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Informality and Inclusive Growth in Latin America: The Case of Colombia



Fedesarrollo (Center for Economic and Social Research)
Colombia

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SUMMARY

The purpose of this research is to understand the impact of informality on inclusive growth in Latin America, and particularly in Colombia. The relationship between informality and inclusive growth is represented by two different hypotheses. According to the traditional view, informality constrains inclusive growth by restricting growth of the formal sector, draining resources from the public treasury and supplying low quality jobs that are unable to provide adequate conditions for a better standard of living. However, from another point of view, informality is a default alternative to unemployment, particularly among poorly educated individuals; a perspective that is rarely taken into account in Latin America.

The case study of Colombia is relevant to the region, not only because Colombia demonstrates regional averages in terms of informality and inclusive growth, but also because the informal sector is highly heterogeneous and this allows for simultaneous testing of both hypotheses. Another interesting feature of Colombia is that it is one of the few countries that have implemented an active policy to reduce informality in recent years. As such, it is expected that the experience of Colombia will provide useful insight for countries facing formal labour market restrictions such as Argentina, Brazil and Costa Rica. Notwithstanding, the impact of any policy will vary depending on the specific characteristics of informality in each country.

The analysis of the relationship between informality and inclusive growth has been understudied in general, perhaps because of the multiple channels that intervene in this relationship, as well as the lack of a consensus around the definition of both variables. For the purpose of this paper, we understand informality as those jobs or firms that are not regulated and/or do not contribute to public funds; and inclusive growth as growth accompanied by poverty reductions and equal opportunities for all segments of the population. Given this concept is rather broad, we have defined a set of inclusive growth indicators relating to the labour market as: employment, labour earnings, income distribution across different population groups, labour satisfaction, job stability and productivity. Exploring the way these variables impact inclusive growth is beyond the scope of this project. However, we have included in the literature review an assessment of evidence concerning the macroeconomic impact of informality, given the amount of externalities that tend to arise from individual labour decisions.

One of the main conclusions of this paper is that an analysis of informality cannot be performed assuming that informal workers are a mass of individuals with similar characteristics. In fact, in Latin America informal workers range from poorly educated individuals including women heads of household and the older population, to highly educated young adults living in productive cities. This finding corroborates new literature which points to heterogeneity in labour markets in terms of the coexistence of three types of informal workers: the 'structural' informal worker, for whom informality represents a default option to unemployment due to poor education, skills or experience; the 'induced' informal worker who is segmented from the formal labour market due to high entry restrictions or to less obvious restrictions, such as segregation; and, finally, the 'voluntary' informal worker who chooses to be informal.

The relationship between informality and inclusive growth is very different between these three groups. In terms of 'structural informality', informality represents a default option to unemployment and, as such, it is difficult to argue against the idea that among this group informality promotes inclusive growth. In contrast, 'induced informality' may constrain inclusive growth because labour market barriers prevent a population group from obtaining higher benefits and work stability available in the formal market. And, finally, 'voluntary informality', might be viewed as beneficial at an individual level, but not at an aggregate level because individuals and/or firms restrict themselves to operating in a less

productive environment in order to obtain certain 'free-rider' benefits. In any case, it cannot be ignored that informality negatively impacts inclusive growth at a macroeconomic level. Existing literature supports the view that informality lowers productivity, erodes the tax base, reduces productivity, produces unfair competition with the formal sector and increases corruption in Latin America.

The present analysis leads to important policy recommendations that are relevant not only in Colombia but in most developing countries. Although this research does not analyse policies implemented to address informality in detail, some lessons can be drawn from the literature review relating to the appropriateness of different approaches for targeting different groups of informal workers. While some informal workers might benefit from the removal of barriers to formal employment or affirmative action, structural informality must be tackled with different kinds of policy, such as improving access to education and flexible pension systems. Similarly, in the case of voluntary informality, monitoring and controlling informal professionals might be effective, whereas the same approach applied to structural informality might produce a negative impact on inclusive growth.

In December 2012, the Colombian government reformed the tax law by reducing payroll taxes from 29.5% to 16%. Our estimations show that this reform led to a one-off significant but moderate reduction in informality among the target population of about 7 percentage points, after controlling for some observable and unobservable variables. However, some of this reduction was the result of formal workers with flexible work becoming fully formal workers earning a minimum wage. We also found that the reform was even more effective among those workers with secondary education or less, showing that the impact of policies oriented towards reducing barriers to informality is not restricted to the higher tier of informal workers. This experience is of value for countries with high payroll taxes as well as high and enforced minimum wages.



Photo: [City View of Bogota](#)
Credit: Dominic Chavez/World Bank

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INTRODUCTION

Informality is usually considered as a constraint to inclusive growth because, independently of our preferences for big or small governments, there is always the need for a pool of resources to meet communal expenses. When half of the working population or firms do not contribute to these expenses, as is the case in some Latin American countries, major problems can arise. A large informal economy also implies lower productivity, more corruption and represents a source of low quality jobs that are unable to provide adequate conditions for a better standard of living. However, informal employment also plays a key role in absorbing the unemployed and as such it might increase inclusive growth. This is particularly true for those groups considered vulnerable in terms of gender, race, age and education.

The purpose of this research is to understand the impact of informality on inclusive growth in Latin America and particularly in Colombia. To date, this relationship has been understudied, perhaps because of the multiple factors that interact in this relationship, as well as the lack of consensus around the definition of both variables. For the purposes of this paper, we understand informality as those jobs or firms that are not regulated and/or do not contribute to the public funds; and inclusive growth as economic growth accompanied by poverty reductions and equal opportunities for all segments of the population. Since this concept of inclusive growth is rather broad, we have restricted our set of indicators to: employment, labour income, distribution of earnings across different groups of the population, labour satisfaction and stability, and labour productivity. Examining the way these variables impact inclusive growth is beyond the scope of this research. However, we have included in the literature review evidence concerning the macroeconomic impact of informality, given the amount of externalities that tend to arise from individual labour decisions.

In order to explore our central research question, we investigate three specific hypotheses. First, *informality may promote inclusive growth by acting as a buffer to unemployment and creating opportunities for vulnerable populations*. By providing incomes to those who might otherwise be unemployed, informality allows individuals to engage in the economy and potentially benefit from economic growth. This is relevant for the structurally unemployed - those who have little hope of accessing the formal labour market - and for the cyclically unemployed, who may enter the informal sector during economic downturns, particularly if unemployment benefits, or any other type of transfers that favour unemployment over informality, are low or non-existent.

Second, *informality may constrain inclusive growth both at an individual and at a society level through lower quality employment and lower productivity, and also by impacting growth and jobs in the formal sector*. By preventing an important group of the population from obtaining higher wages, benefits and work stability, informality constrains inclusive growth, provided that these factors are present in the formal sector. In addition, informality generates lower productivity, erodes the tax system, increases the incidence of corruption and operates as a source of unfair competition to formal firms. Similarly, informal workers act as 'free riders' by congesting and not paying for public services.

Third, *facilitating transitions from unemployment to informal employment and from informality to formality promotes inclusive growth*. Smoother transitions may help ensure a more efficient allocation of resources and greater benefits for workers, firms and society as a whole. In the case of Colombia, we will focus on estimating the impact of reducing payroll taxes on informality. This issue is highly relevant, not only for Colombian authorities, but also for other governments in Latin America and Africa that might consider following this road in order to reduce informality.

The two general perspectives about the relationship between informality and inclusive growth described at the outset closely relate to older discussions around integrated, segmented and induced informal markets. First, the general idea of segmented markets (Lewis, 1954; Harris & Todaro, 1970) relates to 'structural informality' wherein for a particular portion of the population, informality represents the only available alternative to unemployment. Second, the notion of integrated markets (Maloney, 2004), relates to those individuals/firms that voluntarily decide to take a job/operate in the informal rather than formal market. Under this scenario individual/firms may benefit from informality at an individual, but not at an aggregate level because individuals/firms are restricting themselves to operating in a less productive environment. Finally, the concept of 'induced informality' (De Soto, 2000) relates to individuals prepared to operate in the formal sector but segregated from this market by high entry barriers that are either explicit in legislation or implicit as in the case of segregation. These barriers constrain inclusive growth by preventing workers from obtaining higher wages, benefits and work stability (Loayza, 1997). There is also a macroeconomic cost to informality that applies to all types described above. (Levy, 2008; Perry, 2008)

The type of informality that prevails in each country will vary and has important implications for policy making. For example, while 'induced informality' might be tackled by removing formal employment barriers or by implementing affirmative action policies and childcare programmes, 'structural informality' requires a different policy approach, such as improved education and flexible pension systems, among others. Similarly, in the case of 'voluntary informality', providing economic incentives to formalise and enforce formality might be effective, whereas the same policy applied to structural informality could have a negative impact on inclusive growth. In terms of our three specific hypotheses, removing entry barriers to the informal labour market could facilitate transition from unemployment to informality, and, likewise, removing entry barriers to the formal labour market could improve the transition from informality to formality, depending on context-specific constraints to inclusive growth.

We started our analysis expecting to be able to locate countries according to either of the two general hypotheses and to formulate policy recommendations accordingly. However, one of the main conclusions of this paper is that informality cannot be analysed based on the assumption that informal workers are a bulk mass of individuals with similar characteristics. Instead, the informal sector should be understood as involving a mixture of individuals with different characteristics who operate in diverse environments. This finding corroborates new studies that have also identified heterogeneity in informality labour markets (Perry, 2008; Garcia, 2014; Ulyseas, 2013; Alcaraz et al., 2012).

The case of Colombia is relevant for identifying lessons for the Latin American region not only because Colombia demonstrates regional averages in terms of informality and inclusive growth, but also because the country is home to a highly heterogeneous informal sector and this allows for simultaneous testing of both hypotheses. Another interesting feature of Colombia is that it is one of the few countries that have implemented policies aimed at reducing informality in recent years. Thus it is expected that lessons drawn from Colombia will be useful to other countries facing high formal labour costs, such as Argentina, Brazil and Costa Rica. Notwithstanding, the impact of any policy addressing informality will vary depending on the particular characteristics found in each country.

This paper is structured as follows. Section 2 presents the research and design methods; section 3 presents evidence from the Latin America regional literature review; section 4 provides an analysis of the case of Colombia; section 5 summarises the main lessons, and section 6 provides conclusions and policy recommendations.

RESEARCH DESIGN AND METHODS

The complexity of analysing the relationship between informality and inclusive growth is due in part to the lack of a common or standard definition for either of these concepts, the variety of channels that explain the impact of informality over inclusive growth and the number of variables that affect inclusive growth outside the labour market. We address these issues as follows.

Definition and Measurement of Informality

The definition of informality varies, however for the purpose of this paper we understand it as jobs or firms that are not regulated and/or do not contribute to public funds, as this covers the majority of definitions provided in the literature. Both firms and individuals are included in the definition, which means that informal workers can work either in the formal or the informal sector.

There are also several ways to measure informality. The two most commonly used are: i) the firm definition, which is closely related to the type and size of the firm and therefore with the quality of the job³, and; ii) the legal definition, which relates to compliance with legal requirements and the kind of social protection provided to the worker. The correlation coefficient for both measures in Latin America is 0.85 (Tornarolli et al., 2012). In the case of Colombia, we mostly use the firm measure because it is most frequently used by Colombian authorities and the most suitable for making international comparisons since it does not vary according to local enforcement and regulation policies (as the legal definition may). The firm definition also enables us to maintain greater consistency across the research since we have chosen to explore the impact of lowering payroll tax, and the legal definition is not amenable to the method that we selected. We occasionally do use the legal definition, however, to provide robustness to our findings or where necessary due to data availability.

Definition and Measurement of Inclusive Growth and its Relationship with Informality

As with informality, there is no standard definition of inclusive growth. However, the literature broadly understands it as growth accompanied by poverty reductions and equal opportunities for all segments of the population. Attempts to measure inclusive growth include McKinley (2010), Ali and Son (2007), Almeida-Ramos, Ranieri and Lammes (2013) and Anand, Mishra and Peiris (2013).

Using these inclusive growth indexes, or any other welfare analysis methodology, to analyse informality and inclusive growth would necessarily imply an oversimplification of our findings and may compromise their applicability across different contexts. Instead, we use data-based evidence methodologies to review each of the channels through which informality may affect inclusive growth. By using this approach, rather than generating a 'one-size-fits-all' recommendation, we recognise the diversity in country contexts. In addition, we limit the set of variables for analysing inclusive growth to those related to the labour market, namely: employment, labour income, distribution of earnings across groups of the population, labour satisfaction and stability, and labour productivity. Exploring the way these variables impact inclusive growth is beyond the scope of this research. However, we do include a literature review of the macroeconomic impact of informality, given the amount of externalities that tend to arise from individual labour decisions.

³ This category includes workers employed in firms with no more than five employees; unpaid family helpers or housekeepers; self-employed with the exception of independent professionals and technicians; and business owners or firms with no more than five workers. This criterion changed from 10 workers or less (ILO10) to 5 workers or less (ILO5) showing a higher correlation with other measures of informality (Bernal, 2009). Since 1999 the Delhi Group established the ILO5 as the standard measurement of informality (Central Statistical Organisation, 1999).

Channels through which informality impacts inclusive growth

As explained previously, our analysis is focused on some relevant channels that occur inside the labour markets. Channels selected for each hypothesis and the methods used to approach each of them are explained below.

Channels through which *the transition from unemployment to informality can improve inclusive growth* are: (i) informal employment reduces unemployment, particularly among some vulnerable groups; (ii) informal employment is associated with a higher income than unemployment, even in the presence of unemployment benefits; and (iii) informal employment can prove to be useful in economic downturns to prevent serious falls in living standards, however this depends on the informal sector constituting a counter-cyclical variable. The methods used to analyse these channels are: (i) review of surveys identifying informality as a default alternative to unemployment; (ii) characterisation of informal workers, and particularly the most vulnerable, to identify the incidence of informality among this segment; (iii) transition matrices to analyse the frequency of transitions between groups and whether these transitions are increasing inclusive growth by facilitating the functioning of the labour markets, and; (iv) pro-cyclical analysis of informality to confirm whether informality acts as a buffer to unemployment during hard times⁴.

Channels through which *informality constrains inclusive growth* are: (i) informal employment generates less income, benefits and stability than formal employment; (ii) informal sector productivity is lower than formal sector productivity, controlling for observable variables such as size, and; (iii) informality erodes the tax base and/or the quantity and/or quality of public services. The methods used to analyse these channels are the following: (i) analysis of income, work satisfaction and stability of informal versus formal workers controlling for observable characteristics and using Matching methods; (ii) analysis of differences in productivity between formal and informal workers controlling for size and using Matching methods and (iii) analysis of the fiscal impact of informality based on a review of relevant literature.

Concerning *policies oriented at facilitating labour market transitions*, we concentrate our efforts on measuring the impact of lowering the payroll tax through a methodology that mixes Matching and Differences in Differences techniques. The reasons for applying this methodology instead of other techniques are explained in section 4. We also analysed the distributional impact of this particular reform by measuring its impact on specific segments of the population as well as Lorenz curves.

INFORMALITY AND INCLUSIVE GROWTH IN LATIN AMERICA

With the exception of Heintz (2012), who presents a general approach and formulates an agenda to analyse the relationship between informality and inclusive growth, this topic has not been explicitly researched at a global level or in the Latin American region. However, some literature does analyse the channels through which informality impacts inclusive growth. This evidence, organised according to our three hypotheses, allows us to get a good grasp of the mechanisms through which informality impacts inclusive growth in the region. In this section, we begin by presenting an overview of informality and inclusive growth in Latin America as well as the main attempts to measure this relationship. Second, we summarise the literature that explores the channels through which informality promotes and constrains inclusive growth. Third, we review policies aimed at increasing inclusive growth by tackling informality and, finally, we provide conclusions and identify the knowledge gaps that we intend to fill in the subsequent section.

⁴ The pro-cyclical analysis of informality also helps to identify whether informality is the result of an individual choice, which is explained later

Informality in Latin America and Colombia

Informality is a challenge of great dimensions in Latin America. The average informality rate among the largest 14 economies is 46%, representing nearly 130 million informal workers in the region (ECLAC/ILO, 2015). In countries like Bolivia, Honduras and Paraguay, up to 70% of workers are informally employed (OECD, 2015). Furthermore, informality rates are particularly high among vulnerable groups in the region: 75% of all workers with low levels of education, 50% of working women (FORLAC, 2014) and 55% of young workers are informal workers (FORLAC, 2015).

Despite these figures, Latin America does not show particularly high informality rates among developing countries. According to WIEGO (2014), sub-Saharan Africa, South Asia and East Asia have even higher average informality rates as a percentage of non-agricultural employment. Nevertheless, as shown in Table 1, given the higher proportion of economically active population and urbanisation rates in Latin America, urban informality is higher relative to the size of the total population than it is in African countries, for example. Notwithstanding, informality rates have declined in Latin America over the last ten years. From the early nineties to the early 2000's, the informality rate remained constant at around 53% and then lowered to 46.8% in 2013, as shown in Graph 1. This period of improvements in the labour market coincided with high growth rates, and it is therefore difficult to establish the drivers behind this reduction. As such, the question arises whether or not informality may go back to its previous level as a result of the recent downturn in the region's Gross Domestic Product (GDP).

In Colombia, almost half of the working population is engaged in the informal sector, despite the fact that informality shows a declining trend. As of June 2015, 48% of the working population in the 13 main metropolitan areas was informal, compared with 54.7% back in 2002 (GEIH 2007-2015; ECH 2002-2006).⁵ In Graph 2 we compare this measurement with other measurements for labour informality, such as workers who do not make contributions to state health and pension schemes or do not contribute to either. As Graph 2 shows, although there are some differences in level of informality, which ranged between 44% and 51% in 2014 depending on the definition adopted, all the measures demonstrate similar behaviour across time, including a negative trend since the year 2000. Thus, the number of workers in the formal sector and people contributing to non-wage benefits has increased in the country.

Inclusive growth and informality in Latin America and Colombia

According to the inclusive growth index produced by Almeida-Ramos et al. (2013), which takes into account per capita income growth, income distribution, poverty reduction and employment generation in 2006, most Latin American countries are ranked between the high-medium range, such as Mexico and Uruguay; the medium range, including Brazil, Chile, Ecuador, El Salvador, Paraguay and Peru; and the medium-low range, such as Bolivia, Colombia, the Dominican Republic and Panama. Similarly, the index produced by Anand et al. (2013), which takes into account per capita income growth and income distribution variables from 1990 to the latest available data in 2013, classifies Venezuela, Bolivia and Colombia as countries with low levels of inclusive growth and Argentina, Brazil, Ecuador and Mexico as Latin American countries with medium levels of inclusive growth.

Adopting a less systematic approach, Cord (2015) claims that after the eighties and nineties when Latin America was last or second to last in terms of regional growth and income distribution, the region emerged with one of the best performances in terms of inclusive growth during the 2000's, registering a growth rate higher than the world average, reducing extreme poverty by half and achieving considerable reductions in income gaps. Similarly, Colombia, a country with low to medium-low inclusive growth levels, has recently achieved remarkable results reducing poverty from 50% in 2002 to 28.5% in 2014. Regarding income distribution, however, the results were less impressive. Although the Gini coefficient that measures income inequality reduced from 0.57 in 2002 to 0.53 in 2014, it continues to be one of the

⁵ Based on IL05.

highest in the world. Neither of these indexes and analyses takes into account the most recent period, 2015 in particular, during which time growth has seriously slowed in most countries of the region, probably affecting these achievements.

Graph 3 plots the two reviewed indexes of inclusive growth against informality for the set of countries for which data is available⁶. It is possible to observe a slightly negative but low correlation between the two variables. The correlation coefficient between the level of self employment and the level of inclusiveness, according to the 2006 Almeida-Ramos et al. (2013) index⁷, is -0.02. The correlation coefficient in terms of changes, using the Anand et al. (2013) index and self-employment⁸, is -0.3. Both relationships are significant to 95%. As can be observed in Graph 3, South Africa is an outlier in this matter, whereas Colombia, showing more standard results, is one of the countries with the most negative correlation between informality and inclusive growth.

Results in Graph 3 also suggest that the relationship between inclusive growth and informality is either negative or non-existent. A negative correlation is consistent with the literature that relates informality to some of the components commonly used to measure inclusive growth. Loayza and Rigolini (2006), for example, found that countries with low GDP per capita tend to have higher self-employment rates, used as a proxy for informality. They also found that an increase in one standard deviation in informality leads to a decline of 0.7 to 1 percentage points in the rate of per capita growth and an increase of 0.12 to 0.24 percentage points in poverty rates⁹. Perry et al (2007) found a strong correlation between informality and inequality at a global level, while Maurizio (2013) and the Economic Commission for Latin America and the Caribbean (ECLAC, 2014) found that formalisation had a positive effect on labour income distribution in Latin America. Nevertheless, since it is small, the correlation coefficient between informality and inclusive growth indexes might also suggest the existence of conflicting forces that underlie informality, and which may promote or restrict inclusive growth, as we have suggested in our two hypotheses.

Informality may promote inclusive growth by acting as a buffer to unemployment and creating opportunities for vulnerable populations: a literature review

This section provides a review of literature relating to our first hypothesis by examining surveys reports, transitions, counter-cyclical movements of informal employment and incidence of informality among vulnerable groups.

In the previous sections, we hypothesised that informality might be positive for inclusive growth by offering a substitute to unemployment, provided that informal earnings are higher than unemployment benefits, which is not an issue in Latin America given the lack of these benefits. It should also be noted that in the case of 'induced informality', providing an alternative to unemployment can only result in more inclusive growth if reducing explicit or implicit barriers to the formal labour market is not an option.

Drivers of informality

From the point of view of preferences, Arias and Bustelo (2007) and Arias, Landa and Yañez (2007) use household surveys to determine that 59% of the self-employed in Colombia would prefer to have a job in the formal market. This figure amounts to 40% in Argentina, 26% in Bolivia and 25% in the Dominican Republic. Among informal salaried workers, preferences for a formal job are 60% in Colombia, 57% in Argentina, 48% in Bolivia and 43% in the Dominican Republic.

⁶ These countries are Argentina, Brazil, Bolivia, Botswana, Burkina Faso, Chile, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Jamaica, Madagascar, Mexico, Namibia, Nicaragua, Paraguay, Panama, Peru, South Africa, Tanzania, Uruguay, Venezuela and Zambia.

⁷ Or the inverse index, since for Ramos et al. (2013) a higher index means less inclusiveness whereas for Anand et al. (2013) a higher index means greater inclusiveness.

⁸ We used self-employment as a proxy, since the ILO does not provide informality series.

⁹ All the results were significant and controlled for enforcement and partially controlled for endogeneity through instrumental variables.

Although not strictly comparable with one another, the surveys also reported that a common reason for self-employment is the impossibility of finding a salaried job. This was cited as the main reason by 25% of interviewees in Bolivia; the first or second most important reason by 55% and 52% of interviewees in Colombia and the Dominican Republic respectively, and as a relevant reason amongst 58.8% of Argentines¹⁰. According to Perry et al. (2008)¹¹, in Mexico, 44% of the male population chose self-employment because of higher earnings and only 12.4% because they could not find a job in the formal market. Among women, only 6% reported that they could not find a job in the formal market. In Brazil, 33% of people in informal self-employment said they would leave their current job for a salaried contract. The surveys in Mexico and Brazil also show a higher preference for independent work among women and older populations. While these results demonstrate that an important portion of the population works informally because they can't find a job in the formal market, there is also clear and significant heterogeneity between and within countries, with Colombia showing the highest preference for formal employment and Mexico the lowest.

Counter-cyclical

Another popular indicator used to measure whether informal employment is a substitute to unemployment is counter-cyclical. According to Tornarolli et al. (2014), in the presence of labour market rigidities and involuntary informal sector employment, when the economy enters into recession and a minimum wage exists, some of the formal firms fire workers who subsequently find refuge in the informal sector. Therefore, the ratio of informal to formal workers tends to increase during downturns. Similarly, when the economy grows the cost of hiring becomes relatively lower and the ratio of informal to formal employment decreases (Loayza and Rigolini, 2006). However, in the presence of voluntary informal workers, during upturns, an increase in the informal wage should attract informal workers and increase the size of the sector, parallel or even pro-cyclically to the increase in formal employment¹².

Some of the most important findings in this respect can be summarised as follows. Bosch and Maloney (2008), in the case of Mexico and to a lesser extent in Brazil, found that transitions between formality and informality operate as though the two markets were well integrated, whereby informal employment does not behave as a substitute to unemployment in Mexico. Using information from household surveys, Tornarolli et al. (2014) found the informality rate to be counter-cyclical in Brazil, Colombia and Chile, mostly among salaried informal workers and in Uruguay and Venezuela, mostly among the self-employed, and did not find any clear relationship in other countries such as Costa Rica and Peru. Loayza et al. (2006) also found good evidence confirming the prevalence of counter-cyclical of informality in the region. Finally, Fiess et al. (2008) found that whereas informal employment in Mexico and Brazil tends to be pro-cyclical, in Argentina and Colombia this relationship is counter-cyclical. Their main finding, however, is that the issue of counter/pro-cyclical is very much associated with the shocks faced by the countries and therefore it is dependent on the period of analysis. In sum, most studies signal that informal markets tend to be pro-cyclical in Mexico and counter-cyclical in Argentina, Chile, Colombia, Uruguay and Venezuela. Evidence for Brazil suggests pro-cyclical, however results are less conclusive in this case.

Incidence of informality among workers with low education, skills and experience

In general, there is a higher incidence of informality among certain vulnerable groups in Latin America, namely: women heads of household, the old and the very young and very low-educated workers. This would not be a problem if labour decisions were voluntary, in fact in this case informality might increase inclusive growth at an individual level. This is less clear in the case of workers that would prefer to have a job in the formal market but are unable to find it, either because they have low levels of education and experience or because they face high entry barriers to

¹⁰ The survey asked for the main reason in Bolivia, up to two reasons in Colombia, and the two most important reasons in the Dominican Republic, whereas in Argentina the question permitted multiple responses.

¹¹ Based on local surveys. In the case of Mexico, the survey asked respondents to identify the main motivation.

¹² According to Fiess, Fugazza and Maloney (2008), during booms generated by commodity exports, which promote the informal-intensive service sector, one might expect informal employment to be even more pro-cyclical than formal employment.

the formal market. Drawing on this approach, we first review literature that analyses the incidence of informality among the poorly educated population and the very young population. We then analyse the incidence of informality and signs of segmentation among the women and ethnic minorities.

According to ILO (2013a), the incidence of informality among the low educated population in Latin America is high, averaging 63% among workers with primary education and 75% among workers with less than primary education; compared with a rate of 47% for those with secondary education. Similarly, Gong, Van Soest and Villagomez (2004) showed that in Mexico education is negatively correlated with informal work. Haanwinckel and Soares (2014) found in Brazil that an increase in the ratio of skilled to unskilled workers between 2003 and 2012 was partly related to a decline in informality and that without this increment informality would have increased by 4.8 percentage points, instead of declining by 6.4. Finally, Herrera, Lopez and Montellon (2013) found that differences in income between formal and informal workers in Colombia are much higher for the low educated population because informal workers face not only lower returns on their education, but also suffer a second penalty associated with educational mismatches. However, as El Badaoui and Rebière (2012) point out, even if higher education means a better chance of engaging in the formal sector, it does not mean that educated workers cannot search for an informal job.

Concerning age, the young population in Latin America demonstrates an average informality rate of 56% compared with 46% among the adult population. This segment also shows an unemployment rate two to four times higher than that of adults in the region (ILO, 2013a). In the case of Mexico, Perry (2008) found that working in the informal sector was much more involuntary for the younger population than for adults, while this is not the case in Brazil. Bassi, Busso, Urzea and Vargas (2012) claim that one of the problems with unemployment among the young population is the low probability of them transitioning from an informal to a formal job; a figure that stands at just 10% in Mexico, 15% in Argentina and close to 30% in Brazil and Chile. There is little evidence of informality rates amongst the older population in Latin America, with the exception of Fedesarrollo (2015) which shows a recent important increment among this group in the case of Colombia.

Incidence of Informality Among Women and Ethnic Minorities

In Latin America, the incidence of informality is higher for women (50%) than for men (45%) (ILO, 2013a). However, as explained previously, this does not mean much in terms of inclusive growth if it is the result of a choice. In fact, it would be perfectly understandable for a woman with children to choose informal work because of the flexibility it provides. The Mexican survey, and to a lesser extent in the Brazilian survey, women showed a relatively higher preference for informal work (Arias & Bustelo, 2007; Arias, Landa & Yañez, 2007). In the case of Colombia, there difference for independent workers is 5%, after controlling for other observable characteristics (Bernal, 2009). Likewise, Galli & Kucera (2008) found that in Latin America women's behaviour does not differ from men's in terms of counter/pro-cyclical. Therefore, it is not easy to establish whether the incidence of informality among women is source of segregation or a matter of preference. In particular, there is a current lack of knowledge on this subject concerning women heads of household for whom the decision to work may be less of a choice.

Regarding race segregation, according to Henley, Arabsheibani and Carneiro (2006), in Brazil whites and Asians show the lowest rates of informality, whereas mixed races and blacks face the highest rates. Similarly, Tokman (2008) claims that countries with larger indigenous populations demonstrate higher informality rates. He also searched for bias in the labour market against immigrants, but found no support for his hypothesis. Bernal (2009) also reported a high incidence of informality among ethnic minorities in Colombia.

In sum, there is a high incidence of informality among vulnerable groups in Latin America who seem to perceive informality as a default option to unemployment. This is particularly true in the case of the poorly educated, the young, indigenous people and ethnic minorities. This finding is important in determining whether informality increases inclusive growth, since informality in vulnerable groups is likely to be understood as 'structural informality' or 'induced informality', if it is the result of segregation.

Informality as a default option to unemployment in Colombia

In Colombia, there is no consensus around whether the labour market is segmented or integrated. There is some evidence supporting the idea that integrated markets existed during the period 1991-1996 and became more segmented after the nineties, a decade characterised by increases in payroll taxes and low productivity (Peña, 2013; Mondragon, Peña & Kugler 2010; Perry, 2007; Maloney, 2004). These findings corroborate Fliess et al. (2008), which shows a high, negative and significant rolling correlation between the economic cycle and informality between 1997 and 2002, and no significant correlation in subsequent periods. On the other hand, Pratap and Quintin (2004) were unable to find any strong evidence of segmentation between the formal and the informal sectors in Colombia. Recent literature (Garcia, 2014; Perry, 2008), which understands informality as a mixture of integrated and segmented markets, reflects the heterogeneity of the labour market in the country.¹³

Summary

The question we were trying to address in this section was whether informality in Latin American countries can be positive for inclusive growth. We learned that if informality is a default and not a voluntary option, and if it is due to low productivity, it can even be positive for inclusive growth. In fact, according to Busso, Fazio and Levy (2012) informality employs an important segment of the population with low education and/or skills that otherwise would not find a job in the formal market because the cost of hiring them is greater than their productivity value for the firm. If the government enforces formality, this group will face unemployment and will probably end up worse off than when working informally. However, in the context of 'induced informality, where informal workers demonstrate similar productivity than formal workers, permitting informality as an alternative to unemployment only represents the second best policy option, the first being to reduce implicit or explicit formal market entry restrictions.

The distribution of the three types of informality in each country is not really covered by existing literature,¹⁴ perhaps because even at an individual level structural, induced and voluntary informality are not straightforward to identify. In fact, a worker can operate in all three types of informality at the same time. Despite this challenge, we were able to gather evidence to identify which type of informality prevails in each country. The evidence indicates significant heterogeneity across Latin America, not only within countries but also between countries and macroeconomic contexts. This finding corroborates recent literature that posits informality as a dynamic combination of all three types of informality (Perry et al, 2007; Fies et al., 2008; Ulysea, 2013). Despite this uncertainty, and at the risk of over-simplifying, one could argue that whereas Mexico shows a higher prevalence of 'voluntary informality', Colombia seems to have a very heterogeneous mixture of informality.

Informality may constrain inclusive growth not only by providing a low standard of life but also by impacting growth and jobs in the formal sector: a literature review

The channels through which informality might constrain inclusive growth are: (i) informal employment generates less income, benefits and stability than formal employment; (ii) informal sector productivity is lower than formal sector productivity controlled for observable characteristics as size, and; (iii) informality erodes the tax base and/or the quantity and/or quality of public services. The findings of the previous section also apply here since informality

¹³ Garcia (2014) used wages as a criterion for segmentation inside the labour market and found that big cities in Colombia tend to show a larger proportion of voluntary informality. However, Perry (2008) argues that wages do not necessarily demonstrate segmentation but can in fact signal differences in unobservable characteristics among workers, as well as preference for informality

¹⁴ One exception is Alcaraz, Chiquiarand Salcedo (2012) who found that between 10 and 20% of informal workers in Mexico demonstrated marked signs of segmentation based on the personal characteristics of individuals.

is understood as a mixture of 'structural informality', where the first hypothesis – informality increases inclusive growth – is more relevant, and 'induced' and 'voluntary' informality where the second hypothesis – informality constrains inclusive growth – is more relevant.

Informal employment generates less income, benefits and stability than formal employment

In general, informal workers are at a disadvantage in terms of earnings when compared with formal workers. According to the ILO (2013a), the incidence of informality in Latin America reduces from 72% among the lowest earning quintile to 31% among the highest earning quintile. Similarly, the incidence of poverty among informal workers is between two and five times higher than that of formal workers (Maurizio, 2015).

However, this income gap might only reflect different worker productivities due to differences between the two sectors in terms of observable characteristics such as education or unobservable characteristics such as social skills. Therefore, wage differences between formal and informal workers should be controlled by observable characteristics for specific sectors of the population or using more sophisticated techniques to control by unobservable variables. Controlling by differences in preference for informal work, another possible cause of wage differentials, is a more difficult task.

Maurizio (2015) found a positive earning gap in favour of formal jobs in the cases of Argentina, Brazil, Chile and Peru. This gap tends to decrease with the level of income and becomes negative at high-income levels in the case of Chile and Brazil. Similarly, Bargain (2010) found that low-income informal self-employed workers face lower earnings than their formal sector peers, whereas workers in the high-earning tier of informal self-employment receive a significant earning premium, as is the case in Brazil, Mexico and South Africa. Perry et al (2008) performed a similar exercise for Argentina, Bolivia and the Dominican Republic also finding a positive gap for low-income workers in the cases of Argentina and Brazil and a negative gap for high-income workers in Bolivia and high-income self-employed workers in Argentina. As for Colombia, Herrera, Lopez & Montellon (2013) found a positive income gap in favour of the formal sector for all income quintiles. Also in the case of Colombia, Daza and Gamboa (2008) found a gap in favour of formal market earnings ranging between 30% and 60% depending on the definition of informality used, with small variations over the period 2008 to 2012.

Other than income, there are other advantages to being formally employed versus informality, including access to social protection in terms of health benefits and old age pension as well as job stability. Even if a worker does not value these perks, for society as a whole it is important that workers and their families are protected against these risks. A similar argument can be applied to worker training. According to Perry et al (2007), formal workers tend to be more satisfied with their jobs in Colombia, however this is not necessarily the case in the Dominican Republic or Argentina where formal and informal workers report similar levels of welfare.

Informal sector productivity is lower than formal sector productivity controlled by observable characteristics

One of the most powerful arguments against informality is the impact on productivity. According to Levy (2008), formal market restrictions are associated with a misallocation of firms in favour of small firms that operate more intensively in the informal sector. This occurs not only because there is an implicit subsidy to informality but also because informal firms try to keep themselves out of the sight of authorities in order to continue being informal. According to Levy, the low productivity embodied by informality is not caused by the existence of self-employment or family firms, but rather it is due to the existence of too many of them. In fact, a small amount of self-employed workers and family firms can have a positive impact on informality by completing market functioning.

However, size is not the only cause for differences in productivity. Other factors affecting the informal sector include limited access to credit (Dabla-Norris & Koeda, 2008), fewer incentives to train and adopt technology (Dabla-Norris, Gradstein & Inchauste 2007), a lower probability of engaging in the export market and restricted access to public

goods, such as the legal system and government labour training schemes. Ydrovo (2010) even suggests that informality affects aggregate productivity by weakening the process of creative destruction.

In the case of Mexico, Busso, Fazio and Levy (2012) found that one peso invested in capital and labour within formal firms is worth 28% more than if it is invested in illegal firms, and 50% more than if it is invested in legal and informal firms.¹⁵ They also found a difference of productivity of 84% in favour of formal firms, controlled by observable characteristics. In the case of Brazil, Fajnzylber, Maloney and Montes Rojas (2011) found that after the government implemented a policy to lower the cost of operating formally, newly created formal firms showed higher levels of revenue and profits and employed more workers. Finally, Perry (2008) found that the difference in labour productivity between firms that started up informally and firms that have always operated formally is 50% in Peru, 33% in Mexico, 30% in Bolivia, 30% in Panama and 12% in Argentina. The positive productivity difference in favour of formal firms is also supported by other research at a Latin American and global level (Hsieh & Klenow, 2009; Verdera, 2015; Porta & Shleifer, 2008).

Differences in productivity between the informal and formal sector have been estimated for Colombia. Using Matching methods, Cardenas and Mejia (2007) found significant differences in firm income per worker after controlling by observable characteristics. Along the same lines, Yvodro (2010), who used matching propensity score techniques, found that informal firms hire fewer salaried workers, mainly because they face restrictions to growth. As a result, aggregate productivity is lower. However, it is important to note that Perry et al. (2007) found no significant differences in productivity in Colombia.

Informality erodes the tax base and/or lowers the quantity and/or quality of public services and/or increases corruption

The relationship between tax revenues and informality has also been widely confirmed and explained by Levy (2008), Loayza (1997), Perry et al (2007) and Anton (2014). According to the classical model of Loayza (1997), higher tax rates generate higher tax revenues but also increase informality and therefore an optimal tax rate exists for each economy. The high correlation between VAT evasion and informality, shown in most of the literature, supports this conclusion. On the other hand, Levy (2008) argues that benefit programmes for informal workers demonstrate good intentions but end up encouraging informality, reducing productivity and diminishing government funds for social programmes.

Finally, according to De Soto (1989) informal entrepreneurs deviate 10% to 15% of their gross income to corruption, whereas formal entrepreneurs pay an average of only 1% of gross income in bribes. This behaviour erodes the rule of law and the integrity of public institutions. Similarly, informality ends up creating unfair competition for formal firms. According to the World Bank Enterprises Survey, 28% of firms worldwide report the practices of informal sector competitors as a major constraint to their functioning. This percentage amounts to an average of 31% in Latin America, but is as high as 49% in Brazil, 49.8% in Bolivia and 55% in Colombia.

Summary

In general, formal workers receive higher income, and particularly in Colombia, tend to be more satisfied with their job. The income gap appears to be positive and in favour of the formal sector for all levels of income in the case of Colombia and subject to income levels in Brazil, Chile and Mexico. These results support the findings of the previous section which point to an important segment of voluntary informality in Mexico, whereas in Colombia a combination of induced and structural informality, and to a lesser extent, voluntary informality, can be observed. The important macroeconomic cost that arises from all kinds of informality should also be stressed.

¹⁵ In this paper the authors define two types of workers: employees, for whom the firm pays social security (legal) and freelance contractors for whom the firm does not pay social security (informal.)

Informality and public policies aimed at improving labour market efficiency and inclusive growth: a literature review

In this section we analyse the impact on inclusive growth of public policies aimed at improving labour market efficiency, with a special focus on the Colombian tax reform of 2012 which lowered payroll tax.

Public Policy Analysis

The list of policies that have been implemented in different countries worldwide to improve inclusive growth through labour market efficiency is long, but can be summarised into the following two broad categories. First, policies that address the relationship between unemployment, informality and inclusive growth include: (i) promoting entrepreneurship through self-employment;¹⁶ (ii) encouraging firms to formalise from inception (Klapper et al. 2007); (iii) reducing the barriers to transition from unemployment to formality (Mincer, 1991) and (iv) changing unemployment benefits and subsidies (Bosch & Pretel, 2013). The second category relates to policies aimed at facilitating transition from informality to formality and include: (i) reducing labour taxes (Slonimczyk, 2011); (ii) reducing the minimum wage (Muravyev & Oshchepkov, 2013); (iii) reducing the regulatory burden of formality (Bettcher, Friedl and Marini, 2009); (iv) enforcing formality (Almedia & Carneiro, 2011); (v) establishing schemes of partial formalisation (ILO, 2007), and; (vii) improving support services provided to formal firms (Campos, Goldstein & McKenzie, 2015), among others.

Inevitably, analysis of these policies must take into account the specific country context. Literature indicates that for developing countries, whenever it is assumed that segmented markets exist, reducing barriers to entry into the formal sector have a marginal impact on the informal sector while regulating and taxing informality have led to increases in unemployment and poverty (Porta & Shleifer, 2014). Meanwhile, analyses, whenever it is assumed more integrated markets exist conclude that reducing entry barriers (such as cutting payroll taxes) to formality is an important and useful policy to control informality. Ulyssea (2013), from a welfare analysis point of view, and assuming the coexistence of segmented and integrated markets for the case of Brazil, shows that it is possible to reduce informality by reducing entry costs to the formal sector and dropping payroll taxes. Reducing entry costs improves welfare by bringing about a substantial reduction in deadweight losses due to wasteful entry costs however the second approach does not because it cuts tax revenue. Similarly, enforcing formality in a labour market where voluntary informality exists might have a positive impact on welfare because of the new tax revenue, while enforcing formality in a market where structural informality exists might have a negative impact on welfare.

Impact of lowering payroll tax on informality

Although at a global level, the impact of lowering the payroll tax on informality has not been as widely analysed as the impact of this policy on unemployment, there are nevertheless some important findings in this field. Albrecht et al. (2009), for example, who use a theoretical model, found that payroll taxes increase informality particularly if firms are small and able to evade controls. Empirical works, such as Hazans (2011), have found that European countries with higher payroll taxes show higher levels of informality and Slonimczyk (2011) found that a reduction in payroll taxes in Russia had an important impact on informality indicators. As for Latin America, Lora and Fajardo (2012) found that payroll taxes increase informality if the workers do not perceive the direct benefits of these contributions, as is often the case in the region.

¹⁶ An impact evaluation conducted by CAF in 2013 showed that policies oriented to solve market failures in innovation, promote labour, entrepreneurship and skills development, and provide finance were most likely to generate higher profits and productivity among the self-employed. Meanwhile, policies targeting vulnerable entrepreneurs with low levels of education (who perceive self-employment a default option), have a lower probability of success. According to CAF, only one quarter of entrepreneurs in Latin America possesses the characteristics required to grow their firms thereby increasing employment and productivity.

A number of studies analyse the relationship between payroll taxes and informality in Colombia. For example, Kugler and Kugler (2009) surveyed a panel of Colombian firms and found that an increase of 10% in payroll tax was related to an increase in informal employment between 4% and 5%. Similarly, Mondragon et al. (2010) found that an increase in 10% of payroll contributions was related to an increased probability of informality ranging between 5 and 8 percentage points. However, the impact of the 2012 reform which reduced payroll tax from 29.5% to 16% is yet to be documented. The exception is Anton (2014) who used a general equilibrium model to show that the 2012 tax reform should bring an increase of formal employment between 3.4 and 3.7%, and a decrease in informal employment between 2.9 and 3.4%.

Summary and evidence gaps

As Heintz (2012) noted, and as is still the case, very few studies analyse informality and inclusive growth at a global level. This may be because of the measurement difficulties and because of the many different forces involved in this relationship within and among the different countries.

However, the perseverance of a large informal sector in Latin America has given rise to a multitude of studies supporting the idea that informality constrains inclusive growth, both at an individual and macroeconomic level. Based on a review of the most prominent literature on these issues, we have identified several channels through which informality not only constrains but also promotes inclusive growth. In fact, some evidence suggests that informality can benefit vulnerable groups; a point of view that is rarely analysed in existing works.

The literature review also revealed considerable heterogeneity among Latin American countries with respect to the nature and behaviour of informality. For example, 'voluntary informality' appears to predominate in Mexico, whereas Colombia demonstrates a high but very heterogeneous mixture of informality. This makes the country an interesting case study because it allows us to test our two first hypotheses simultaneously. Colombia also demonstrates regional averages in terms of informality, inclusive growth and the relationship between them. Another interesting feature of Colombia is that it is one of the few countries in the region that have implemented an active policy to reduce informality. Lessons from this experience will be very useful for other countries in the region facing high formal labour costs, such as Argentina, Brazil, Costa Rica and Mexico (Graph 4). Notwithstanding, the impact of any policy will vary depending on the specific characteristics of the informality in each country.

In terms of specific gaps in the literature, in Latin America there is a lack of evidence around whether informality can be understood as a default option for vulnerable groups who would otherwise not be able to find a job in the formal sector. In the following sections, we attempt to fill this gap, in particular by analysing the role and relevance of informality for the older population and women heads of household. With regards to whether informality constrains inclusive growth, we will focus our attention on the impacts of formality and informality from the point of view of workers, since enterprise analysis implies the use of some problematic databases.¹⁷ Finally, although the impact of payroll tax on labour markets in Colombia has been widely analysed, little is known about the effects of the most recent tax reform which reduced payroll taxes. It is expected that analysing this policy will provide relevant insights for other regions and African countries that exhibit a combination of high payroll taxes with high informality rates.

INFORMALITY AND INCLUSIVE GROWTH IN COLOMBIA

In this section we present an analysis of the channels through which informality can promote and constrain inclusive growth in Colombia. We also review national policies aimed at reducing informality, in particular, the 2012 payroll tax reform.

In most of the analysis that follows, we refer to two consecutive national household surveys provided by the Department of Statistics (Dane); and the panel survey by the Universidad de los Andes. These are the *Encuesta Continua de Hogares (Continuous Household Survey)* (ECH, 2002-2006) for urban households and the *Gran Encuesta Integrada de Hogares (Widescale Integrated Household Survey)* (GEIH, 2007-2015) for urban households in 13 metropolitan areas, representing 60% of the total urban population according to the 2005 census.¹⁸ These are representative surveys; however they do not have a panel structure. In order to be able to analyse additional variables not included in the GEIH, we also refer to the *Encuesta Longitudinal Colombiana de la Universidad de los Andes (Longitudinal Survey of Colombia by the Andes University)* (ELCA, 2010-2013). The ELCA, although not statistically representative, was gathered from around 5,000 urban households per year and was applied in a panel structure. In this chapter we mostly use the ILO5 firm definition for informality. However, when we refer to the ELCA, we classify informal workers as those who do not contribute either to state health or pension systems, the legal definition most used in Colombia. This decision is due to data limitations in estimating the firm definition. The information analysed in sections 4.1 and 4.2 of this chapter correspond to averages between April, May and June 2015, unless otherwise stated. In section 4.3, the period of analysis is adjusted in order to estimate the impact of the 2012 payroll tax reform.

Analysis of the channels through which Informality might promote inclusive growth in Colombia (Hypothesis 1)

In this section, we analyse whether informality acts as a substitute to unemployment in Colombia drawing on surveys, reports, figures of incidence of informality among vulnerable groups, transition matrices and analysis of counter-cyclical movements of informal employment. As is the general trend across Latin America, income gaps between unemployment and informality are not an issue in Colombia in so far as there are no sound unemployment benefits.

Drivers of informality

According to a special report of the 2006 GEIH,¹⁹ 59% of informal self-employed and 60% of the informal salaried workers in Colombia would prefer to have a job in the formal sector at the same salary or less. Similarly, 55% of self-employed workers reported the impossibility of finding a salaried job as the main reason why they were engaged in the informal sector. Table 2 presents these statistics by socio-economic sector according to the GEIH and similar results obtained in the ELCA.²⁰ As can be observed, all the groups that we have identified as vulnerable are likely to report this reason - inability to find a salaried job in the formal sector - as a principal cause for their self-employment status. The older population also reported 'obtaining an additional income' as an important reason for informality.

¹⁷ Most available data is low quality and not representative at the population level.

¹⁸ The GEIH, which is conducted annually in 13 metropolitan areas, gathers information on more than 30 thousand households per month. We opted not to use the GEIH sample that covers 23 cities with rural areas since the 13 metropolitan area sample covers a longer period of time, with each month representative at a metropolitan area level. The 11 remaining cities are only representative when analysed per semester. Furthermore, the 13 cities sample is more frequently used by Colombian authorities

¹⁹ The 2006 report on informality is not available online. Reported by Bernal (2009) and Perry (2008).

²⁰ Results are not totally comparable since the GEIH (2006) asks for the two main reasons and the ELCA for the main reason.

These results show that, in the case of Colombia, an important portion of the informal population reports informality as being a default option to unemployment. Informality thus represents the best option for individuals whose personal characteristics, such as low education, mean they are unable to secure a job in the formal sector. However, for those individuals who meet the basic requirements for formal employment but are unable to enter into the formal sector due to high barriers, then informality may represent the second best option.

Incidence of informality among workers with low education, skills and experience

In this and the next section we analyse informality among different socio-economic groups, and particularly among the most vulnerable, to explore whether informality is a default option to unemployment for them and why the formal market is not an option. A high incidence of informality among workers with low levels of education and experience who live in cities with low productivity will indicate a large incidence of subsistence informality, whereas a large incidence of informality among women and ethnic minorities will indicate that informality is the result of discrimination. Exploring this hypothesis will allow us to establish the relationship between informality and inclusive growth. Table 3 shows the relevant rates and shares for different socio-economic groups. This analysis also makes use of the statistics presented in Table 2 in order to assess the extent to which each socio-economic group enters into informality voluntarily.

Education

Education is the area where the largest differences among the socio-economic groups can be observed. The informality rate among workers with primary education or less is 79%, compared with 23% among workers with tertiary education. The average years of education among informal workers are 8.6 in comparison with 10.5 among the unemployed and 12.4 years among formal workers. These indicators show that an important segment of the population has such low levels of education that it is highly unlikely that they would find a job in the formal sector, which is consistent with previous results presented in this section. This finding underlines the importance of improving education as a mean to reduce informality, as was the case in Brazil (Haanwinckel et al., 2014).

On the other hand, the share of informal workers with technical and/or university studies is 17%, indicating that another important segment of the population is informal despite their high level of education. The unemployment rate of this group is almost the same as the national average, probably because they are more likely to be able to afford being unemployed. This and the fact that the low, medium and high-educated population are equally represented in the unemployed group, suggests that the level of education might be more correlated with informality than with unemployment.

Age - Experience

Age is commonly used as a proxy for experience. According to Table 3, the young population²¹ tends to have high informality and unemployment rates (42% and 20%, respectively) whereas the older population has higher informality and lower unemployment (76% and 4%, respectively). Both groups have low participation rates. The differences in informality rates can be partially explained by the fact that the young population has studied 10.6 years on average, whereas the older population has studied an average of 6.8 years. As we suggested before, education seems to be more strongly correlated with informality than with unemployment. Another possible explication is that, according to Table 2, the older population tends to have stronger preferences for informal work than the younger population.

Differences between metropolitan areas

The probability of working in the formal sector very much depends on the city where one lives. While the informality rate is close to 45% in big cities such as Bogotá and Medellín, it is more than 70% in Cucuta, and even higher in some rural areas. Moreover, as shown in Graph 5, cities with a higher ratio of average wage to minimum wage demonstrate

²¹ The young population includes people between 12 and 24 years old, young adults are people between 24 and 35 years of age and the older population includes individuals over 60 years old.

lower informality rates. This supports claims made by Mondragon et al. (2010) around the advantages of setting minimum wages closer to productivity levels. This also supports the findings of Hazans (2011) for Europe, according to which countries where minimum wages are set at a regional level have higher informality rates than those where minimum wages are fixed by central government. Based on this evidence, Fedesarrollo (2013 and 2014) has recently proposed a minimum wage at regional level in Colombia. Another option for the country is to set a minimum wage by sector, as in the case in South Africa, or to return to the rural/urban minimum wages that existed in Colombia in the past. Nevertheless, the implications of this measure on income distribution are still being discussed. According to Graph 5, there are other forces that govern the distribution of informality among cities. For example, Pasto and Cucuta are situated close to the border and the local economy is thus impacted by smuggling. Consequently, these cities demonstrate higher levels of informality than could be expected based on productivity levels.

Incidence of informality among women and ethnic minorities - Gender

As of June 2015, the unemployment rate among women was 12% and 8% among men and the informality rate was 52% among women and 46% among men. These figures show some bias against women in the labour market in spite of the fact that the levels of education are similar between both genders. As expected, the inactivity rate is much higher among women (39%) than men (24%). Women are also over-represented among the unemployed (57%) and the informal (52%), while they are slightly under-represented among formal workers (48%) (Table 3).

Women heads of household are perhaps one of the most vulnerable groups in society. According to the 2005 Colombian census, women headed 25% of the all households and this is a growing tendency. The unemployment rate of this group is just 6% while their informality rate stands at 55%; compared with national averages of 9.9% and 48.6%, respectively. This low rate of unemployment and high rate of informality is consistent with the high percentage of self-employed women who are head households and who report difficulties in finding an alternative salaried job. This suggests that an important portion of this group cannot afford to be unemployed.

Ethnic minorities

In the 2005 census, around 14% of the population declared itself as belonging to an ethnic minority: 10.6% as Afro-Colombians and 3.4% as indigenous. The GEIH does not ask questions related to ethnicity, however using the 2006 special report on informality, Bernal (2009) found that the probability of working in the informal sector is 5.4 percentage points higher for indigenous people and 2.2 percentage points higher for Afro-Colombians, controlled by other observable characteristics. Similarly, informality rates estimated using the ELCA survey suggest that the incidence of informality decreases as skin colour gets lighter, as shown in Graph 6. In the case of ethnic minorities there does not appear to be any specific reason for informality other than being unable to find a job in the formal sector. In fact, Bernal (2009) also found that ethnic minorities are 8% more likely to prefer a formal job than the rest of the self-employed population. This is corroborated by the fact that a relatively high percentage of ethnic minorities reported being self-employed because they couldn't find a salaried job.

Summary of differences in observable characteristics

In Colombia, informal employment is over-represented among women heads of household, the older and young populations, ethnic minorities, poorly educated individuals and border city workers. If all individuals with at least two of the previous characteristics are categorised as 'vulnerable',²² this group would account for 11% of the working-age urban population. The high rate of informality of this group, 78%, cannot be explained by specific high preferences for self-employment, since we observed that they reported even higher preferences for salaried work

²² Excluding ethnic minorities, if we classify as 'vulnerable' all those individuals who show at least one of these characteristics the size of the group would amount to half of the national population and their informality rate would be 58%.

than the rest of the population.²³ Furthermore, informality on this specific group does not appear to be caused by barriers to formality. In fact, given low productivity levels amongst vulnerable groups,²⁴ it would be very difficult for these workers to find a job in the formal market even if formal market restrictions were drastically reduced. Taking all this evidence into account, we can assert that in Colombia informality is a default option to unemployment and promotes inclusive growth at an individual level among vulnerable groups.

Using the information gathered in this section, we also estimated the probability of formality. As shown in Table 4, all the coefficients obtained from the logit demonstrate the expected signs. The groups that we have identified as vulnerable demonstrate low odds ratios, which means that they have lower probabilities of working in the formal sector, whereas men, household heads, young adults, workers with higher education and inhabitants of Bogotá, Medellín and Cali are more likely to work in the formal sector. According to Table 2, this high tier group also reported higher preferences for informal jobs related to factors such as higher pay, more flexible hours and being their own boss.

How frequent are transitions between groups? Is informality a buffer to unemployment and/or a step towards formality?

Another characteristic which allows us to identify whether informal workers are integrated with the unemployed or with formal workers is to analyse the frequency of transitions between groups. In doing so, we use the ELCA survey which provides panel data for 2010 and 2013. According to Table 5, the probability of remaining informal in 2013 for workers who were informal in 2010 is 72%. For formal workers in 2010, the probability of remaining in formal employment in 2013 is also 72%. This shows a high degree of persistence of both informality and formality in Colombia. For several reasons, including methodological ones, our calculations show that people are less likely to remain unemployed. Table 5 shows that informality does not necessarily lead on to a formal job because the probability of transitioning to formal employment from informal employment is just 14%; lower than the probability of transitioning to formality from unemployment (19%). However, informality might be a buffer to unemployment because the probability of transitioning from formal to informal employment is 20%, which is higher than the probability of transitioning from formal employment to unemployment (3%).

We also analysed transition matrices for different segments of the population. As we can see in Table 6, the persistence of men in the formal sector is higher than persistence in the informal sector for men. The same is true for the highly educated population and young adults. In contrast, the persistence of women and poorly educated workers is higher in informality than in formal jobs. In the case of the older population persistence in the formal and informal sectors is the same at 72%, which is the same persistence rate of the population as a whole. Table 6 also shows that persistence in any segment of the market - unemployment, informality or formality - is higher for men than for women. In other words, men tend to transit less than women across different statuses. It is also possible to observe in Table 6 that the probability of transitioning from informality to formality is higher for men than women, higher for young and young adults than for the older population, and higher for highly educated workers than for workers with primary education or less. In contrast, the probability of transitioning from formality to informality is higher for women, for older workers and for less educated workers. In every group of workers, however, the probability of transitioning from formal employment to unemployment is much lower than probability of moving from formal to informal employment.

Transitions in and out the labour force are also interesting. According to the ELCA, 26% of the inactive population in 2010 entered the labour force through informality in 2013, and 27% of the unemployed population became inactive in 2013. The former is mostly the result of young individuals becoming active, but unable to find a formal job. The

²³With the only exception of the older population

²⁴The average earnings of this vulnerable population groups are 33% lower than the average earnings of the informal worker and 30% lower than the minimum wage.

latter could be the result of people getting tired of looking for a job or it taking too long to find employment, which is consistent with high numbers of individuals with higher education becoming unemployed.

The main conclusion here is that informality promotes inclusive growth insofar as it acts as a buffer to unemployment, yet at the same time it can also constrain inclusive growth due to the difficulty of moving from informal to formal sector jobs. It was also found that there are asymmetries in these transitions, with vulnerable groups more prone to transit from formality to informality, and less likely to use informality as a step towards finding a formal job. This analysis assumes that the transition from informality to formality promotes inclusive growth, which is the subject of discussion in subsequent sections.

Is informality a buffer to unemployment?

The counter-cyclicality of informality is not only important as a benefit of informality itself but also because it is very much related to the question of how voluntary or involuntary informal employment is and therefore whether informality promotes or constrains inclusive growth. The left-hand panel of Graph 7 shows that there is a positive relationship between the formality rate²⁵ and the economic cycle, measured as the relative difference between observed and potential GDP. The correlation coefficient between the formality rate and the output gap is 0.74 for the ILO10 series and 0.74 for the ILO5 series until 2013. These results support the hypothesis pertaining to the counter-cyclicality of informal employment in Colombia.

The positive relationship between the economic cycle and the formality rate does not necessarily imply causality between economic growth and formality. It can be argued that high rates of economic growth can be a consequence of low informality. In order to isolate this type of double causation, we plotted the relationship between the formality rate and the value of commodity exports as a percentage of GDP trend in the right-hand side of Graph 7. Commodity exports represent a good proxy for the economic cycle since they are exogenous to informality and well correlated with the output gap²⁶. The correlation coefficient between formality and commodity exports is 0.73 for the ILO10 series and 0.63 for the ILO5 series. Therefore, we can claim that the formality rate in Colombia is in general procyclical and the informality rate is in general counter-cyclical, which is consistent with having a significant portion of involuntary informal workers amongst whom informality can increase inclusive growth. It also supports the idea of informality being a buffer to unemployment during crisis.

However, as shown in Graph 7, the most recent years show an important increase in formality rates that cannot be explained by the economic cycle. In fact, the correlation coefficient between ILO5 and both measures of the output gap, drop to 0.43 if we include the years 2014 and 2015. As we will later demonstrate, this might be related with the 2012 payroll tax reform. In other words, a relaxation of formal market rigidities might have resulted in more procyclical behaviour of the informal sector.

Is informal employment a substitute to unemployment?

Based on evidence reviewed, informality appears to represent a substitute to unemployment for the cyclically and structurally unemployed. In other words, informality represents the only alternative option for vulnerable groups and it is difficult to argue against the idea that informality promotes inclusive growth through this channel. However, for the segment of the population with at least secondary school studies, informality may represent a constraint rather than a step towards inclusive growth. The following section explores these issues further.

²⁵ Defined as one minus the informality rate. Note that the formality rate is calculated for two different ILO methodologies/series since one includes firms with less than 10 workers (ILO10, 2010) and the other includes firms with less than 5 workers (ILO5).

²⁶ See Fernandez, Villar & Sánchez, 2015

Analysis of the channels through which Informality might constrain inclusive growth in Colombia (Hypothesis 2)

To evaluate whether informality constrains inclusive growth by impacting growth and jobs in the formal sector, we analyse data from household surveys which allow us to explore whether informal employment implies lower productivity and generates lower income, benefits and stability than formal employment. Other channels that we have identified, but shall not investigate here, relate to whether: informality generates lower labour productivity according to firms; informality lowers tax revenues and/or the quantity and/or quality of public services, and; informality increases corruption. We have opted not to explore these channels further since they are already well documented in existing literature and require different sets of data than the ones we use here.

Does informal employment generate lower income, benefits and stability than formal employment?

Average income of formal workers is almost double the average income of informal workers in Colombia. However, this gap might be related to differences in individual characteristics, such as education, gender and city of work, amongst others, as demonstrated in the previous section. With the caveats explained in the literature review,²⁷ we calculated a Matching model for comparing workers' income controlled by observable characteristics, with the formal sector as a treatment group and informal workers as the control group. As shown in Table 7, the average income of the formal sector before the matching was two times the average income in the informal sector, however once controlled by observable characteristics, or matched, the wage gap lowered to 1.5 times.²⁸ Table 8 shows the test that confirms the quality of the matching.²⁹

The lower panel of Table 7 presents the unmatched and the adjusted comparisons in income between formal and informal workers by education, gender and age. Performing this disaggregated matching helps to reduce the bias generated by unobservable characteristics. We find that income is always higher for formal than for informal workers. However, the differences between unmatched and adjusted income are higher for women and the older population, as well as for the low educated group. This last result confirms findings by Herrera et al. (2013) and Nuñez (2002) regarding the disadvantages of having lower levels of education in the Colombian labour market.

Nevertheless, income might not be the only reason to look for a formal job. For example, formal jobs tend to be more stable than informal jobs. As can be observed in Table 7, 80% of formal workers consider that their job is stable compared to 66% of informal workers. These numbers are quite similar after adjusting by observable characteristics. Similarly, other benefits might provide work satisfaction other than income and stability, such as flexibility and the satisfaction of being the own boss. As the results show, 78% of formal workers are satisfied with their jobs whereas the rate of satisfaction is only 67% among informal workers, after adjusting by observable characteristics. Table 7 also shows that informal workers have high rates of health coverage at 88%, compared with 97% of formal workers. This does not necessarily mean that informal workers are contributing to the health system, since they may receive benefit from the subsidised scheme. This result suggests that the size and quality of the welfare state in Colombia plays an important mediating role in the effect of informality on inequality with the formal sector.

In sum, we find a positive income gap in favour of formal employment. However, as stated in the literature review, this difference should be analysed with care since it does not necessarily imply that workers in the formal sector are

²⁷ Wage differences between formal and informal workers should be taken with care when used because they can reflect differences in preferences for informal work or other unobservable variables, which can be partially controlled by dividing the sample in socio-economic groups.

²⁸ The logit model and the p-score that we used to do the matching are the same as those used in the previous section. The method used to match the p-scores of the informal workers with those of the formal workers is the kernel method – Epanechnikov – which has the advantage of using most of the observations and reducing the variance. Leuven and Sianesi (2003) developed the Stata code used in this exercise.

²⁹ We tested the quality of matching according to Rosenbaum and Rubin (1985), which stipulates that the standardised bias should be less than 5%. Although the bias was large for the unmatched co-variables (U in Table 7), after matching (M) all the control variables complied with this criterion. The average standard bias that is what really matters since we are working with p-scores is only 1.6%.

better-off than informal workers. The gap can also imply differences in unobservable characteristics or preferences for formal/informal work. Analysing the results by groups of individuals can reduce, though not remove, this discrepancy. In general, formal works also provide more satisfaction, health coverage and stability than informal jobs.

Is informal employment associated with lower labour productivity than formal employment?

It is possible to analyse productivity differences between formal and informal firms with the household surveys by using labour income as a proxy for labour productivity. We replicated the previous exercise controlling not only by observable characteristics but also by firm size. We also applied the definition of informality that measures health contributions in order to avoid including firm size, the new control variable, in the definition of the treatment group. As shown in Table 9, the productivity ratio between formal and informal firms is 1.5, after controlling for firm size and worker observable characteristics.³⁰

Summary

Formal jobs seem to generate higher income, satisfaction and stability than informal employment. In particular, much higher wage differentials are observable for vulnerable groups in the formal and the informal sectors. However, these findings should be interpreted with care given the difficulty of controlling for unobservable characteristics. The results also show that informal workers, particularly more vulnerable groups, receive less income and are not as protected against shocks, which implies a constraint on inclusive growth.

Given the fact that formal firms are generally bigger than informal firms, these results can be partially explained by size. However, we repeated the exercise and found that the conclusions remain the same after controlling for size, which also provides some evidence in favour of productivity differences between formal and informal firms. This reinforces what we learned from the literature review in terms of the macroeconomic costs of informality, such as tax evasion, unfair competition and higher corruption. It should be kept in mind that although informality can be positive in terms of inclusive growth for some vulnerable groups, the cost of informality at a society level should not be ignored. These costs might only become visible when informality accounts for a large portion of the working population and is more difficult to control.

Policy Analysis in Colombia: The Impact of Lowering Payroll Tax (Hypothesis 3)

The Colombian government recently reformed the tax law by reducing payroll contributions from 29.5% to 16% and substituting them with a profit tax. This substitution only affects the payments made by the employers of workers that earn wages between one and ten times the minimum wage, and does not change the amount of taxes or contributions payable by the workers. Passing and implementing the law involved several milestones. Most of the discussions were held between October and November 2012, the law was approved in December 2012, some of the reductions in contributions became effective in May 2013 and the reform was fully implemented on 1st January 2014.

The period following the reform coincided with an important reduction in informality rates. However, it also coincided with high economic growth rates and a significant reduction in unemployment rates. It is therefore of great interest to investigate whether the recent reduction in informality, from 51% in 2012 to 48.3% in 2015, was due to high rates of growth or to the tax reform; and therefore, whether informality will continue to drop in the current climate of low economic growth, which has resulted from a reduction in export commodity prices and a general economic deceleration among South American economies.

³⁰ Unfortunately the average mean grows up to 6.5, which is on the higher side. Changing the specification, we obtained the same results and a better matching, however we preferred to maintain the co-variables used in all the exercises for consistency.

The Impact of Payroll Tax Reform on Informality

One of the most adequate methodologies for isolating the impact of growth over time is the Differences in Differences method. Slonimczyk (2011) uses this technique to analyse the impact of a tax reform in Russia. The method involves dividing the population into two groups: one affected by the reform, the treatment group, and the other unaffected by the reform, the control group. The change in probability of informality within the control group is then compared with the change observed in the probability of informality within the treatment group. By taking the difference between these changes –or the difference in differences- one isolates factors that affect both groups simultaneously, such as macroeconomic conditions, assuming that the impact on informality is evenly spread between both groups. As Todd (1999) claims, the advantage of this methodology compared to a cross-section analysis is that it allows for time-invariant unobservable differences between the treatment and the control groups.



Photo: [Knife Sharpener in Mexico \(street vendor\)](#)
Credit: Eneas de Troya

As a first step, we performed this exercise for the case of Colombia, using the following equation and Ordinary Least Squares (OLS).

$$INF_{it} = \theta t + X_{it}\beta + \psi Timet + \mu Treated_i + \alpha(Treatment_i \times Timet) + uit$$

where X_{it} refers to the observable characteristics, $Time$ is a dummy variable that takes the value of zero in the baseline period and a value of one in the period after the reform, and $Treatment$ is a dummy that takes the value of one if the individual is from the treatment group and zero if not. The treatment group includes all workers that were directly impacted by the reduction in payroll taxes.³¹ The control group includes all other workers. In our baseline estimations, we excluded self-employed and public sector employees in order to reduce differences between the control and treatment groups in terms of unobservable characteristics, but we relaxed this constraint later. The control variables are the same as those used in previous sections. However, we included dummies per month in recognition of the existence of some seasonality.

Graph 8 plots the informality rate for the treatment and control groups before controlling by observable characteristics. As can be observed, although the reform was discussed in the second semester of 2012 and approved in December 2012, it only started to have an impact in January 2014 when it was fully implemented. After this period, the model confirms that workers affected by the reform, or the treatment group, were less likely to engage in the informal sector, while this was not the case for workers in the control group. Graph 8 also indicates that relatively long-term moving averages should be considered in this type of analysis since the series demonstrates considerable

³¹ According to the law, this includes workers that earn between one and 10 times the minimum wage excluding NGO workers. We also included those workers who reported an income close enough to the minimum wage or to ten times the minimum wage. In fact, we realised that a number of formal workers who probably earn the minimum wage rounded this figure up to the next ten thousand Colombian Pesos, and therefore we included them in the treatment group.

volatility. Therefore, we defined our period of analysis from the first semester of 2012, before the implementation of the reform, to the first semester of 2014, after the implementation of the reform. Second semesters of both years were analysed separately.

The results of the OLS exercise are presented in Table 10 which shows the impact of the tax reform on the treatment group was statistically significant, having reduced informality by 6.5 percentage points; whereas among the control group the informality rate increased by 3.7 percentage points. All the control variables show the expected signs. However, this exercise has some limitations because it assumes common time effects across groups³² and no changes to the composition of each group. These assumptions are less easy to control when there is no panel structure (Blundell, 2009).

To partially reduce these limitations, it is possible to use a procedure called 'Matching Differences in Differences' developed by Heckman et al. (1997). Villa (2011) developed the Stata code that we used in this paper. The idea is to match the treatment individuals after the reform with treatment individuals before the reform and with the control individuals before and after the reform, and then compare the differences in informality rates between the treatment and control groups over time.³³

Table 11 shows the results of applying the Matching and Difference in Difference methods for the first semester of 2014³⁴. According to the results, informality rates among the treatment group reduced by 7.4 percentage points in the analysis period due to the reduction in payroll taxes or to a shock impacting the control but not the treatment group, such as the reduction in payroll taxes. We also performed the exercise including self-employment and the results show a reduction in the informality rate of the treatment group of 6.8 percentage points.³⁵ Similar results were also obtained when analysing the impact between the second semester of 2012 and the second semester of 2014 when the informality rate of the treatment group reduced by 7.9 percentage points due to the reduction in payroll tax or any similar shock. These outcomes are comparable to what Anton (2014) predicted for the tax reform using a general equilibrium model and what Kugler and Kugler (2009) and Mondragon et al. (2010) predicted having examined historic changes in payroll tax.

Some interesting conclusions were also found in analysing the specific transitions of the treatment and control groups during the period of analysis (2012-2014). In fact, while the informality rate of the treatment group in comparison with the control group decreased approximately 7.7 percentage points due to the tax reform, some of this change was explained by formal workers earning less than a minimum wage becoming fully formal workers earning at least a minimum wage and probably making pension and health contributions.³⁶ We did not find the same behaviour around the upper bound of the reform i.e. ten times the minimum wage.

³² In fact, the model can control for non-observable individual specific effects and non-observable macroeconomic effects because they cancel one another out, but not for non-observable temporary individual specific effects.

³³ By mixing the methodologies, Matching and Differences in Differences, the assumption of common time effects on un-observables becomes common trend time effects on un-observables. This method does not require the linear assumption (Blundell, 2009).

³⁴ In estimating the p-score, we employed the same logit model used throughout the research and we included a dummy variable per month to control for seasonality. When conducting the matching methodology, we used the kernel procedure developed by Epachnikov, which has the advantage of reducing variance and making use of most available information.

³⁵ Not including self-employment in the estimations, the fulfillment of the parallel trends assumption for a considerable period of time before the reform was weaker; given particular changes in the self-employment affected the control but not the treatment group in 2010. This was one of the reasons for excluding self-employment from the main exercise. It is very likely that change in trends in 2010 was the result of incentives to increase formalisation at that time, particularly directed towards the self-employment. The behavior of both groups after these incentives is relatively stable and the results of the exercise including and not including self-employment are similar, suggesting that the exercise including self-employment is not heavily biased.

³⁶ By assuming that the formal workers were responsible for all the increase in the treatment group, we estimated that at most 4.1 of this change was due to this type of endogeneity. It should also be noted that the aim of the reform was to obtain exactly the same results that were obtained by the increase in the treatment group i.e. to fully formalise the working population. We also found that the change in the treatment group was overestimated by the survey, meaning that if we use the Matching Differences in Differences procedure using weights we will find a lower but more robust impact of the reform.

In order to test the quality of the matching, we applied the criteria developed by Rosenbaum and Ruben (1985)³⁷. Table 9 shows that after the matching, all variables and the aggregate bias, which is what matters the most since we are working with p-scores - fulfil this criterion. We also implemented a Placebo Test to check the common trend assumption, according to which unobservable variables such as growth, affect the outcome variable, informality, of treatment and control groups in an equal way. For the Placebo Test, the Matching and Differences in Differences Methods are applied to any other year with similar external characteristics, faking the existence of a tax reform or a similar shock, with the expectation that the results will not be affected. We performed this exercise in relation to the previous period - the first and second semesters of 2012 -and compared the results with the first and second semesters of 2013, a period which showed similar external characteristics in terms of growth but did not witness major changes in labour policy.³⁸ We obtained no significant results in informality between the treatment and control groups, as shown in Table 11. Although this test does not exclude the violation of the common trend assumption, it does suggest that growth or other unobserved variables did not impact informality in a differential manner.³⁹

Impact of the payroll tax reform on income distribution

In order to be able to apply lessons from the Colombian case to other contexts and to analyse the impact of the reform on income distribution, we explored the characteristics of the workers most affected by the reform. We began by analysing the behaviour of the informality rate per income quintile for the first semester of 2012 and the first semester of 2014. We performed the exercise for both observed labour income and imputed labour income.⁴⁰ As shown in Graph 9, informality lowered during the period of analysis primarily amongst the middle-income quintile which includes minimum wage earners.⁴¹ When we performed the Differences in Differences exercise per socio-economic group, shown in Table 12, we also found that the workers with secondary education or less benefited most from the reform. This can be explained by the fact that the reform removed a constraint that was bigger for minimum wage earners compared to workers receiving higher levels of income where wages are more flexible.

Summary

The tax reform had a relatively significant impact on the informality rate of the treatment group after controlling for observable and some unobservable characteristics. This result reflects the most common findings in other studies. However, the reduction in informality seems to have been a one-off improvement and therefore new increases can be expected as a result of the current stage in the economic cycle. We also found that the payroll tax reform had the most impact on the middle-income population because workers in this group earn close to the minimum wage where the constraint was released.

³⁷ We tested the quality of matching by using Rosenbaum and Rubin's (1985) rule of thumb according to which the standardised bias should be less than 5%. Table 9 shows that, after matching, all the control variables complied with this criterion and the average bias in the p-score - that is actually what matters the most in the estimation - is 0.4%. The standardised bias for the dummy co-variables was estimated as:

$$SB = 100 * (pc - pt) / [\{ pt(1 - pt) + pc(1 - pc) \} * 1/2]^{1/2}$$
, where pc is the proportion of each co-variable in the control group and pt is the proportion of each co-variable in the treatment group.

³⁸ Same results were obtained between the first and second semesters of 2011 and the first and second semesters of 2013.

³⁹ We had some concerns with the individuals who represent the formal workers in the control group in terms of the unobservable characteristics. This group includes some formal workers who earn more than 10 times the minimum wage, however most formal workers earn less than a minimum wage. This is not very common in a country like Colombia where the minimum wage prevails in the formal sector. Therefore, it might be the case of these workers having different unobservable characteristics when comparing them to the informal workers in the control group. However, as we are working with Differences in Differences this bias is netted when subtracting the pre-reform results, unless these unobservable characteristics cause un-even changes in the rate of informality during the observed period. We did not find any reason for such an impact, as the placebo test confirms.

⁴⁰ Using a Tobit function and years of education, gender, age, squared age and city as independent variables. The fit is reasonably accurate but it does not show the high density at the minimum wage

⁴¹ Second or fourth quintile, depending whether we used the current or imputed income.

5. MAIN FINDINGS

Does informality promote or constrain inclusive growth? After reviewing relevant literature for Latin America and conducting a detailed analysis of the case of Colombia, our answer to this question is: it depends. As Levy (2008) claimed, the problem is not informality per se rather it is too much informality which can constrain inclusive growth. In a context where it is important to promote decent working conditions yet formal market restrictions cannot be totally removed, some informality has to be tolerated. In fact, informality plays an important role in the economy by providing employment to a segment of the population that otherwise would not find a job in the formal market. However, too much informality constrains inclusive growth, particularly when it is caused by excessive labour market restrictions which prevent workers from operating in a more productive environment and from obtaining higher wages, benefits and work stability. Likewise, informality constrains inclusive growth when it is pursued on the basis of a voluntary decision, which generates negative externalities at a society level. More specific conclusions can be summarised as follows.

Informality is a major problem in Latin America and particularly in Colombia, however the informality rate has diminished recently.

The average informality rate in Latin America is high at 46%. In countries such as Bolivia, Honduras and Paraguay informality is as high as 70%. Colombia has an average informality rate of 48%. Over the last decade, informality rates have declined across the region and in Colombia, probably due to high economic growth. However, there is a chance that informality may rise again as a result of recent downward trends in growth and considering that in most countries of the region, informality demonstrated counter-cyclical behaviour.



Photo: [Local Shoe Shop in Cordoba Colombia](#)
Credit: Edwin Huffman / World Bank

Latin America has a poor record of inclusive growth. Nonetheless, recent growth was accompanied by an impressive reduction in poverty. This is also the case in Colombia

Latin America is a region with medium levels of inclusive growth. Colombia sits in the medium- lower range and demonstrates one of the most negative relationships between inclusive growth and informality. In recent years, economic growth has been accompanied by remarkable results in poverty reduction in Latin America and particularly in Colombia where poverty rates almost halved from 50% in 2002 to 28.5% in 2014. However, there is some uncertainty concerning whether this trend will be resilient in the current down turn in growth.

Informal workers in Latin America, and particularly in Colombia, are a dynamic mixture of diverse groups which demonstrate different relationships between informality and inclusive growth

Amongst vulnerable groups in Latin America, high informality rates are accompanied by relatively high preferences for salaried work. These findings lead us to the conclusion that for these groups, informality is indeed a default option to unemployment. It is difficult to argue against informality being an alternative that has increased inclusive growth for this group. However, for the segment of the population with at least secondary school studies, informality may represent a constraint rather than a step towards inclusive growth, especially considering the high persistence rates of informality which can be considered a sort of poverty trap for the region. In general, the informal sector in Latin America is extremely diverse, with Mexico showing a higher rate of 'voluntary' informality and the informal sector in Colombia demonstrating greater heterogeneity. These findings go in line with Garcia (2014) who identifies heterogeneity within the Colombian informal sector, whereby some informal workers desire a formal job whereas a relatively smaller proportion chooses to be informal.

Nevertheless, the cost of informality at a society level, which is greater when informality includes a bigger proportion of the working population, cannot be ignored

It is also important to note that although informality can be positive in terms of inclusive growth for some vulnerable groups, the costs at a society level should not be ignored. In fact, there are significant productivity differences between formal and informal sector firms and this reinforces what we learned from the literature in terms of other macroeconomic costs of informality such as tax evasion, unfair competition and higher corruption.

The payroll tax reform in Colombia produced a one-time significant but moderate reduction in informality, and generated some positive effects on income distribution

Our calculations show the Colombian 2012 tax reform had a relatively high impact of about 7 percentage points on the informality rate among workers targeted by the reform after controlling for observable and some unobservable characteristics. While some of this increase was the result of formal workers with flexible work becoming fully formal workers who earn a minimum wage, this result is very much in line with the most common findings of previous studies. On the other hand, this reduction seems to have been a one-off improvement and therefore new increases in informality can be expected as a result of the current stage in the economic cycle. We also found that the payroll tax reform impacted mostly the middle-income population. This can be explained by the fact that a greater constraint was released for minimum wage level earners compared to higher level income groups where wages are more flexible.

6. CONCLUSIONS AND POLICY RECOMMENDATIONS

When we started this research, we expected to find evidence that informality constrains inclusive growth, as common wisdom in the region dictates. However, as our analysis proceeded we discovered that informality plays an important role in society, particularly for vulnerable groups. This is a rather innovative perspective in the Latin American context.

One of the main conclusions in this paper is that informality cannot be analysed based on the assumption that informal workers are a bulk mass of individuals with similar characteristics. Informal workers in Colombia range from poorly educated individuals, which may be classified as structurally informal, to highly educated young adults living in productive cities who can be included in the voluntary informality group. These groups show very different relationships between informality and inclusive growth.

This analysis has important policy implications. Although an important bulk of the informal population is affected by formal employment barriers, 'structural informality' needs to be tackled with other kind of policies such as education. In the case of voluntary informality, imposing constraints on any remaining informal and economic incentives to become informal might be effective, whereas the same policies applied to structural informality might have a negative impact on inclusive growth. This lesson can be applied to most countries in Latin America and Africa. However, it is important to note that even if informality can be positive in terms of inclusive growth for some vulnerable groups, the cost of informality at a society level should not be ignored.

Regarding the recent Colombian payroll tax reform, our estimations show a one-time significant but moderate reduction in the informality rate of 7 percentage points among the target groups after controlling for observable characteristics and partially controlling for unobservable characteristics. Some of this increase was the result of formal workers with flexible work becoming fully formal workers who earn a minimum wage. This experience is of the most interest for countries with high levels of payroll taxes on top of high and enforced minimum wages.



Photo: [Woman tending her home store in Burga, Colombia](#)
Credit: Charlotte Kesi / World Bank

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APPENDIX A: TABLES AND GRAPHS

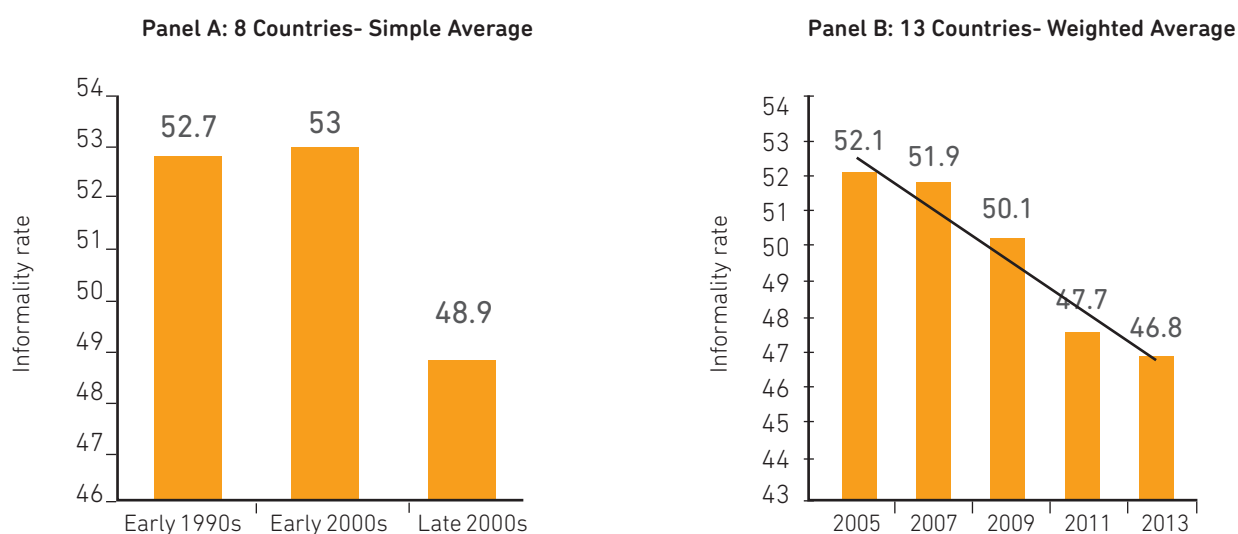
Table 1: Regional Informality Rates (2004 to 2010)

	Informality / non agricultural employment	Non agricultural employment / population
Latin America and the Caribbean	51	50
Sub-Saharan Africa	66	28
Middle East and North Africa	45	33
Eastern Europe and Central Asia	10	46
South Asia	82	26
East and Southeast Asia (excluding China)	65	38
China*	33	N/A

Source: Wiego (2014) and own calculations

* Estimates for urban China based on six cities: Fuzhou, Guangzhou, Shanghai, Shenyang, Wuhan and Xi-an

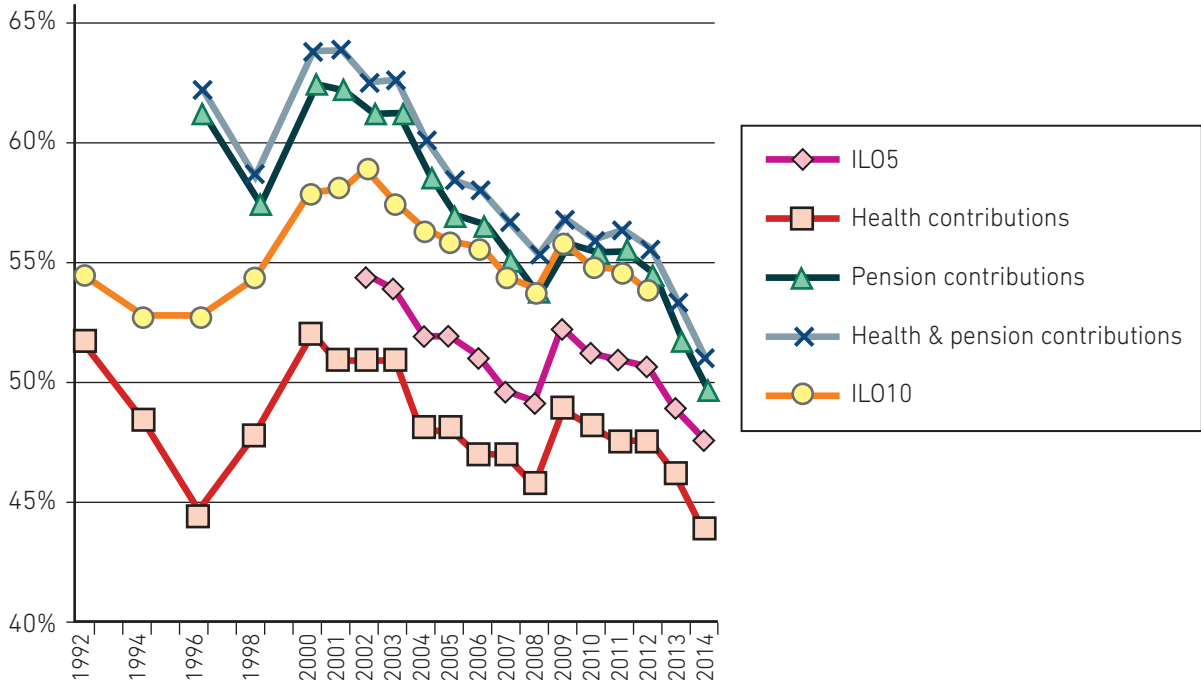
Graph 1: Informality in Latin America Based on the Firm Definition



Source: Panel A: Tornarolli (2014) based on household surveys of the countries

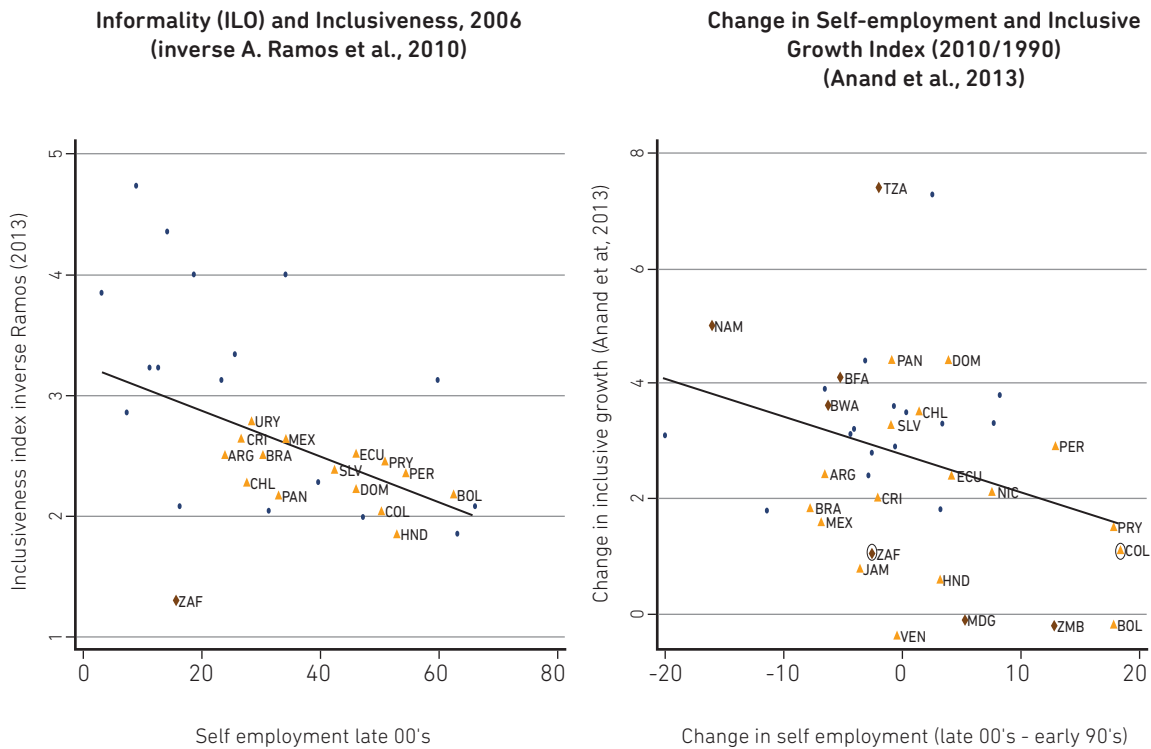
Panel B: (ILO 2013b), based on official information of the household surveys of the countries

Graph 2: Informality. Rates Based on Different Measures



Source: Own calculations based on GEIH 2007-2014

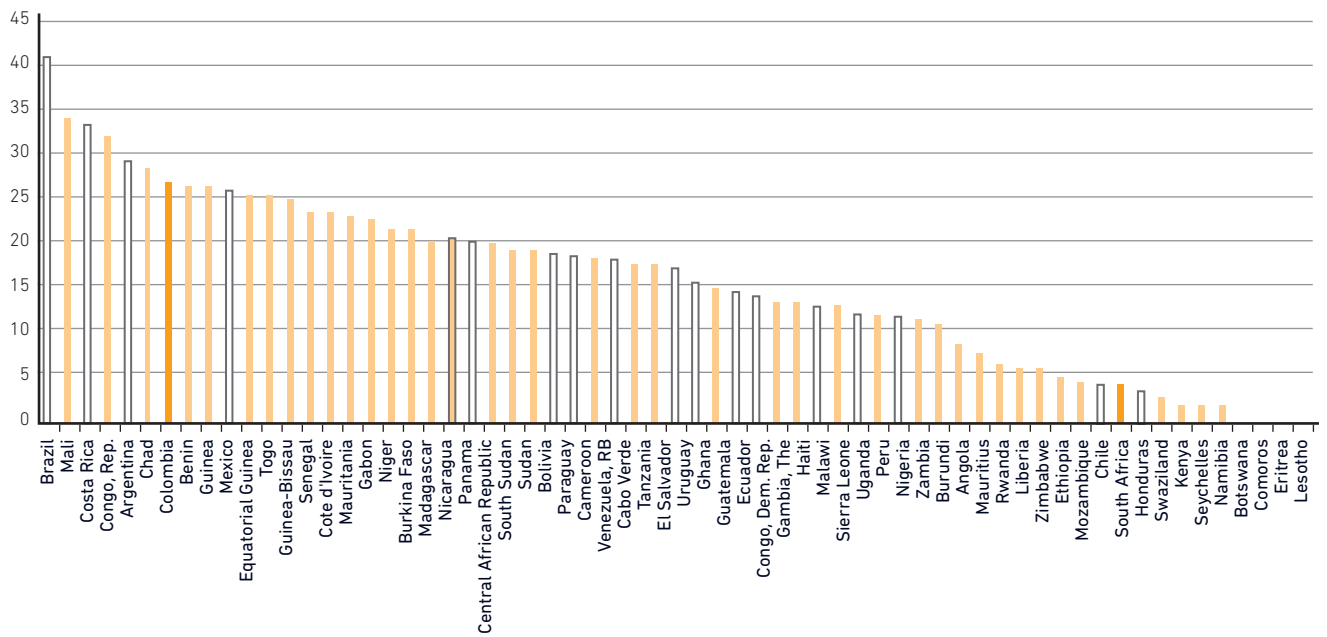
Graph 3: Informality and Inclusive Growth



Source: Own calculations based on ILO (2014), World Bank 2015 World Development Indicators, Almeida-Ramos et al (2010) and Anand et al. (2013).

Note: In the case of South Africa, change in self-employment is calculated with respect to the 2000's due to data availability

Graph 4: Payroll Taxes as a Percentage of Commercial Profits in Sub-Saharan and Latin American Countries (2014)



Source: World Bank 2014 World Development Indicators

Table 2: Drivers of Informality in Colombia. Motivations of informal self-employed workers by socio-demographic characteristics (% of answers)

	Total	Education				Gender		
		None	Primary	Secondary	College	Male	Female	
GEH 2006	Higher pay	9,6	4,3	7,4	11,4	17	11,5	6,6
	More flexible hours	13,8	6,1	10,7	17	21,5	9	21,4
	Due to his/her age	22,9	34,2	27,2	18,2	15,9	21,2	25,6
	More stability or better future	1,9	0,7	1,7	2	4	2,2	1,6
	Better prospects	4,1	2,3	3,1	4,2	9,6	4,6	3,3
	Wishes to own his/her own firm	4,6	2,3	3,6	5,2	8,6	4,6	4,6
	Less responsibility	2,4	2,2	2,5	2,5	1,6	2,2	2,6
	Does not like having a boss	8,6	7,9	8,8	8,8	8,4	9,8	6,8
	Family tradition	5,7	8,7	7,6	4	3	7	3,8
	Inherited the business	1,3	18,8	1,7	0,9	0,3	1,7	0,8
	Is used to working independently	15,6	7,9	17,9	14,1	10,2	18,2	11,5
	Other reasons	10,4	7,9	10,8	20,3	52,8	7,4	12,6
	Was fired has not found another job	4,7	2,6	3,5	5,6	8,3	5,2	3,9
	Only job he/she could get	54,9	60,4	58	54,9	41,1	54,9	54,6
ELCA 2013	Only job he/she could get	28,7	35,7	34,1	27,6	19,9	31,6	25,9
			Age				Ethnic minorities 2010	Women head of household
		Less than 15	15-18	19-24*	25-44	45+*		
GEH 2006	Higher pay	1,3	2,7	8,9	11,7	7,9		
	More flexible hours	16,9	14	16,3	17,2	9,8		
	Due to his/her age	32,2	26,5	2,3	9,1	41		
	More stability or better future	0	0,6	1,3	2,5	1,5		
	Better prospects	0,8	0,8	4,1	5,3	3		
	Wishes to own his/her own firm	0,8	3,8	4,3	5,8	3,4		
	Less responsibility	2,4	3,4	2,8	2,5	2,1		
	Does not like having a boss	4,2	4,8	8,1	9,8	7,7		
	Family tradition	8,1	4,4	5,3	4,8	6,8		
	Inherited the business	0,2	0,8	1,4	1,3	1,5		
	Is used to working independently	0,8	3,9	11,3	15,5	17,3		
	Other reasons	15,7	17,3	13,2	11,1	8,8		
	Was fired has not found another job	0	1,2	3,6	5,4	4,4		
	Only job he/she could get	56,1	68,7	68,6	57,4	48,8		
ELCA 2013	Only job he/she could get			31,7	28,4	28,8	32,2	35,2

Source: Bernal (2009), ELCA (2013), and own calculations. In the GEIH 2007-2015, the values correspond to the percentage of options checked by respondents since the two responses per questions were permitted. The ELCA 2010-2013 asked respondents to identify the main reason for informality.

* 17-24 for ELCA

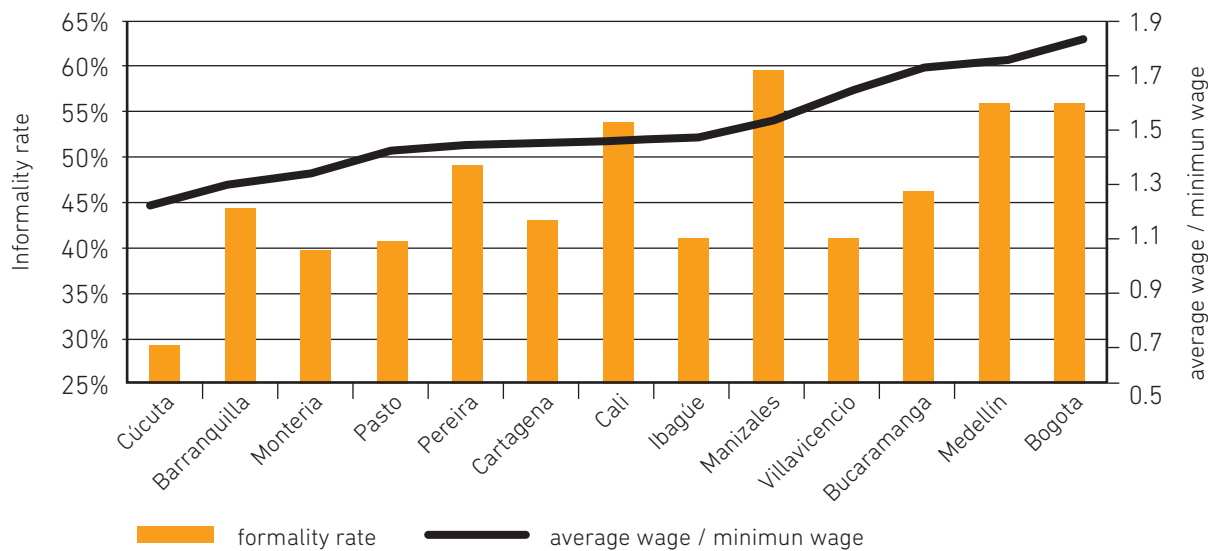
** 65+ for ELCA

Table 3: Rates and Shares in the Colombian Labour Market

	Labour Market Ratios				
	Unemployment	Informality	Formality	Economic Activity	Participation Rate
Total population	9.9%	48.6%	51.4%	32.0%	68%
Women	12%	52%	48%	39%	61%
Men	8%	46%	54%	24%	76%
Women heads of household	6%	55%	45%	32%	68%
Younger than 15	5%	92%	8%	95%	5%
Young (15-24)	20%	42%	58%	43%	57%
Young adult (25-35)	10%	35%	65%	11%	89%
Young adult (36-45)	7%	46%	54%	10%	90%
Adult (46-60)	7%	59%	41%	20%	80%
Older than 60	4%	76%	24%	66%	34%
Primary education or less	7%	79%	21%	42%	58%
Secondary education	10%	69%	31%	51%	49%
Higher education	11%	50%	50%	23%	77%
Technical or university education	10%	23%	77%	20%	80%
Years of education	10.5	8.6	12.4	8.1	9.7
	Representation among Different Socio-economic Groups				
	Unemployed	Informal	Formal	Economically Inactive	% of Total Working-age Population
Women	57%	49%	43%	64%	53%
Men	43%	51%	57%	36%	47%
Women heads of household	12%	16%	13%	14%	14%
Younger than 15	0%	1%	0%	16%	5%
Young 15-24	36%	14%	18%	29%	21%
Young adult (25-35)	29%	20%	35%	7%	21%
Young adult (36-45)	14%	21%	23%	5%	16%
Adult (46-60)	18%	32%	21%	13%	21%
Older than 60	3%	12%	4%	30%	15%
Primary education or less	13%	30%	8%	28%	21%
Secondary education	15%	21%	9%	33%	21%
Higher education	34%	31%	30%	19%	27%
Technical or university education	38%	17%	54%	19%	31%

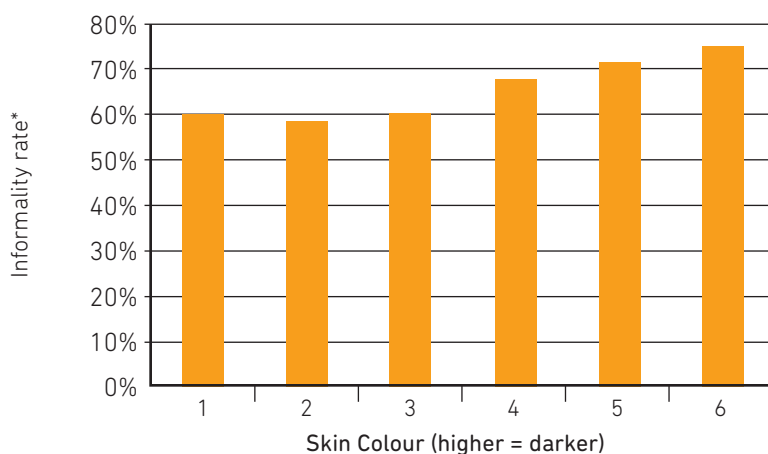
Source: Own calculations based on GEIH 2007-2015

Graph 5: Informality by Metropolitan Area in Colombia



Source: Own calculations based on GEIH 2007-2015

Graph 6: Informality and Skin Colour



Source: Own calculations based on ELCA 2013
*Includes informal workers making health and pension contributions

Table 4: Logit Model. Dependent Variable: Probability of Formality

	Odds ratio	Std error	z	Sig.
	1.5	0.0	388	***
Head of household	1.3	0.0	218	***
Women Head of household	1.0	0.0	-12	**
15-24 years	1.2	0.0	162	***
25-35 years	1.4	0.0	299	***
45-60 years	0.7	0.0	-329	***
60+ years	0.4	0.0	-550	***
Less than primary	0.2	0.0	-301	***
Primary	0.5	0.0	-646	***
Higher	2.3	0.0	530	***
Technical or university	2.4	0.0	508	***
Big city	1.6	0.0	506	***
Border city	0.6	0.0	-222	***
Constant	0.4	0.0	-695	***
LR chi2(13)	7507820			
Prob> chi2	0			
Pseudo R2	0.1697			

Source: Own calculations based on GEIH 2007-2015

Table 5: Transition Matrix

		2013			
		Unemployed	Informal	Formal	Inactive
2010	Unemployed	18%	35%	19%	27%
	Informal	4%	72%	14%	10%
	Formal	3%	20%	72%	6%
	Inactive	4%	26%	3%	67%

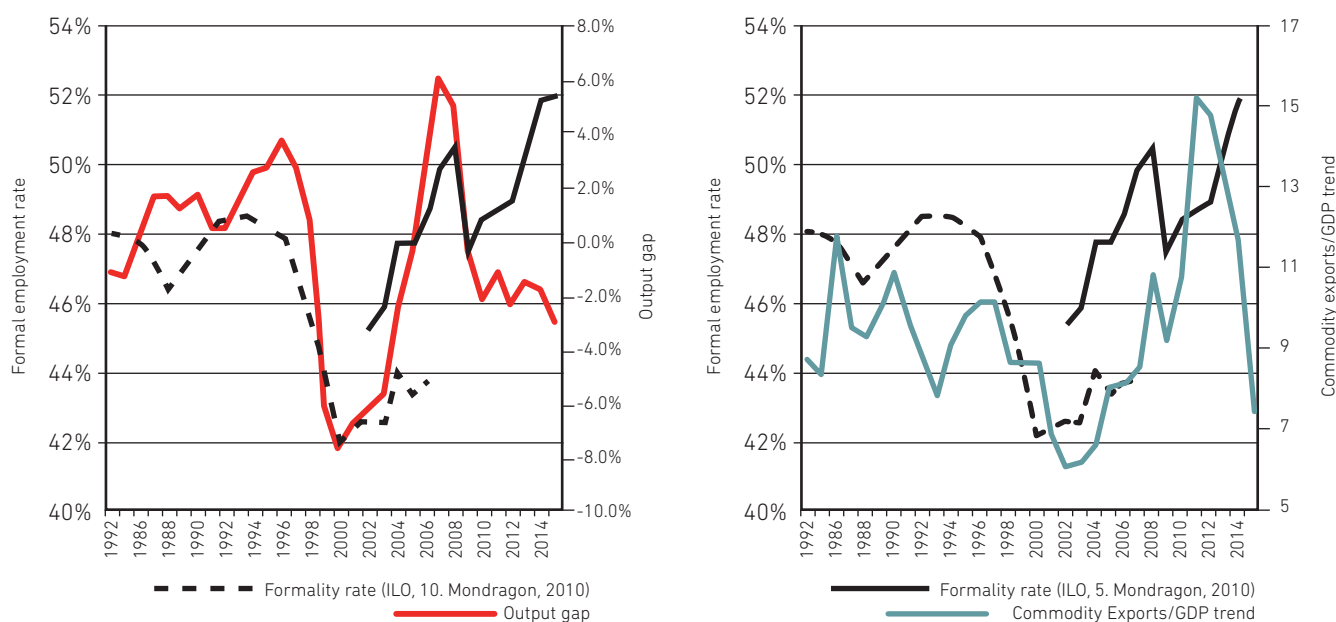
Source: Own calculations based on ELCA 2013

Table 6: Transition Matrices by Gender

		2013						2013			
		Female						Male			
2010		Unemployed	Informal	Formal	Inactive	2010		Unemployed	Informal	Formal	Inactive
	Unemployed	14%	38%	17%	31%		Unemployed	27%	30%	24%	19%
	Informal	6%	68%	9%	17%		Informal	3%	75%	17%	5%
	Formal	3%	22%	65%	9%		Formal	3%	17%	77%	3%
	Inactive	5%	26%	3%	66%		Inactive	2%	24%	7%	68%
		Older population (60+)						Young and your adults (15-35)			
2010		Unemployed	Informal	Formal	Inactive	2010		Unemployed	Informal	Formal	Inactive
	Unemployed	18%	35%	19%	27%		Unemployed	13%	36%	20%	31%
	Informal	4%	72%	14%	10%		Informal	4%	68%	20%	8%
	Formal	3%	20%	72%	6%		Formal	5%	16%	76%	4%
	Inactive	4%	26%	3%	67%		Inactive	10%	40%	5%	44%
		Elementary education or less						Tertiary education			
2010		Unemployed	Informal	Formal	Inactive	2010		Unemployed	Informal	Formal	Inactive
	Unemployed	20%	40%	9%	30%		Unemployed	11%	30%	14%	45%
	Informal	5%	73%	10%	12%		Informal	2%	66%	26%	6%
	Formal	2%	31%	60%	7%		Formal	1%	12%	83%	4%
	Inactive	4%	21%	1%	74%		Inactive	2%	30%	11%	57%

Source: Own calculations based on ELCA 2013

Graph 7: Formality Rate and Output gap in Colombia. Formality Rate and Commodity Exports



Source: Own calculations, Mondragon et al. 2010, Fedesarrollo and World Bank 2014 World Development Indicators

Table 7: Differences in income, stability and satisfaction in Colombia before and after adjusting by observable characteristics

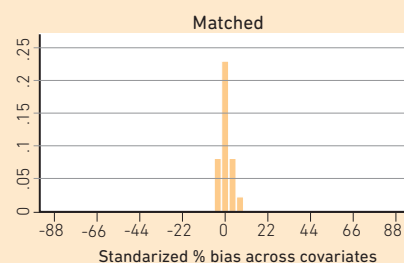
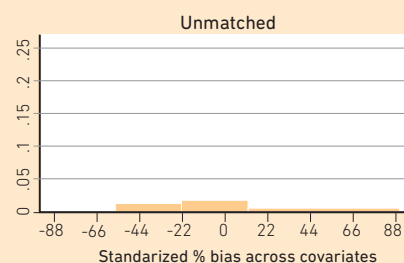
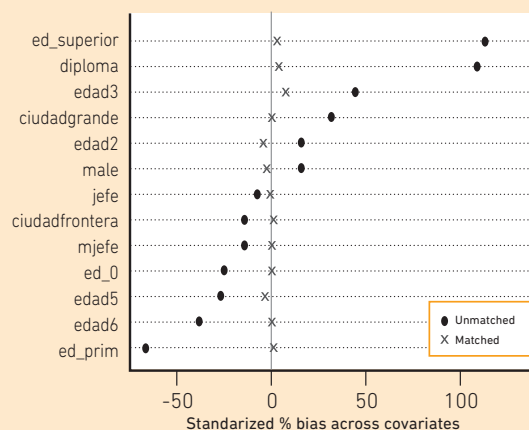
		Formal	Informal	Ratio	T-stat
Labour income	Unmatched	1308440	644807	2.0	49.4
	Matched	1308440	846798	1.5	30.4
Stability	Unmatched	80%	66%	1.2	30.8
	Matched	80%	67%	1.2	20.4
Work satisfaction	Unmatched	78%	68%	1.1	21.4
	Matched	78%	67%	1.2	18.2
Health benefits	Unmatched	97%	90%	1.1	28.2
	Matched	97%	88%	1.1	21.7
Differences in labour income per group					
		Formal	Informal	Ratio	T-stat
Primary education or less	Unmatched	780023	516648	1.5	19.9
	ATT*	780023	607136	1.3	13.0
Secondary education	Unmatched	858356	672035	1.3	15.7
	ATT*	858466	713981	1.2	11.5
Tertiary education or more	Unmatched	1703256	913491	1.9	19.5
	ATT*	1706413	972054	1.8	23.1
Older population	Unmatched	1673901	646982	2.6	33.4
	ATT*	1673901	960047	1.7	17.2
Women Head of Household	Unmatched	1369093	519175	2.6	28.1
	ATT*	1369093	765452	1.8	15.7

Source: Own calculations, based on GEIH first quarter 2015

* Average treatment on the treated, the effect of the programme on the treatment group minus the situation of the treatment group if the individuals of the treatment group had not been participants of the programme.

Table 8: Fitting the Matching model (Probability of Formality)

Variable		Mean		%bias (std)
		Test	Control	
Male	U	56%	50%	11.60
	M	56%	56%	-1.40
Head of Household	U	44%	48%	-7.10
	M	44%	44%	-0.40
Women Head of household	U	13%	18%	-14.20
	M	13%	13%	0.20
15-24 years	U	18%	13%	12.30
	M	18%	19%	-2.50
25-35 years	U	33%	19%	32.00
	M	33%	31%	5.70
45-60 years	U	22%	32%	-24.40
	M	22%	23%	-3.10
60+ years	U	4%	13%	-33.40
	M	4%	4%	0.50
Less than primary	U	0%	3%	-21.90
	M	0%	0%	0.30
Primary	U	7%	28%	-57.30
	M	7%	7%	0.70
Secondary	U	55%	16%	86.70
	M	55%	54%	1.30
Technical or university	U	46%	12%	81.70
	M	46%	45%	2.70
Big city	U	36%	27%	21.20
	M	36%	36%	0.60
Border city	U	10%	14%	-13.70
	M	10%	9%	1.20
Average (p-score)	U			32.10
	M			1.60



Source: Own calculations, based on GEIH 2007-2015.

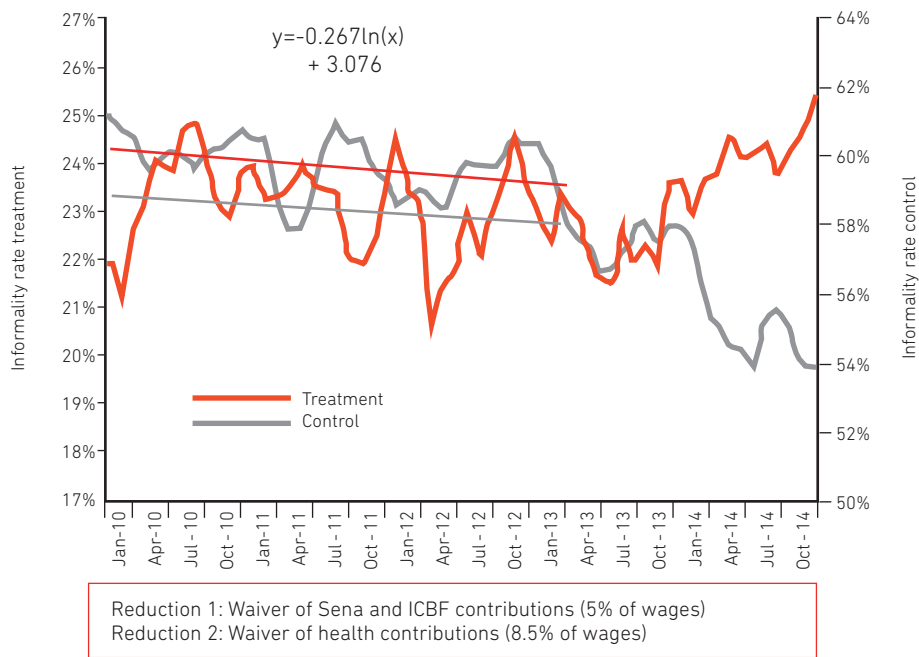
Table 9: Differences in labour income*after adjusting by observable characteristics and size

		Formal	Informal	Ratio	T-stat
Controlling for size only	Unmatched	1,323,776	576,290	2.3	56.0
	ATT	1,323,776	709,176	1.9	28.6
Controlling for size and observable characteristics	Unmatched	1,323,776	576,290	2.3	56.0
	ATT	1,314,642	858,766	1.5	20.0

Source: Own calculations, based on GEIH first quarter of 2015

*Understood as marginal productivity

Graph 8: Impacts of the Tax Reform on the Treatment and Control Groups*



Source: Authors calculations, based on GEIH
*Self-employed not included

Table 10: Results of the Differences in Differences Methods (OLS)

	Coef.	Std. Err.	t	p > t
January	0.02	0.00	6.3	0.0
Male	0.00	0.00	0.0	1.0
Head household	0.00	0.00	1.0	0.3
Women Head of Household	0.00	0.01	0.4	0.7
15-24 years	-0.01	0.00	-3.1	0.0
2-54-35 years	-0.03	0.00	-8.5	0.0
45-60 years	0.04	0.00	9.0	0.0
60+ years	0.17	0.01	21.1	0.0
Less than primary	0.07	0.02	4.4	0.0
Primary	0.03	0.01	5.7	0.0
Secondary	-0.12	0.00	-25.8	0.0
Higher education	-0.20	0.01	-32.4	0.0
Technical or university	-0.05	0.01	-8.5	0.0
Big city	-0.04	0.00	-12.3	0.0
Border city	0.04	0.00	7.8	0.0
Test	-0.28	0.00	-58.8	0.0
Year	0.04	0.01	6.4	0.0
Test*year	-0.07	0.01	-9.8	0.0
_cons	0.67	0.01	104.1	0.0
Number of obs	89058			
F(18, 89039)	1121.27			
Prob> F	0			
R-squared	0.1848			
Adj R-squared	0.1846			
Root MSE	0.42176			

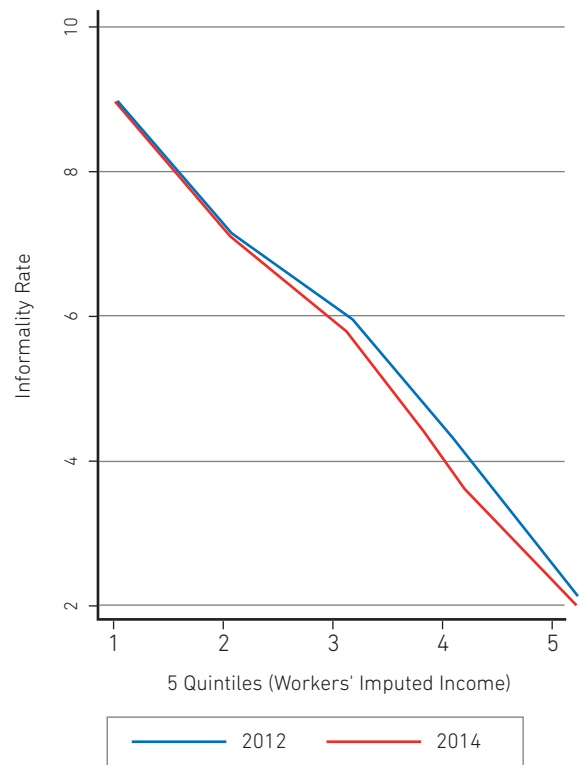
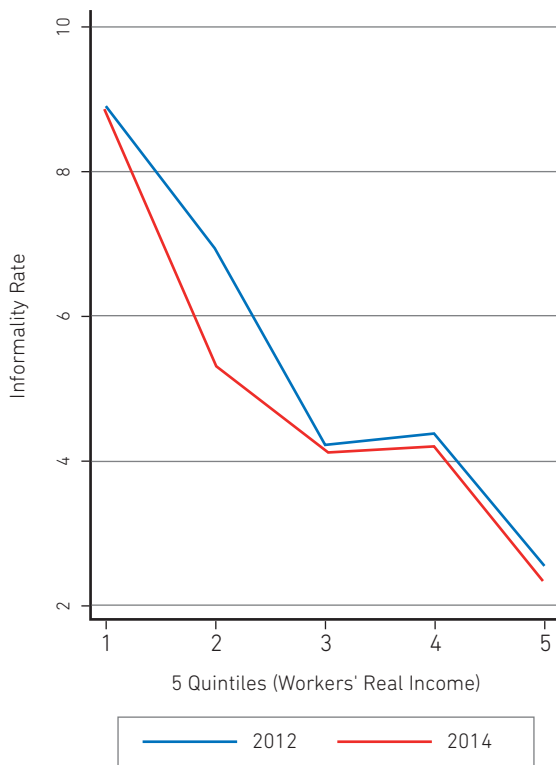
Source: Own calculations, based on GEIH 2007-2015
*Times

Table 11: Impact of the Lowering of Payroll Taxes. Results from the Differences in Differences and Matching Methods

Baseline (excludes self-employment)							
First semester 2014/First semester 2012							
	Baseline			Follow up			
	Control	Test	Difference	Control	Test	Difference	DID
Informal workers	52.20%	25.40%	-26.90%	55.90%	21.70%	-34.20%	-7.40%
Std. Error	0.003	0.003	0.004	0.003	0.003	0.004	0.006
T	168.16	81.7	-61.13	180.82	70.16	-78.25	-11.86
P> t	0	0	0	0	0	0	0.00%
Second semester 2014/Second semester 2012							
	Baseline			Follow up			
	Control	Test	Difference	Control	Test	Difference	DID
Informal workers	53.40%	25.00%	-28.40%	57.20%	20.90%	-36.30%	-8.00%
Std. Error	0.003	0.003	0.004	0.003	0.003	0.004	0.006
T	173.8	81.5	-65.3	188.7	68.8	-84.7	-13
P> t	0	0	0	0	0	0	0.00%
Quality of the Matching							
Weighted Variable(s)	Mean	Control	% Bias (std)	Weighted Variable(s)	Mean	Control	% Bias (std)
Less than primary	0.60%	0.60%	0	Male	59.10%	59.20%	-0.2
Primary	12.40%	12.10%	0.92	Head of household	47.40%	47.40%	0
Secondary	35.50%	34.50%	2.1	Women Head of Household	11.40%	11.60%	-0.63
Higher education	40.10%	41.10%	-2.04	15-24 years	16.00%	16.10%	-0.27
Technical or university	31.90%	32.80%	-1.92	25-35 years	33.40%	34.80%	-2.95
Month 1	15.90%	16.10%	-0.5	45-60 years	22.80%	21.30%	3.62
Month 2	16.30%	16.00%	0.8	60+ years	3.40%	2.70%	4.07
Month 3	17.30%	17.30%	0	Big city	37.00%	37.00%	0
Month 4	17.40%	17.50%	-0.3	Border city	8.80%	8.60%	0.09
Month 5				Total			0.09
Placebo test							
First semester 2011/First semester 2013							
	Baseline			Follow up			
	Control	Test	Difference	Control	Test	Difference	DID
Informality rate	56.1%	25.9%	-30.2%	53.3%	23.8%	-29.5%	-0.7%
P> t	0%	0%	0%	0%	0%	0%	76%
First semester 2011/First semester 2013							
Informality rates	56%	26%	-30%	53%	24%	-29%	1%
P> t	0%	0%	0%	0%	0%	0%	17%

Source: Own calculations, based on GEIH 2007-2015

Graph 9: Lorenz Curvev



Source: Own calculations, based on GEIH 2007-2015

Table 12: Impact of the tax reform by population group

	Outcome	Baseline		Follow up		DID
		Control	Treatment	Control	Treatment	
Low Educated (Primary or less)	Informality P> t P > t	72% 0%	47% 0%	77% 0%	41% 0%	-10.14% 0%
Secondary	Informality P> t P > t	55% 0%	26% 0%	64% 0%	23% 0%	-11.9% 0%
Tertiary education or higher	Informality P> t P > t	37% 0%	14% 0%	40% 0%	13% 0%	-4.26% 0%
Male	Informality P> t P > t	54% 0%	28% 0%	58% 0%	24% 0%	-8.21% 0%
25-35 years	Informality P> t P > t	48% 0%	18% 0%	52% 0%	16% 0%	-6.61% 0%
60+ years	Informality P> t P > t	72% 0%	55% 0%	72% 0%	49% 0%	-4.9% 0%
Women head of household	Informality P> t P > t	52% 0%	26% 0%	53% 0%	23% 0%	-4.0% 0%

Source: Own calculations, based on GEIH 2007-2015