	967	8.507	9.4	5.74	1.46	0.166	5.3
Armenia	ARM	2011	992	8.004	-14.1	18.74	3.41	0.101	5.0
Brazil	BRA	2014	1,366	9.054	-0.1	8.28	4.89	0.066	4.8
Belarus	BLR	2011	545	8.585	0.2	9.90	12.94	0.352	5.6
China	CHN	2013	1,515	8.253	9.4	4.29	-0.73	0.644	6.9
Colombia	CHL	2012	1,425	8.541	1.2	12.07	4.20	0.041	6.0
Ecuador	ECU	2013	1,187	8.356	0.6	6.47	5.16	0.072	5.6
Georgia	GEO	2014	1,134	7.903	-3.7	16.84	1.73	0.089	6.3
India	IND	2012	3,408	6.994	8.5	3.75	10.88	0.176	4.9
Kazakhstan	KAZ	2011	1,468	8.877	1.2	6.55	7.32	0.388	6.0
Jordan	JOR	2014	1,177	8.158	5.5	12.90	-0.74	0.132	5.5
Kyrgyzstan	KGZ	2011	627	6.770	2.9	8.41	6.84	0.380	6.3
Malasia	MYS	2012	1,296	8.899	-1.5	3.69	0.58	0.085	5.9
Mexico	MEX	2012	1,895	8.961	-5.3	5.38	5.30	0.124	6.1
Nigeria	NGA	2012	1,741	7.544	8.0	3.97	11.54	0.148	5.6
Pakistan	PAK	2012	1,144	6.914	2.8	5.46	13.65	0.239	5.9
Peru	PER	2012	1,064	8.335	1.1	3.90	2.94	0.083	5.3
Philippines	PHL	2012	1,186	7.509	1.1	3.86	4.22	0.028	6.6
Romania	ROU	2012	1,336	9.045	-5.9	6.86	5.59	0.071	5.0
Russia	RUS	2011	1,894	9.059	-7.8	8.42	11.65	0.292	5.6
Rwanda	RWA	2012	1,510	6.290	6.3	2.74	12.89	0.166	6.2
South Africa	ZAF	2013	3,223	8.667	-1.5	23.54	7.26	0.236	6.0
Thailand	THA	2013	1,065	8.346	-0.7	1.49	-0.84	0.325	5.5
Turkey	TUR	2012	1,442	9.109	-4.7	12.55	6.25	0.124	5.6
Ukraine	UKR	2011	562	7.842	-14.8	8.84	15.88	0.249	5.6
	MEAN			8,181	-0,076	8,186	6,171	0,191	5,7

Country	ID	Survey year	Sample Size	Logarithm of GDP per capita	GDP Growth	Unemployment rate	Inflation	Social trust	Soc fairr
	ST. DEVIATION			0,794	6,413	5,381	4,884	0,143	0,5

Table A.3. Components of the Opportunity index by countries

Country	ID	Personal Rights	Personal Freedom	Inclusiveness	Access to advanced education
Azerbaijan	AZE	24,44	46,06	38,19	50,34
Armenia	ARM	41,73	47,13	39,6	44,07
Brazil	BRA	73,77	68,49	67,72	44,98
Belarus	BLR	22,96	58,26	47,37	58,32
China	CHN	17,25	71,53	38,55	44,2
Colombia	CHL	65,09	66,59	59,54	51,37
Ecuador	ECU	53,38	63,38	60,67	36,68
Georgia	GEO	65,31	59,48	29,54	43,93
India	IND	70,69	56,22	26,36	29,46
Kazakhstan	KAZ	28,5	60,93	48,47	62,06
Jordan	JOR	44,03	60,82	41,04	44,35
Kyrgyzstan	KGZ	49,13	54,43	36,62	42,54
Malasia	MYS	45,61	62,47	38,92	51,88
Mexico	MEX	65,87	62,1	53,57	49,92
Nigeria	NGA	50,5	36,05	27,09	13,56
Pakistan	PAK	44,66	41,71	20,17	18,39
Peru	PER	73,33	60,53	56,86	40,38
Philippines	PHL	82,78	65,02	56,74	45,54
Romania	ROU	72,92	61,53	41,24	53,98
Russia	RUS	32,1	54,09	36,66	75,14
Rwanda	RWA	31,41	72,81	45,03	15,32
South Africa	ZAF	74,71	70,14	53,86	46,88
Thailand	THA	52,33	66,6	37,47	48,74
Turkey	TUR	47,67	56,42	32,53	41,03
Ukraine	UKR	58,41	53,66	48,47	61,31
MEAN		51,543	59,058	43,291	44,575

Country	ID	Personal Rights	Personal Freedom	Inclusiveness	Access to advanced education
ST DEVIATION		18,522	9,112	11,937	14,160

Table A.4 Definition of variables

VARIABLES	DEFINITION
Life satisfaction	Continue variable related to the respondent's life satisfaction: All things considered, how satisfied are you with your life as a whole these days? Possible answers from 1. Completely dissatisfied to 10. Completely satisfied
Male	Dummy variable that is set to 1 for male respondents
Age	Age of individuals
Number of children	Four dummy variables, relating to number of children in family: no children, 1 child, 2 children and 3 or more children; with the reference group being No children
Education	Four dummy variables, relating with education level: no formal education, primary education (complete or incomplete), secondary education (complete or incomplete), university education (complete or incomplete); with the reference group being no formal education
Occupational status	Six dummy variables, relating with occupational status: full time employee, part time employee, self employed, retired, unemployed and other; with reference group being full time employee
Household income	Four dummy variables, relating household income: first (poorest) to fourth quartile (richest); with reference group being first quartile
Marital status	Five dummy variables: married (or cohabiting), divorced, separated, widowed and single; with the reference group including married or cohabiting
Social status	Five dummy variables, relating subjective social status: upper class, upper middle class, lower middle class, working class and lower class; with reference group including upper class
Religion	Seven dummy variables: no religion denomination, Muslim, Catholic, Protestant, Orthodox, Jewish and other religion denominations; the reference group is no religion denomination
Most people can be trusted	Dummy variable that is set to 1 for respondents who believe that most people can be trusted
Most people would try to take advantage of you if they got a chance /try to be fair	Answer of the question: Do you think most people would try to take advantage of you if they got a chance, or would they try to be fair? Possible answers: from *1* People would try to take advantage of you to *10* People would try to be fair
Often without enough food	Dummy variable relating to the question: In the last 12 month, how often have you or your family: Gone without enough food to eat? Possible answers: *1* Often *2* Sometimes *3* Rarely *4* Never. Dummy variable is set to 1 for respondents who answer 1 (often)
Often gone without cash	Dummy variable relating to the question: In the last 12 month, how often have you or your family: Gone without a cash income? Possible answers: *1* Often *2* Sometimes *3* Rarely *4* Never. Dummy variable is set to 1 for respondents who answer 1 (often)
Saved money during past year	Dummy variable that is set to 1 for respondents who saved money during past year
Social trust	It is derived from averaging in each country the answers to the following question: Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people? Possible answers: *1* Most people can be trusted and *0* Need to be very careful.
Social fairness	It is derived from averaging in each country the answers to the following question: Do you think most people would try to take advantage of you if they got a chance, or would they try to be fair? Possible answers: from *1* People would try to take advantage of you to *10* People would try to be fair

Table A.5 Articles on Inequality and SWB. Summary of the results.

Reference	Dataset	Region	Time Span	SWB and inequality measures	Empirical Methods	
Alesina et al. (2004)	For USA: General Social Survey; for Europe: Euro-barometer survey	USA and Europe	For USA:1972-1992; for Europe: 1975-1992	For USA: happiness; for Europe: life satisfaction. Gini	Ordered logit	1) SWB of th USA o
Beja (2014)	WVS	Industrialized and emerging countries	2005	Life Satisfaction. Gini	Ordered probit	1) neg i co su
Berg and Veenhoven (2010)	World Database of Happiness	119 countries	1993-2004	Life satisfaction, mood, and contentment.	Correlation analyses	1) SW Easte in an s
Bjørnskov et al. (2013)	WVS	87 countries	1990-2008	Life satisfaction. Gini	OLS regressions	1) redis 2) diffe dep
Delhey and Dragolov (2014)	European Quality of Life Survey	30 European countries	2007	Life satisfaction and happiness. Gini	Multilevel mediation analysis	1) SWI Gini by di

						perce
Diener et al. (1995)	Veenhoven World Database of Happiness	55 countries	Different points in time, 1984-1986	Life satisfaction. Gini	Correlation analyses	1) SWI no
Graham and Felton (2006)	Latinobarómetro	18 Latin American Countries	1997-2004	Life satisfaction. Gini	Ordered logit	1) SW G w
Hajdu and Hajdu (2014)	European Social Survey	29 European countries	2002-2008	Life Satisfaction. Gini	OLS regressions	1) SWI Redi effe gove in W neg
Haller and Hadler (2006)	WVS	41 countries	1995-1997	Life satisfaction and happiness. Gini	Multilevel regression	1) SV cou incor 3 dev coun
Mikucka et al. (2017)	WVS and EVS	46 countries	1981-2012	Life satisfaction. Gini	Multilevel analysis	1) In has a coun and 2) E

						on li cou in t trus on li t rel gr mod
Kelly and Evans (2017)	Pooled WVS-EVS	68 countries	1981-2009	Life satisfaction and happiness. Gini	Random-intercept fixed-effects multi-level models.	Gin SWB it
Oishi and Kesebir (2015)	Veenhoven's (2015) World Database of Happiness and Latinobarómetro	16 developed countries and 18 Latin American countries	For developed countries: 1959-2006; for Latin America: 2003-2009	For developed countries: Life satisfaction and happiness; for Latin America: Life satisfaction. Gini	Multilevel analysis	Gini
Powdthavee et al. (2017)	Gallup World Poll	24 countries	2005-2013	Life evaluation and individual's emotional experiences. Top 1%	fixed-effects filtered (FEF)	1) T on li E tow tha
Ravazzini and Chávez-Juárez (2018)	ESS	31 European countries.	Different points in time	Life satisfaction. Gini	Standard panel data models.	Gini ar ea mob
Reyes-García et al. (2018)	PEN	21 developing countries	2005-2010	Life satisfaction. Gini at the	Ordered logit and mixed-effects logistic	A Gini and

				country and village levels.	models	Gini
Rözer and Kraaykamp (2013)	WVS and EVS	85 countries	1989-2008	Life satisfaction and happiness. Gini	Multilevel analyses	G posi a pers and
Schröder (2018)	WVS and Cross-National Equivalent	72 countries	1984-2013	Life satisfaction. Gini	Hybrid regressions	A in satis ine
Tavor et al. (2018)	World Happiness report	41 developed countries and 98 developing countries	2012-2014	Happiness. Gini	Hierarchical regressions	1) H ne reg Ginis an a reg
Verme (2011)	EVS and WVS	84 countries	1981-2004	Life satisfaction. Gini	Ordered logit	1) SWI on negat

Table A.6. Determinants of Life Satisfaction without variables of social trust and social fairness.

VARIABLES	Model 1	Model 2	Model 3	Model 4
Individual variables				
Male	-0.020	-0.020	-0.020	-0.020
	(0.026)	(0.026)	(0.026)	(0.026)
Age	-0.033***	-0.033***	-0.033***	-0.033***
	(0.008)	(0.008)	(0.008)	(0.008)
Age squared	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Number of children				
No children	Ref.	Ref.	Ref.	Ref.
1 child	-0.013	-0.014	-0.014	-0.014
	(0.047)	(0.047)	(0.047)	(0.047)
2 children	0.066	0.066	0.066	0.066
	(0.055)	(0.055)	(0.055)	(0.056)
3 or more children	0.125***	0.125***	0.124***	0.124***
	(0.047)	(0.047)	(0.047)	(0.047)
Education				
No formal education	Ref.	Ref.	Ref.	Ref.
Primary	0.227***	0.227***	0.227***	0.227***
	(0.070)	(0.069)	(0.069)	(0.070)
Secondary	0.162	0.160	0.161	0.161
	(0.096)	(0.096)	(0.096)	(0.097)
University	0.183*	0.180*	0.181*	0.182*
	(0.099)	(0.099)	(0.099)	(0.099)
Labor status				
Full time	Ref.	Ref.	Ref.	Ref.
Part time	-0.063	-0.063	-0.063	-0.063
	(0.054)	(0.054)	(0.054)	(0.054)
Self employed	-0.031	-0.030	-0.031	-0.030
	(0.078)	(0.078)	(0.078)	(0.078)
Retired	-0.124	-0.124	-0.124	-0.123
	(0.083)	(0.083)	(0.083)	(0.082)
Unemployed	-0.224***	-0.225***	-0.225***	-0.225***
	(0.063)	(0.063)	(0.063)	(0.063)
Other	0.006	0.006	0.006	0.006
	(0.045)	(0.045)	(0.045)	(0.045)

VARIABLES	Model 1	Model 2	Model 3	Model 4
Household income				
First quartile	Ref.	Ref.	Ref.	Ref.
Second quartile	0.433***	0.433***	0.433***	0.433***
	(0.082)	(0.082)	(0.082)	(0.082)
Third quartile	0.657***	0.657***	0.657***	0.657***
	(0.114)	(0.114)	(0.114)	(0.114)
Fourth quartile	1.107***	1.108***	1.108***	1.108***
	(0.158)	(0.158)	(0.158)	(0.158)
Marital status				
Married	Ref.	Ref.	Ref.	Ref.
Divorced	-0.372***	-0.372***	-0.372***	-0.372***
	(0.109)	(0.109)	(0.109)	(0.109)
Separated	-0.453***	-0.453***	-0.453***	-0.453***
	(0.085)	(0.085)	(0.085)	(0.085)
Widowed	-0.437***	-0.436***	-0.437***	-0.436***
	(0.082)	(0.082)	(0.082)	(0.082)
Single	-0.103**	-0.102**	-0.103**	-0.103**
	(0.051)	(0.051)	(0.051)	(0.051)
Social status				
Lower class	Ref.	Ref.	Ref.	Ref.
Working class	0.289***	0.288***	0.288***	0.288***
	(0.066)	(0.066)	(0.066)	(0.066)
Lower middle class	0.424***	0.423***	0.424***	0.424***
	(0.056)	(0.056)	(0.056)	(0.056)
Upper middle class	0.650***	0.649***	0.650***	0.650***
	(0.067)	(0.067)	(0.067)	(0.067)
Upper class	0.878***	0.876***	0.878***	0.878***
	(0.121)	(0.121)	(0.121)	(0.121)
Religion				
No religion	Ref.	Ref.	Ref.	Ref.
Muslim	-0.043	-0.043	-0.041	-0.036
	(0.154)	(0.154)	(0.154)	(0.154)
Catholic	0.149**	0.151**	0.149**	0.148**
	(0.074)	(0.074)	(0.074)	(0.074)
Protestant	0.138**	0.140**	0.139**	0.139**
	(0.052)	(0.053)	(0.052)	(0.053)
Orthodox	-0.047	-0.055	-0.052	-0.047
	(0.059)	(0.057)	(0.058)	(0.059)
Jewish	0.148	0.147	0.149	0.150
	(0.389)	(0.390)	(0.390)	(0.390)
Other religion	0.074	0.077	0.077	0.072
	(0.081)	(0.081)	(0.081)	(0.081)
Often without enough food	-0.305***	-0.304***	-0.305***	-0.305***
	(0.095)	(0.095)	(0.095)	(0.095)
Often going without cash	-0.582***	-0.582***	-0.582***	-0.581***
	(0.105)	(0.106)	(0.106)	(0.106)
Saved money during past year	0.183***	0.184***	0.183***	0.183***
	(0.036)	(0.036)	(0.036)	(0.036)

VARIABLES	Model 1	Model 2	Model 3	Model 4
Country variables				
Logarithm GDP per capita	0.206	0.132	0.127	0.042
	(0.172)	(0.143)	(0.148)	(0.157)
GDP Growth	-0.006	0.029	0.015	-0.005
	(0.018)	(0.015)	(0.019)	(0.022)
Unemployment Rate	-0.055***	-0.037**	-0.047**	-0.076***
	(0.020)	(0.018)	(0.021)	(0.025)
Inflation	-0.017	-0.001	-0.006	-0.016
	(0.027)	(0.023)	(0.024)	(0.025)
Gini Index	0.033***		0.017	-0.153**
	(0.012)		(0.013)	(0.069)
Opportunity Index		0.049***	0.036**	-0.103*
		(0.016)	(0.018)	(0.057)
Gini Index * Opportunity Index				0.003**
				(0.001)
Constant	4.292***	3.577***	3.701***	11.661***
	(1.497)	(1.322)	(1.382)	(3.503)
Observations	35,169	35,169	35,169	35,169
Number of countries	25	25	25	25

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Chapter 4: The Palliative Function of System Justification and Life Satisfaction: Evidence from Europe

4.1. Introduction

A spate of research has been produced on the nexus between (real) income inequality and life satisfaction (LS), having yielded contradictory findings: negative, positive, and weak effects of inequality on LS (Alesina et al., 2004; Beja, 2014; Kelley and Evans, 2017; Reyes-Garcia et al., 2018; Senik, 2004; Veenhoven, 2005; Verme, 2011). These mixed results may be the consequence of several factors including, amongst others, type of methodology, sample size, geographical coverage, and data source. However, other authors have raised concerns about whether real inequality measures are able to capture the accurate effects of inequality on human welfare (Schneider, 2016). The matter is, in particular, about the extent to which people do have awareness of disparities or whether they really know their actual standing in the income distribution. The answer is 'no' because they have, in general, poor information about the actual disparity, and even their taste for inequality differ among them, depending on several factors, i.e. their rooted cultural and social values and daily life experiences (Loveless and Whitefield, 2011).

Accordingly, in recent years, research attention has growingly shifted to take into account different underlying mechanisms and other auspicious paths to avoid following a strict economic rational. More specifically, recent research has employed social psychological mechanisms in order to identify the effect of inequalities on LS. For instance, Cheung (2016) explains the link between inequality and happiness in China through the hope factor, while, for the same country, Huang (2019) relies on the role of personal distributive justice beliefs to explain the relationship between income inequality and happiness. Using worldwide data, Katic and Ingram (2018) delve into different psychological paths to identify the effect of income inequality on LS, including perceived fairness of income generation process, egalitarian preferences, and social comparison.

Similarly, in this study we draw on a social psychological perspective to explain the relationship between societal inequality and LS. More particularly, we put our attention on the palliative function of system justification theory. The theory assumes that people have cognitive and psychological propensity to rationalize, justify and legitimate societal inequalities within their society (Jost and Banaji, 1994; Jost and Hunyady, 2002) because they have needs to fulfill, namely epistemic, existential, and relational needs. Thus, fulfilling these needs goes hand-in-hand with fetching psychological avails, such as enhancing self-esteem and LS and diminishing

anxiety, depression and neuroticism. Thereby, the psychological consequences of system justification operate as the palliative function for people with the existing societal arrangements.

However, the investigation of the palliative function and human wellbeing remains controversial among researchers. Particularly, the examination of the palliative function of system justification and its consequences for human welfare has followed different methodological patterns in prior works. Some authors have sought to test whether the link between the palliative function of system justification and subjective wellbeing could be captured through an interaction with (real) income inequality (e.g. Sengupta et al, 2017 for New Zealand; Vargas-Salfate et al., 2018 using a longitudinal online survey from 18 countries around the world). In contrast, others authors have investigated the consequences of the palliative function of system justification drawing on self-reported questionnaires (subjective manner) regarding several issues, i.e. the endorsement of system-justifying ideology, support for redistribution, and moral outrage (see Goudarzi et al., 2020; Wakslak et al., 2007 for an American sample). In this vein, Goudarzi et al. (2020) aimed at testing how system justification relates to emotional responses to inequality, whereas Wakslak et al. (2007) sought to test whether adherence to system justification would decline moral outrage and support for redistribution and whether it would make people feel better about the status quo.

Similar to Goudarzi et al. (2020) and Wakslak et al. (2007), in this study we draw on self-reported measures in which individuals were asked about their beliefs and attitudes regarding various issues, including system justifying beliefs, inequality aversion, support for redistribution and life satisfaction. This is because some authors have suggested that the consequences of inequality for subjective wellbeing are better identified when accounting for subjective attitudes toward inequality rather than for (real) inequality measures because inequality is an abstract phenomenon (see Schneider, 2016 for a review). Thus, this study goes in line with this argument.

In particular, we seek to provide a new way of thinking regarding perplexing aspects of human response to inequality by exploring how and why Europeans are satisfied with their lives despite societal inequalities, even if previous research on Europe provides evidence suggesting that the consequences of (real) inequality measures are negatively associated with their LS[8]. More precisely, we pursue to see how the psychological role of inequality-justifying beliefs relates to

[8] Research on the relationship between (real) income inequality and LS for Europe shows that Europeans' LS is negatively affected by (real) income inequality (Alesina et al. 2004; Delhey and Dragolov, 2014; Schneider, 2019).

Europeans' LS directly and indirectly (via inequality aversion and support for redistribution). Our empirical approach differs from previous studies on system justification and subjective wellbeing because it identifies how the indirect link between system justification, inequality aversion, support for redistribution, and life satisfaction operates, which has never been empirically examined by other works. Additionally, previous work on system justification theory has thus far been confined to small sample sizes and no studies that we are cognizant of have been undertaken for a representative sample in general and, in particular, for a European context. This study includes 30900 persons living in 27 European countries. To operationalize our approach, we use Generalized Structural Equation models in order to account for the potential indirect effects (mediation models) and data from the ninth round of the European Social Survey.

Our findings are in line with the palliative function of system justification. System justifying beliefs have sizeable and positive significant direct effects. More specifically, system justifying beliefs reduce inequality aversion and support for redistribution, which also increase LS. Then, there is an indirect effect of system justifying beliefs via inequality aversion and support for redistribution, which augments the direct effect of this feeling on LS. However, the indirect effect via inequality aversion and support for redistribution explicate a small part of total effect.

The study is organized as follows: Section 2 discusses the existing literature on inequalities and LS, and introduces research questions. Section 3 describes the variables definitions and the empirical models, while section 4 presents the results. The final section concludes and discusses.

4.2. Background

In this section, we particularly focus on system justification theory (within social psychology), which offers comprehensive explanations for how and why people justify the existing disparities.

4.2.1. Income inequality and LS

Although there is a bulk of empirical studies on the **nexus between income inequality and LS,** the literature on the topic has yielded mixed findings. For instance, some researchers indicate a negative effect of inequalities on LS (Alesina et al., 2004; Beja, 2014; Delhey and Dragolov, 2014; Graafland and Lous, 2018; Oishi et al., 2011; Verme, 2011), while others find positive effects on LS (Berg and Veenhoven, 2010; Esping-Andersen and Nedoluzhko 2017; Haller and Hadler, 2006; Kelley and Evans, 2017; Nielsen, 2017; Reyes-Garcia et al., 2018; Rözer and Kraaykamp, 2013), or no significant effects of inequality on LS (Senik, 2004; Veenhoven 2005).

While these mixed findings may be triggered by different methodologies, regional differences, sample size, and measurement error (see Schneider, 2016 for a review), other authors argue that national inequality measures, i.e. Gini index, do not accurately capture the proper impacts of inequality on LS (Graham and Felton, 2006; Cojocaru, 2014), as these measures are 'an even more abstract phenomenon' (Schneider, 2016: 1731). In other words, the main notion here is that people, on average, have no exact knowledge of the factual inequalities or their changes, and, as a result, they do not know where they are actually placed in the income distribution. That is, the unawareness of the real level of inequality makes people either overestimate the increase in inequality (Chambers et al., 2014) or underestimate the level of inequality (Norton and Ariely, 2011). This argument is empirically confirmed by Fatke (2018) and Kuhn (2011), who find that people's perceptions of inequalities differ from the real levels. Rather, individual perceptions of income inequality depend on several factors, such as their day-to-day experiences, information from media and communications with others (Oshio and Urakawa, 2014), as well as their rooted values, shared cultural values and egalitarianism views (Loveless and Whitefield, 2011). Further, the subjective evaluation of income inequality will be different with different standing in socioeconomic status, and in personal merits, skills and efforts (Bjørnskov et al., 2013). Therefore, we argue that a more circumspect look into the literature suggests that the relationship between income inequality and LS may be more intricate than what it seems to be at first glance.

4.2.2. Subjective Perceptions of Inequalities

The concept of **'subjective evaluation of income inequality'**, in terms of people's perceptions and attitudes, has played a key role in the sociological and social psychological theoretical discussion because they explain 'why people perceive the world the way they do and how they then respond to those perceptions' (Jetten and Peters, 2019: 4). The theoretical discussion is built on the view that people's perceptions and evaluations help us to understand how they respond to income inequality and how those perceptions affect their LS (Schneider, 2012). In this vein, several perspectives have emerged to elucidate subjective attitudes toward inequalities, such as social comparison, which relates to the theories of relative deprivation (Runciman, 1966; Yitzhaki, 1979) and the tunnel effect (Hirschman and Rothschild, 1973); fairness perceptions (Bjørnskov et al., 2013); egalitarian beliefs (see Senik 2009 for a review); and distributive justice beliefs (Lucas et al. 2013; Miller, 1992)[9]. Accordingly, these social psychological views have inspired the recent empirical research on inequality and LS (see Cheung, 2016; Delhey and Dragolov, 2014; Huang, 2019; Katic and Ingram, 2018; Kelley and Evans, 2017; Oishi et al., 2011). However, these views are widely tested in the recent literature and therefore we prefer to draw on another theorizing within social psychology, known as the 'system justification theory'.

4.2.3. Palliative Function of System Justification

System justification theory, initially introduced by Jost and Banaji (1994) and developed later by Jost and Hunyady (2002), provides key notions of why people pursue to preserve the defense and legitimacy of the prevailing system despite inequalities. At its heart, the theory addresses underlying social and psychological needs, i.e. relational, existential and epistemic needs, to lessen insecurity and threat (Jost, 2019). In other terms, people strive to achieve stability and certainty about social arrangements 'epistemic need', to feel less threated and unsecured 'existential need', and to fulfill shared reality with others 'relational need'. This implies that people are psychologically inclined to deny uncertain social change, even if this change can

[9] To sum up these perspectives, (1) the relative deprivation and the tunnel effect are two terms contrasting with each other. People may feel left behind when they see that they earn less than those around them (relative deprivation), while they may tolerate inequality if they see the better off earnings of others around them as a sign of improving their own positions in the near future (the tunnel effect). (2) Fairness perceptions suggest that attitudes toward inequality are determined by the perceived probabilities of success, while (3) egalitarian views suggest that attitudes toward inequalities depend on preferences (e.g. preferences for progression.) and beliefs (e.g. equality of chances and role of luck). (4) Distributive justice beliefs pertain to individual perceived fairness of outcomes and allocations.

carry the prospect of ameliorating their outcomes because uncertain social change can possibly unsettle the familiarity and stability of existing arrangements. Thus, people's needs are closely aligned to preferences for system justification and refusal of system-challenging biases (Hennes et al., 2012; Jost and Hunyady, 2005; Jost et al., 2008a). Likewise, adherence to the prevalent system allows people to develop a preference for things that they are familiar with, while denying unfamiliar ones. As the saying goes, better the devil you know than the devil you do not.

The key question is thus what the manifestations of people's tendency to uphold the existing system that they do not control with legitimacy and justification are. In this regard, social and social psychological research suggests that support for the existing system can be explained by adherence to dominant ideological beliefs (Jost et al. 2008b), as they not only provide sights about how the society should socially operate but also define one's attitudes to a system and lay the basis of the system's legitimacy (Jost et al., 2003a; Kay et al., 2009). Based on the early works, social research stresses the vital role of people's beliefs in legitimating and rationalizing disparities in a manner that people deserve what they get and get what they deserve (Lane, 1962; Tyler and McGraw, 1986). In this vein, Jost and Hunyady (2002) shed light on 'the power of meritocratic ideology' by which hard work and efforts bring success, that is, people tend to upbraid others for their own poverty, while they absolve the system from responsibility for the poverty. Thus, people explicate the indigence of some groups and the prosperity of others in a manner that makes these discrepancies appear fair and even legal (Jost and Banaji, 1994). Moreover, Kluegel and Smith (1986) provide evidence suggesting that poor persons felt satisfied and less guilt when they felt responsible for their poverty. This argument is called **the palliative function for people with the prevailing system within their society** (Jost and Hunyady, 2002).

Here, we detail what the psychological consequences of the palliative function of system justification are. The assumption that people legalize and justify societal inequalities, irrespective of being poor or rich, not only fulfills people's psychological needs, but also goes hand-in-hand with fetching psychological benefits. The belief that society is just and fair is often seen as a "motivationally induced way of adapting to a world in which one is relatively helpless. The individual seeks stability in his world by attributing absolute virtue to the legal system" (Hess and Torney, 1967: 52). This, in turn, enables people to keep their physical and social environment stable and orderly (Lerner and Miller, 1978). Research on system justification

theory suggests that the palliative function is associated with increased positive affect[10] and decreased negative affect, especially in terms of satisfaction with social standing, occupation, financial situation, and life (Jost et al., 2003b; Kay and Jost, 2003; Rankin et al. 2009). Thus, the psychological palliative function serves the adaptive function that reduces anxiety, frustration, and social discord, and enhances self-esteem and overall satisfactions (Jost and Hunyady, 2002).

Research also shows that the palliative function interplays with other contextual factors affecting LS. Thus far, the role played by the adoption of rationalizing- and legalizing-inequality beliefs, i.e. meritocratic beliefs, in declining moral outrage and negative emotional responses to inequality suggests that these beliefs reduce inequality aversion (Goudarzi et al., 2020) and weakens support for social change and redistribution of resources (Wakslak et al., 2007). That is, system justification enhances people's satisfaction with own outcomes and life, and that because it fulfills the palliative function (fulfilling their relational, existential and epistemic needs) and provides a buffer against the hurtful effects of inequalities and cripples uncertain social changes.

4.2.4. Main Hypotheses

In light of the previous argument and given that the palliative function of system justification is associated with increased positive affect, especially in terms of satisfaction with social standing, occupation, financial situation, and life in general, **we predict system justifying beliefs (SJB), regarding the legitimacy of inequalities, to have an enhancing impact on LS (hypothesis 1).**

We also seek to account for the mechanism that underlies hypothesis 1. In particular, we pursue to test how and why system justification is associated with increased life satisfaction. In its essence, system justification theory suggests that the positive psychological impact on LS is the outcome of a number of individual factors correlating with one another. Given that the role played by the adoption of SJB in enhancing LS is the result of fulfilling the palliative function as a means of reducing social discord, threat, and uncertainty, then it builds up a viaduct of excuses between the system and people's satisfaction with life. In other words, the psychological palliative function of SJB makes people satisfied with their own social outcomes via the reduction in inequality aversion (Aversion) and, in turn, the diminution of their support for redistribution (RED), thereby leading to a positive impact on their LS. Therefore, people with

[10] The term 'positive affect' in psychology refers to the extent to which people subjectively experience the positive emotional state that is formalized by feelings of enthusiasm, gratification, joy, pleasure, satisfaction, and happiness.

high SJB would be less inequality averse and less supportive of redistributive policies. This leads us to propose an empirical model that would take into account all the links between SJB, Aversion, RED, and LS. Such causalities operate as follows: **SJB would diminish Aversion and, in turn, RED, which would translate into an enhancing impact on LS (hypothesis 2).** Put differently, we conjecture a positive indirect effect of SJB on LS through Aversion and RED.

4.3. Empirical models and Variables Description

4.3.1. Description of data

Our empirical analysis mainly relies on self-reported measures in which subjects were asked about their beliefs and attitudes about various issues. Our main data source is the ninth round of the European Social Survey conducted in 2018, covering 30.900 persons residing in 27 countries.

We use individuals' responses to the question 'How satisfied with life as a whole' as a proxy for the *LS*. Their responses are distributed on an eleven-point scale ranging from 0 (extremely dissatisfied) to 10 (extremely satisfied). SJB measures how respondents agree with the statement 'By and large, people get what they deserve'. *RED* measures the support for redistribution if individuals agree with the statement 'Government should reduce differences in income levels'.

We measure $Aversion$ using the question 'Top 10% full-time employees in country, earning more than [amount], how fair'. Subjects are considered averse to inequality if they consider this statement unfair. We indeed use a different definition of inequality aversion from the existing literature (analysis-based surveys). The existing literature relies on the sign of the LS-(real) income inequality link to decide whether people are inequality averse or not[11]. However, as argued before, real inequality measures may not accurately capture the exact effect of inequality on satisfaction with life because people do not know where they really stand in the income distribution. Rather, it is a matter that can be better explained by subjective attitude to inequality. The reason for choosing the perceived unfairness of top income earners (top 10%) instead of bottom income earners (or both) is that people psychologically perceive the rich as enemies, which is a much stronger and clearer feeling than the one they experience towards the poor people for who they simply do not show sympathy for[12]. In this regard, we found a clear evidence for this argument in the European Social Survey dataset. We observe that 46.19% of

[11] For instance, Clark (2003) concludes that British workers are not inequality averse due to the positive inequality-LS nexus. Adversely, Schwarze and Härpfer (2007) argue that Germans are inequality averse because of the negative influence of income inequality on LS. In the same manner, Verme (2011) interprets the negative relationship between income inequality and satisfaction with life as a dislike for inequality on a worldwide evidence.

[12] We consider a psychological view regarding the definition of inequality aversion. Claudia Hammond in her book 'Mind over Money, 2016' questions 'why are we sometimes hostile to other people?'. She argues that people show hostility to others because of the difference. More specifically, emotional responses to others are determined by who the others are (friend or foe; warm character or not), and whether they are competent or not. She further argues that 'when it comes to money', people see the rich as competent but with lack of warmth, so the resultant feeling is envy, while they do not see the poor to be competent and warmth, so the prevailing feeling is one of disgust. In other words, people generally see rich people as enemies, and meanwhile they do not show sympathy for the poor ones.

the individuals saw the incomes of top earners as largely unfair[13], while only 5.41% of the individuals saw the incomes of bottom earners as largely unfair[14]. In line with this argument, we argue that the perceived unfairness of top income earners may serve a better proxy for Aversion.

As standard in the literature on life satisfaction, a set of individual characteristics, which may have a relevant influence on LS, is selected. Namely, we take into account age and age squared, gender, number of household members, legal marital status, religion, education, household's income, and mean income group. All relevant information about summary statistics, countries included in the analysis and variables' coding is available in appendix A (tables A1, A2, & A3).

4.3.2. Empirical Models

Based on the preceding argument discussed in sections 2.3 and 2.4, we expect SJB to have a positive direct effect on LS (hypothesis 1) and potential indirect effect on LS via Aversion and RED (see below). In order to capture all the potential indirect effects, we estimate mediation models using Generalized Structural Equation modeling. The models are formulated as follows:

$$LS_{ij} = \alpha_0 + \alpha_1 SJB_i + \alpha_2 Aversion_i + \alpha_3 RED_i + \alpha_4 Z_i + \alpha_5 C_j + e_{ij} \quad (1)$$

$$log\left(\frac{P[Aversion_{ij}=1]}{1-P[Aversion_{ij}=1]}\right) = \beta_0 + \beta_1 SJB_i + \beta_2 Z_i + \beta_3 C_j + e_{ij} \quad (2)$$

$$log\left(\frac{P[RED_{ij}=1]}{1-P[RED_{ij}=1]}\right) = \gamma_0 + \gamma_1 SJB_i + \gamma_2 Aversion_i + \gamma_3 Z_i + \gamma_4 C_j + e_{ij} \quad (3)$$

where subscript i is for individual and j for country where individual i lives. LS denotes life satisfaction. SJB represents system justifying belief, $Aversion$ inequality aversion, and RED support for redistribution. Z is a set of individual socio-demographic characteristics: age and age squared, gender, number of household members, legal marital status, religion, education, household's income and mean income group. e is the error term. C is a set for country dummies.

4.3.3. Expected effects

We summarize the expected effects for all coefficients (the direct and indirect effects) in Table 1.

[13] In response to the question 'Top 10% full-time employees in country, earning more than [amount], how fair'.
[14] In response to the question 'Bottom 10% full-time employees in country, earning less than [amount], how fair'.

Table 1: Summary of expected effects of the direct and indirect effects

Coefficient	Direct effect of	Expected sign
α_1	SJB on LS	(+)
β_1	SJB on Aversion	(-)
γ_1	SJB on RED	(-)
α_2	Aversion on LS	(-)
α_3	RED on LS	(-)
γ_2	Aversion on RED	(+)
	Indirect effect of	
$\beta_1 * \gamma_2$	SJB on RED via Aversion	(-)
$\beta_1 * \alpha_2$	SJB on LS via Aversion	(+)
$\gamma_1 * \alpha_3$	SJB on LS via RED	(+)
$\beta_1 * \gamma_2 * \alpha_3$	SJB on LS via Aversion and RED	(+)
$\gamma_2 * \alpha_3$	Aversion on LS via RED	(-)

.

In terms of models 1, 2 and 3, we posit that the adoption of SJB (hypothesis 1) would translate into a positive sign for α_1. In addition, individuals who justify the system would be less averse to inequality and would exhibit a low RED (negative signs for β_1 and γ_1). Then, those who are less averse to inequality and tend not to support redistribution would also be more satisfied with life.

In the absence of inequality-justifying beliefs, individuals' psychological relational, existential, and epistemic needs would be violated. This in, turn, would treat the social certainty and stability, and accordingly it would arouse the negative emotional side of the social evaluations of inequalities, such as the feelings of insecurity, distaste, envy, anxiety, and social discord, thereby leading to a decline in LS. Therefore, we predict a negative sign for α_2 and α_3. The existing literature also suggests that when societal inequalities are perceived as unfair (inequality aversion), people tend to show greater support for redistribution ($\gamma_2 > 0$) (Bjørnskov et al., 2013).

Based on previous relationships, we propose a set of interrelated hypotheses. SJB is expected to have similar indirect effects on LS via Aversion or RED that would exacerbate the direct positive effect of SJB on LS. In the same manner, the indirect effect of SJB on RED through Aversion would also reinforce the direct negative effect of SJB on RED. Finally, the indirect effect of Aversion on LS through RED would also reinforce the direct negative effect of Aversion on LS.

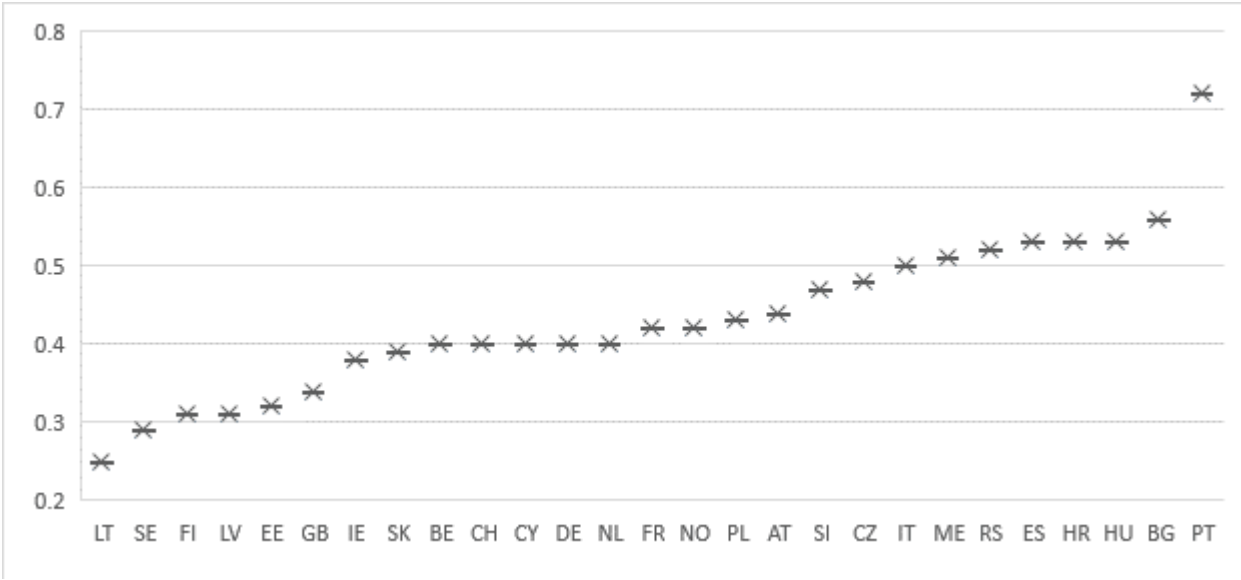
4.3.4. Intergenerational mobility

System justification theory suggests that the consequences of the palliative function for LS would be more salient in countries where social disparities are high (Jost and Hunyady, 2002). Thus, we predict hypotheses 1 & 2 to be stronger in countries with high social disparities, that is, coefficients of models 1, 2 and 3 to be larger for this sample. To capture whether the country has higher or lower social disparities, we include the intergenerational mobility level for each country of our sample. Indeed, lower (higher) intergenerational mobility is associated with higher (lower) inequality of opportunity (WB, 2018). Thus, people living in nations with low mobility level have higher unequal chances to climb the social ladder across generations. Thus, the level of mobility across generations can serve the proxy for social disparity within countries.

In this study, we classify countries according to their intergenerational mobility level (low vs. high). The data were taken from the Global Database on Intergenerational Mobility, which contains comparable cross-country data on intergenerational mobility and covers 148 countries for the cohorts born between 1940 and 1989. However, the database offers a very limited coverage of income mobility across generations compared to the wider coverage of educational mobility variables. Thus, we classify countries using intergenerational persistence in education (children's years of education compared to parents' years of education), with a higher score indicating a higher intergenerational persistence and, hence, a lower mobility across generations.

Intergenerational persistence in education is provided for 5 different generations, born respectively in the 1940s, 1950s, 1960, 1970s, and 1980s. We use the average of these five values where the higher the average indicates the lower mobility across generations. Figure 1 shows that Portugal, Bulgaria and Hungary have the lowest intergenerational mobility level, whereas Lithuania, Sweden, Finland and Latvia have the highest intergenerational mobility level.

Figure 1: Average intergenerational persistence in education

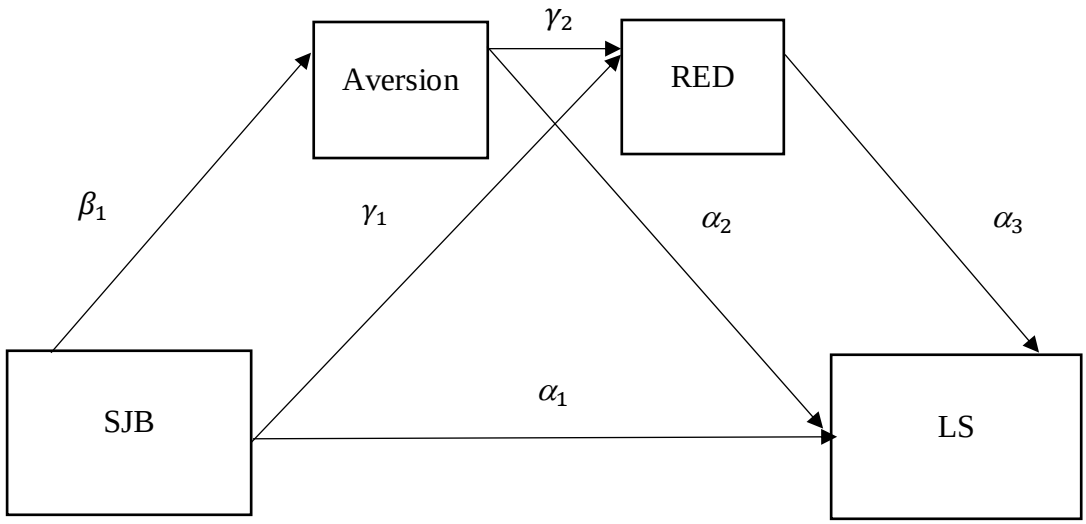


Source: Global Database on Intergenerational Mobility

4.4. Results' Analysis

As stated before, we conduct a mediation analysis to test the direct and indirect effects (through Aversion and RED) of SJB on LS (model 1). Additionally, we test the magnitude of the two mediators (Aversion and RED) separately (models 2 and 3) (see figure 2 for the conceptual framework). The coefficients of the main variables of each of the three models are reported in table 2 for the whole sample, while table 3 (respectively table 4) presents the estimates for the countries with low (respectively high) intergenerational mobility level. We first comment the results of models 2 and 3 that gather the role of SJB in explaining respectively Aversion and RED. Indeed, if these relationships were not significant, no indirect effects of SJB on LS would be expected. We then, in a second step, shed light on the direct and indirect effects of SJB on LS.

Figure 2: Conceptual Framework of Mediation Models



4.4.1. Explaining Aversion and RED

As a first step, we discuss the determinants of Aversion and RED. Prior to turning to the analysis of the main results, we firstly comment the results for the control variables (available in the appendix, table 4A for the whole sample). Marital status does not generally play a significant role in explaining Aversion and RED. Followers of Christian denominations show lower support for redistribution than non-denominational individuals do. We also observe that eldest people bolster redistribution. Males are less inequality averse and exhibit lower RED than females. The

results further reveal that Aversion and RED diminish as income and educational levels increase.

4.4.1.1. Direct and Indirect Effects

Results in model 3 of table 2 clearly corroborate our predictions regarding the effects of Aversion and SJB on RED by which aversion is positively associated with RED (γ_2) and SJB (γ_1) is negatively associated with RED. Thus, subjects with high inequality aversion have higher support for redistribution, whereas those with high system justifying belief oppose government intervention. We also find, as expected, a negative nexus between SJB and aversion (β_1) in model 2, indicating that subjects with high system justification beliefs are less inequality averse.

The results also reveal a negative indirect effect of SJB on RED through Aversion ($\beta_1 * \gamma_2$=-0.009) (in model 3, table 2). This finding provides support for our prediction that high system justifying beliefs diminish the negative emotional responses to disparities and, in turn, decline support for redistribution. However, the quantitative impact of the indirect effect is much lower than expected and constitutes a very small part of the total effect ((-0.009/-0.069)*100=13.04%).

These findings confirm the argument that system justification elicits less negative emotions toward disparities, while inequality aversion enhances these emotions. They are also in line with the view that support for redistribution is mainly determined by how fair people see inequalities.

4.4.1.2. Low versus High mobility countries

The previous findings are confirmed for both subsamples presented in column 1 of tables 3 and 4, with the exception of the non-significant effect of SJB on RED in table 3. We observe that Aversion leads to a higher RED in high mobility countries (γ_2=0.144, 95% CI=(0.126, 0.163)) than in low mobility countries (γ_2=0.071; 95% CI=(0.049, 0.092)). This finding, in some sense, is in line with others arguing that perceived mobility and economic reality may not certainly match (Alesina et al., 2018). Indeed, people may underrate the actual mobility level of their society, which makes them less optimistic about its mobility and more averse to inequality, leading them to exhibit higher support for government intervention to decline social inequalities.

The previous result for the mediation effect is confirmed for the two subsamples: models 3 in table 3 ($\beta_1 * \gamma_2$=-0.005) and table 4 ($\beta_1 * \gamma_2$=-0.008). We observe that the mediation effect has a higher contribution to the total effect of SJB on RED in low mobility countries than in high mobility countries. In model 3 (table 3), the indirect effect accounts for 29.41% of the total effect

((-0.005/-0.017)*100), while in model 3 (table 4), the indirect effect accounts only for 9.41% of the total effect ((-0.008/-0.085)*100). However, the results for the indirect effects do not provide support for our prediction that SJB would lead to a lower RED in low mobility countries than in high mobility countries due to the non-significant difference between the two groups (for low mobility countries: CI=(-0.010, -0.002), while for high mobility countries: CI=(-0.013, -0.004)).

Table 2: The whole sample

	Direct effects	**Indirect effects via aversion**	**Indirect effects via RED**	**Indirect effects via aversion and RED**	**Total effects**
Model 1: LS as function of SJB, Aversion and RED					
Pathway	α_1	$\beta_1 * \alpha_2$	$\gamma_1 * \alpha_3$	$\beta_1 * \gamma_2 * \alpha_3$	
SJB	0.386*** (0.000)	0.006** (0.010)	0.016*** (0.000)	0.002*** (0.000)	0.410*** (0.000)
Pathway	α_2		$\gamma_2 * \alpha_3$		
Aversion	-0.102*** (0.005)		-0.030*** (0.000)		-0.132*** (0.000)
Pathway	α_3				
RED	-0.232*** (0.000)				-0.232*** (0.000)
Model 2: Aversion as function of SJB					
Pathway	β_1				
SJB	-0.063*** (0.000)				-0.063*** (0.000)
Model 3: RED as function of SJB and Aversion					
Pathway	γ_1	$\beta_1 * \gamma_2$			
SJB	-0.061*** (0.000)	-0.009*** (0.000)			-0.069*** (0.000)
Pathway	γ_2				
Aversion	0.124*** (0.000)				0.124*** (0.000)
Number of countries	27				
Number of observations	30900				

*** p < 0.01, ** p < 0.05, * p < 0.1.

Table 3: Low intergenerational mobility countries

	Direct effects	Indirect effects via aversion	Indirect effects via RED	Indirect effects via aversion and RED	Total effects
Model 1: LS as function of SJB, Aversion and RED					
Pathway	α_1	$\beta_1 * \alpha_2$	$\gamma_1 * \alpha_3$	$\beta_1 * \gamma_2 * \alpha_3$	
SJB	0.442***	0.003	0.007	0.002**	0.451***
	(0.000)	(0.599)	(0.296)	(0.002)	(0.000)
Pathway	α_2		$\gamma_2 * \alpha_3$		
Aversion	- 0.032		-0.026***		-0.059***
	(0.597)		(0.000)		(0.002)
Pathway	α_3				
RED	-0.367***				-0.367***
	(0.000)				(0.000)
Model 2: Aversion as function of SJB					
Pathway	β_1				
SJB	-0.078***				-0.078***
	(0.000)				(0.000)
Model 3: RED as function of SJB and Aversion					
Pathway	γ_1	$\beta_1 * \gamma_2$			
SJB	-0.012	-0.005***			-0.018***
	(0.286)	(0.000)			(0.003)
Pathway	γ_2				
Aversion	0.078***				0.078***
	(0.000)				(0.000)
Number of countries	10				
Number of observations	10230				

*** p < 0.01, ** p < 0.05, * p < 0.1.

Table 4: High intergenerational mobility countries

	Direct effects	Indirect effects via aversion	Indirect effects via RED	Indirect effects via aversion and RED	Total effects
Model 1: LS as function of SJB, Aversion and RED					
Pathway	α_1	$\beta_1 * \alpha_2$	$\gamma_1 * \alpha_3$	$\beta_1 * \gamma_2 * \alpha_3$	
SJB	0.366***	0.007**	0.018***	0.002***	0.391***
	(0.000)	(0.015)	(0.000)	(0.001)	(0.000)
Pathway	α_2		$\gamma_2 * \alpha_3$		
Aversion	-0.125***		-0.032***		-0.156***
	(0.005)		(0.000)		(0.000)
Pathway	α_3				
RED	-0.211***				-0.211***
	(0.000)				(0.000)
Model 2: Aversion as function of SJB					
Pathway	β_1				
SJB	-0.056***				-0.056***
	(0.000)				(0.000)
Model 3: RED as function of SJB and Aversion					
Pathway	γ_1	$\beta_1 * \gamma_2$			
SJB	-0.077***	-0.008***			-0.085***
	(0.000)	(0.000)			(0.000)
Pathway	γ_2				
Aversion	0.144***				0.144***
	(0.000)				(0.000)
Number of countries	17				
Number of observations	20670				

*** p < 0.01, ** p < 0.05, * p < 0.1.

4.4.2. Explaining LS

The results for the individual characteristics explaining LS follow the standard in the literature (see model 1 in table 4A). Age exhibits a U-shaped pattern with LS. Being divorced, widowed, and single decreases LS. Adherence to religious denominations does not play a significant role in LS, but, on average, subjects who are Roman Catholic and Protestant register higher level of life satisfaction than people with no religion denomination do. The results further show that higher education level, higher income level, and higher mean income are associated with increased LS. Hence, the demographic characteristics of individuals significantly affect their LS.

4.4.2.1. Direct and indirect effects of SJB on LS

The results for model 1 in table 2 are clearly in line with our predictions. Those with high system justifying belief are more satisfied with their lives (α_1=0.386). In contrast, we find that Aversion and RED exerts a negative effect on LS (α_2=-0.102; α_3=-0.232). That is, subjects with high inequality aversion and with high support for redistribution are less satisfied with their lives. The

results for the indirect effects on LS highlight the importance of the emotional responses to disparities, as hypothesized. Specifically, we find a positive indirect effect of SJB on LS via RED ($\gamma_1 * \alpha_3$=0.016) or via Aversion ($\beta_1 * \alpha_2$=0.006), and via both Aversion and RED ($\beta_1 * \gamma_2 * \alpha_3$=0.002), as expected. This implies that high system justification yields a lower Aversion and a lower RED, which, in turn, has a positive impact on LS. However, the quantitative indirect impacts of SJB on LS are much lower than expected. The results also indicate that aversion has a negative indirect effect on LS via RED ($\gamma_2 * \alpha_3$=-0.030). Thus, higher aversion is positively associated with RED and the latter is negatively associated with LS.

Overall, the indirect effects do not largely contribute to the total effects of SJB on LS (including all vias), accounting only for 5.36% of the total effects ((0.022/0.410)*100), whereas the indirect effect of Aversion on LS via RED accounts for 22.73% of the total effect ((-0.030/-0.132)*100).

These findings indicate that preferences for inequalities and perceived legitimacy of outcomes and procedure are the consequence of such emotions that, in turn, contribute to one's sense of satisfaction with life. As such, negative emotions are promoted when inequalities are perceived as unfair, i.e. feelings of insecurity, threat, uncertainty and distaste, while positive emotions are boosted when social inequalities are justified, i.e. people largely get what they really do deserve.

4.4.2.2. Low versus High mobility's countries

Overall, the direct link between SJB and LS is confirmed for both subsamples (tables 3 and 4) and the indirect effects reinforce the direct effects in a similar manner in both type of countries.

However, the results do not lend support for our prediction that SJB would have a higher positive impact on LS for low mobility countries than for high mobility countries since the difference between the two groups is not statistically significant (α_1=0.442; 95% CI=(0.320, 0.564) for low mobility countries, while α_1=0.366; 95% CI=0.278, 0.454 for high mobility countries). The mediation effect of SJB on LS through RED is only confirmed for high mobility nations (model 1, table 4) ($\gamma_1 * \alpha_3$ =0.018) and accounts only for 4.60% ((0.018/0.391)*100) of the total effect.

Regarding the indirect effect of Aversion on LS via RED, the results are confirmed for both subsamples (tables 3 and 4), but the difference between them is not significant (for low mobility countries: $\gamma_2 * \alpha_3$=-0.026; CI=(-0.048, -0.011), and for high mobility countries: $\gamma_2 * \alpha_3$=-0.032,

CI=(-0.051, -0.016)). The indirect effects accounts for 44.07% ((-0.026/-0.059)*100) of the total effect for low mobility nations, and for 20.51% ((-0.032/-0.156)*100) for high mobility nations.

We also observe a higher negative impact of RED on LS in low mobility countries (α_3=-0.367; 95% CI=(-0.491, -0.244)) than in high mobility countries (α_3=-0.211; 95% CI=(0.-288, -0.134)). The structural nature of low mobility societies already provides people unequal chances to succeed, which is closely connected with high emotional arousal to reach more equal outcomes.

4.5. Conclusion and discussion

This study uses the ninth wave of the European Social Survey, conducted in 2018 and covering 30.900 individuals residing in 27 European countries. By using mediation models (Structural Equations Modelling), we propose a novel manner to identify how and why system justification is associated with increased LS. The results confirm the view that subjective attitudes toward inequality are important determinants of individuals' LS, and of their tendency to support redistributive policies. In particular, results for the direct effects show that individuals with high inequality aversion exhibit higher support for redistribution and are less satisfied with their lives. Conversely, those who justify the system oppose government intervention and are less inequality averse and more satisfied with their lives. Additionally, the positive direct effect of inequality-justifying beliefs on life satisfaction is reinforced by the indirect effect via inequality aversion and support for redistribution. However, the contribution of the indirect effects to the total effects is rather small. Finally, the results do not give support for our prediction that system justification would be stronger in nations where the level of intergenerational mobility is low rather than high.

Taken as a whole, our findings are in line with hypotheses 1 and 2, insofar, as they reveal a positive impact on human subjective wellbeing. Hence, the 'palliative function' hypothesis holds for Europe. Thus far, these findings suggest that the adoption of inequality justifying beliefs serves as a palliative function that reduces moral outrage, elicits less negative emotions toward inequality between social groups, and promotes one's satisfaction concerning her/his own outcomes and life in general. Hence, people's psychological needs are fulfilled. The findings also indicate that the beliefs that justify and legalize the prevailing social arrangements oppose social change, even if this change would bring positive social outcomes. This can be manifested through the decline in individuals' support for redistribution. Thus, people are closely aligned to preferences for system justification and refusal of system-challenging biases. That is, system justification promotes individuals' satisfaction with the existing social arrangements and life in general. This is because it fulfills their relational, existential and epistemic needs, provides a psychological buffer against the hurtful effect of inequality and weakens uncertain social change.

The small indirect effects of the mechanism that explains how and why system justification is associated with increased LS may be influenced by other important composition effects, which deserve further inquiries. Indeed, justifying social disparities may possibly lead to potential

conflicts with ego and group justification motives. The psychological inclination to justify the prevailing social arrangements with fairness and legitimacy may become at the cost of the individual enhancement or collective self-interest and hence it does not always lead to positive affect (Jost, 2019; Jost et al., 2019; Jost and Hunyady, 2002). That is, system justification may bring ambivalence, depression and neuroticism. Furthermore, a number of additional concerns may be derived regarding the motive for system justification, self- and group-interest, and human wellbeing. That is to say, the psychological effect of system justification on LS also depends on the extent to which people perceive that they get equal benefits from the prevailing social arrangements. In other words, engaging in system justification may produce winners and losers, if people see that the benefits are equally distributed among them (winners) or if they see that the benefits are not equally distributed among them (losers), thereby creating the potential for the conflicts between the self- and the group-interest, and the prevailing status quo (Jost et al., 2001).

To conclude, this study addresses some important points regarding system justification theory, namely the direct and indirect psychological link between system justification and LS in a European context. Prior works on system justification and subjective wellbeing have employed different methodologies. For instance, Sengupta et al. (2017) and Vargas-Salfate et al. (2018) tested the contextual role of income inequality in the link between system justification and subjective wellbeing, while Goudarzi et al. (2020) and Wakslak et al. (2007) examined the consequences of system justification in a subjective manner. In this study, we use subjective attitudes toward inequality, including inequality-justifying beliefs, inequality aversion, and support for redistribution, to see how system justification relates to life satisfaction. In particular, this study follows the recent arguments suggested by other authors regarding the consequences of inequality for satisfaction with life—the impact on LS is better identified when accounting for the subjective attitudes toward inequality rather than for the direct consequences of (real) inequality measures (see Schneider, 2016). Furthermore, this study differs from other works in the representativeness of the sample (30.900 persons residing in 27 European countries) and by identifying how the indirect link between system justification, inequality aversion, support for redistribution, and life satisfaction operates. We find evidence for the palliative function in Europe directly and indirectly, but the stronger influence of the palliative function in less egalitarian societies is not confirmed. This may be explained by the fact that intergenerational mobility is relatively high in Europe and the variation is not sufficiently high to conclude. The

general conclusion of this study is that adherence to system justification helps people coexist with unequal social systems and reap the most psychological gains from justifying the status quo.

The palliative function of system justification and its psychological consequences for subjective wellbeing deserve further investigation. In this regard, some dimensions for future research should be noted. First, it would be interesting to deep in the role of individuals' socioeconomic status and of their perceptions of the benefits from the prevailing social arrangements. It may be the case that some individuals with high social status perceive that they do not benefit from the status quo, while others with low status may consider that they do not benefit from the status quo. Second, another interesting area of research could be to account for regional differences within countries. In other words, it would be interesting to test whether the palliative function holds among different regions within the same country. Third, future research could also include different aspects and measures of psychological human welfare, i.e. self-esteem and neuroticism**.**

Appendix A

Table A1: Summary statistics

Variable	Mean	Standard Deviation	Min	Max
LS: Life satisfaction	7.139	2.131	0	10
SJB: System justifying belief	0.365	0.481	0	1
RED: Support for redistribution	0.756	0.430	0	1
Aversion	0.469	0.499	0	1
Age	50.003	17.131	15	90
Gender				
Female	0.522	0.500	0	1
Male	0.477	0.500	0	1
Number of household members	2.573	1.336	1	15
Legal marital status				
Legally married	0.504	0.500	0	1
In a legally registered civil union	0.010	0.099	0	1
Legally separated	0.014	0.116	0	1
Legally divorced/Civil union dissolved	0.098	0.297	0	1
Widowed/Civil partner died	0.08	0.271	0	1
None of these (NEVER married or in legally registered civil union)	0.295	0.456	0	1
Religion				
No religion	0.420	0.494	0	1
Roman Catholic	0.318	0.466	0	1
Protestant	0.108	0.310	0	1
Eastern Orthodox	0.104	0.305	0	1
Other Christian denomination	0.013	0.111	0	1
Jewish	0.001	0.027	0	1
Islamic	0.030	0.170	0	1
Eastern religions	0.004	0.066	0	1
Other non-Christian religions	0.003	0.055	0	1
Education				
Low education	0.209	0.406	0	1
Middle education	0.541	0.498	0	1
High education	0.250	0.433	0	1
Household's income				
Low income	0.407	0.491	0	1
Middle income	0.320	0.467	0	1
High income	0.273	0.445	0	1
Mean income group				
1st group	0.424	0.494	0	1
2nd group	0.241	0.428	0	1
3rd group	0.335	0.472	0	1

Table A2: List of countries and their intergenerational mobility standing

Country	Country code	Cohorts average*	Standing
Austria	AT	0.44	High
Belgium	BE	0.40	High
Britain	GB	0.34	High
Bulgaria	BG	0.56	Low
Cyprus	CY	0.40	High
Czechia	CZ	0.48	Low
Germany	DE	0.40	High
Estonia	EE	0.32	High
Spain	ES	0.53	Low
Finland	FI	0.31	High
France	FR	0.42	High
Croatia	HR	0.53	Low
Hungary	HU	0.53	Low
Ireland	IE	0.38	High
Italy	IT	0.50	Low
Lithuania	LT	0.25	High
Latvia	LV	0.31	High
Montenegro	ME	0.51	Low
Netherlands	NL	0.40	High
Norway	NO	0.42	High
Poland	PL	0.43	High
Portugal	PT	0.72	Low
Serbia	RS	0.52	Low
Sweden	SE	0.29	High
Slovakia	SK	0.39	High
Slovenia	SI	0.47	Low
Switzerland	CH	0.40	High

* Cohort is the average of intergenerational persistence in education for the cohorts born between 1940 and 1989.

Table 3A: Variables coding

Variable	Coding
LS: Life satisfaction	Continuous variable related to how the respondent is satisfied with her/ his life as a whole
SJB: System justifying belief	Dummy that takes value '1' for answers in [0;2] (agree) for the question 'By and large, people get what they deserve', and '0' for answers in [3;5] (disagree)
RED: Support for redistribution	Dummy that takes value '1' for answers in [0;2] (agree) on the question 'Government should reduce differences in income levels', and '0' for answers in [3;5] (disagree)
Aversion: Inequality aversion	Dummy that takes value '1' for answers in [1; +4] (agree) on the question 'Top 10% full-time employees in country, earning more than [amount], how fair', and '0' for answers in [-4; 0] (disagree)
Age	Age of respondents
Gender	Dummy that takes value '1' if respondents are male.
Number of household members	Continuous variable related to the number of people living regularly as member of household
Legal marital status	6 dummies that take value '1' for, respectively: Legally married, in a legally registered civil partnership, legally separated, legally divorced / civil partnership dissolved, widowed / civil partner died, and none of these (NEVER married or in legally registered civil partnership); with the reference group being 'Legally married'
Religion	9 dummies that take value '1' for, respectively: No religion, Roman Catholic, Protestant, Eastern Orthodox, other Christian denomination, Jewish, Islamic, Eastern religions, and other non-Christian religions; with the reference being 'No religion'
Education	3 dummies that take value '1' if Education is respectively : LOW (less than lower secondary and lower secondary), MIDDLE (lower tier upper secondary, upper tier upper secondary, and advanced vocational, sub-degree), and HIGH (lower tertiary education, BA level and higher tertiary education, >= MA level; with the reference group being "LOW EDUCATION"
Household's income	3 dummies that take value '1' if Household's total net income is respectively in the lowest (first), intermediate (second) or highest (third) income quartile.
Mean income group	The mean (actual) income of the ones who are in similar age cohort (5 years younger and 5 years older), have the same education level, and live in the same country

Table 4A: Individual variables as determinants of LS, Aversion, and RED (the whole sample)

Variables	Model 1 (LS)	Model 2 (Aversion)	Model 3 (RED)
Age	-0.089***	0.009	0.018
	(0.000)	(0.238)	(0.052)
Age²	0.001***	-0.000	-0.000
	(0.000)	(0.240)	(0.198)
Gender			
Female	Ref.	Ref.	Ref.
Male	-0.076*	-0.118**	-0.225***
	(0.032)	(0.002)	(0.000)
Number of household members	-0.006	0.028	0.011
	(0.745)	(0.122)	(0.592)
Legal marital status			
Legally married	Ref.	Ref.	Ref.
In a legally registered civil union	-0.037	0.200	0.261
	(0.801)	(0.233)	(0.209)
Legally separated	-0.347*	-0.070	-0.158
	(0.027)	(0.650)	(0.403)
Legally divorced/Civil union dissolved	-0.467***	-0.073	-0.074
	(0.000)	(0.299)	(0.385)
Widowed/Civil partner died	-0.560***	0.052	-0.109
	(0.000)	(0.530)	(0.310)
None of these	-0.455***	0.061	0.054
	(0.000)	(0.291)	(0.427)
Religion			
No religion	Ref.	Ref.	Ref.
Roman Catholic	0.113*	-0.059	-0.192**
	(0.015)	(0.231)	(0.002)
Protestant	0.192***	-0.060	-0.240***
	(0.001)	(0.364)	(0.001)
Eastern Orthodox	-0.085	-0.219	-0.308
	(0.481)	(0.088)	(0.075)
Other Christian denomination	0.046	-0.387*	-0.387*
	(0.775)	(0.014)	(0.030)
Jewish	0.344	-1.118	-0.818
	(0.497)	(0.188)	(0.236)
Islamic	-0.156	-0.355**	-0.153
	(0.247)	(0.006)	(0.306)
Eastern religious	-0.113	-0.295	-0.401
	(0.675)	(0.284)	(0.174)

Variables	Model 1 (LS)	Model 2 (Aversion)	Model 3 (RED)
Other non-Christian religions	-0.208	-0.208	-0.140
	(0.547)	(0.536)	(0.692)
Education			
Low education	Ref.	Ref.	Ref.
Middle education	0.139**	-0.163**	-0.178***
	(0.007)	(0.002)	(0.007)
High education	0.275***	-0.397***	-0.417***
	(0.000)	(0.000)	(0.000)
Household's income			
Low income	Ref.	Ref.	Ref.
Middle income	0.491***	-0.215***	-0.145*
	(0.000)	(0.000)	(0.013)
High income	0.778***	-0.599***	-0.534***
	(0.000)	(0.000)	(0.000)
Mean income group			
1st group	Ref.	Ref.	Ref.
2nd group	0.145*	-0.145*	0.012
	(0.014)	(0.018)	(0.882)
3rd group	0.217**	-0.120	-0.038
	(0.006)	(0.141)	(0.712)
Number of countries	27	27	27
Number of observations	30900	30900	30900

Chapter 5: Conclusion and Future Research

5.1. Trade and Income Inequality in Latin America

In general, income inequality in Latin America is considerably influenced by its comparative advantage in the production of natural resource-based commodities. More precisely, the impact of trade on inequality in the region is driven by the export channel (the export of primary goods) rather than by the import channel. Hence, the region's trade openness has led to an increase in the real return to the natural resource-based commodities and in the demand for unskilled labours. Surprisingly, trade in high-skill intensive goods (intermediate and equipment goods) does not play any significant role in determining income inequality. This finding is at odds with the theories suggesting that trade in high-skill intensive goods would increase income inequality, as these goods promotes technological progress, competiveness and efficiency. In fact, composition trade in this region is still highly dominated by primary commodities, which may explain why trade in skill-intensive goods does not play significant role in income inequality. In other words, in the case of natural resource-based commodities countries, opening up to global economy hinders their movement toward relatively high skill-intensive activities and enhances traditional patterns of production. Taken as whole, these findings indicate that the trade-inequality link is affected by how countries are integrated into the global economic system.

5.2. Income Inequality and Life Satisfaction in Low- and Middle-Income Countries

Inequality exert significant effects per se on life satisfaction in Low- and Middle-Income Countries and this is effect is positive. This apparently counterintuitive result is clarified once we control for the possibilities individuals have within their countries to achieve their potential. In line with this notion, as the level of opportunity heightens, income inequality becomes irrelevant for life satisfaction, regardless the level of inequality, while income inequality exerts harmful effects when the level of opportunity is low. These findings provide critical insights regarding human welfare in low- and middle-income countries. For instance, the social and political systems play an important role in enhancing people's life satisfaction. When people are granted the possibility to take their chances, they become more satisfied with their lives. That is, the relatively stable political and social structures and existential social security, i.e. access to education, personal rights, and personal freedom and choice, pave the way for people to achieve

their potential and to meet their expectations, thereby making societal inequality an indication that these changes are possible and hence enhancing life satisfaction. This, in turn, explains why people living in less egalitarian countries are more satisfied with their lives. On the other hand, in the societies with lower levels of opportunities, societal inequality becomes more salient, hence leading to a negative impact on people's life satisfaction.

5.3. The Palliative Function of System justification in Europe

In general, the findings underline the pivotal role of subjective attitudes towards inequality (inequality aversion, system justifying beliefs and support for redistribution) in explaining life satisfaction. The main conclusion of this essay is that system justification helps people coexist with unequal social arrangements and reap the most psychological gains from justifying the *status quo*. This can be evident through the positive impact of system justification on satisfaction with life. Indeed, rationalizing and justifying the unequal social arrangements operate as the palliative function that declines anxiety, depression and neuroticism, and promote the psychological wellbeing of people. This implies that inequality-justifying beliefs help people live within unequal systems. Inequality justifiers also oppose social change (the tendency not to support redistributive policies), even if this change would lead to positive social outcomes. Overall, people are closely aligned to preferences for system justification and refusal of system-challenging biases. This is because it fulfills their relational, existential and epistemic needs, serves a buffer against the hurtful effect of social disparity, and weakens uncertain social change.

5.4. Future Research

This doctoral dissertation investigates different causes of income inequality focusing especially on trade and different channels through which income inequality affect individuals' wellbeing. Regarding the effect of trade on income inequality, the essay could be extended along several dimensions. A first line of enquiry would be to account for the role of government policies in the distribution of income. In particular, it is important to test the impact of the redistributive function via taxes and cash transfers, as well as other social spending categories, i.e. education and health, on income inequality. However, as most studies, this approach is limited by the limited availability of data for a wide range of countries. A second line of enquiry would be to investigate the impact of financial integration, i.e. sectoral FDI, on income inequality. The distributional impacts of the sectoral FDI is expected to vary, depending on the skill intensity of each sector and on the competition between foreign capital and local capital. Again, the empirical examination of the distributional impacts of the sectoral FDI is complicated due to lack of data but the access to data evolves quickly, so it could quickly change in next years. A third area for future research would be to delve into the role of high-skill intensive goods. We find a non-significant role of these goods in income inequality, but still there is room for improvements through determining the skill intensity used in the production of these goods. Finally, it would be interesting to enlarge the sample size in order to test the essay's findings in the context of countries with a different pattern in terms of specialization.

Regarding the second essay 'income inequality on life satisfaction', further work is needed to explore the soundness of our results in a more comprehensive panel. Indeed, dynamic patterns may be crucial in emerging countries where social conditions, including opportunities, evolve quickly, while income inequality may temporarily increase. Another limitation of our study is that our data do not allow us to assess predictions at more local levels, which certainly deserves further investigation. Another promising area of future research is to investigate how the broader access to information, facilitated by internet access, shapes the perception of inequality. Indeed, there are several globalization aspects that make comparisons easier and accelerate convergence.

Concerning the palliative function and life satisfaction, first, it would be interesting to account for individuals' socioeconomic status and for individuals' perceptions of their benefits from the prevailing system. For instance, an individual with high social status may perceive that she does

not benefit from the *status quo*, while another person with low social status perceive that she does benefit from the *status quo*. Second, future research should explore the regional differences within countries. In other words, it would be interesting to test whether the palliative function holds similarly among different regions within the same country. Third, alternative aspects and measures of psychological welfare, such as self-esteem and neuroticisms, certainly deserve further investigation that would nicely complement the present study.

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