DISSERTATION

THREE ESSAYS ON INFORMALIZATION

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ABSTRACT

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This dissertation uses informalization as a way to identify workers and enterprises that engage in low-productivity, or contingent economic activities, and are systemically excluded from the costs and benefits of social welfare. Informalization represents a serious challenge for inclusive development in many economies around the world, particularly those in Latin America. The first chapter uses a political economy perspective to argue for adopting institutional approaches to conceptualize and understand informalization in order to account for the structural, exclusionary, and discriminatory dimensions of this development challenge. Adopting a macroeconomic perspective, chapter two analyzes the association between real exchange rates and the extent of urban informal employment in multiple Latin American economies in recent decades. Results indicate that real exchange rate competitiveness is associated with lower levels of urban informal employment in the region. The third chapter, taking a microeconomic approach, explores differences between formal and informal enterprises in Guatemala, and how these differences impact output and labor productivity.

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1. Introduction

The following chapter uses informalization as a way to identify workers, enterprises, and other economic agents that engage in typically low-productivity, casual or contingent economic activities, and are systemically excluded from the costs and benefits of social welfare. These circumstances make it difficult for sector participants to invest or make other long-term economic decisions. Informality and informal sectors are different than shadow or underground economies in the sense that the latter refers to all activities outside of legal and fiscal boundaries, including illegal or intentionally hidden activities to evade regulation, taxes, or the law. Instead, informalization, as treated in this essay, emphasizes how surplus labor, exclusion, and discrimination play fundamental roles in keeping informal agents systemically outside of formality. Informalization is then an important social as well as economic category in development economics and political economy.

Dominant narratives about informalization in development economics reflect currents of economic thought that neglect historic, cultural, and political processes that influence the division of labor in development. The following essay gives an overview of the tension between mainstream and heterodox views of informalization from a development economics perspective. It focuses on how previous explanations of informalization are fundamental to the failure of development and economic policy to ameliorate its persistently high levels in many regions of the world.

The core argument is that mainstream theories on informalization have focused on its economic measure and fiscal dynamics. As a consequence, they have neglected the political economy of informalization and the structural problems crucial in determining its appearance and evolution. Furthermore, studying the institutional and structural components of informalization serves as a gateway to exploring its elements in a more holistic way, recognizing it as a multidimensional social issue that manifests the dynamics of exclusion and privilege in the wider economic system. A summary

of this perspective is found in Figure 1.1, which presents a taxonomy of mainstream as opposed to heterodox or structural views of informalization. On the mainstream front, Figure 1.1 highlights how economists understand informalization in a legalist way in which individuals exit the formal sector, highlighting the central role of choice in this perspective. By contrast, structural views include structuralist, Marxian, and feminist approaches, all of which highlight the role of social and economic institutions in determining informalization outcomes.

Combining the insights of these approaches, this chapter argues that high levels of informalization reflect failures of inclusion in formal institutions and labor markets. Informalization also reflects the structural consequences of the lack of industrial job growth, as growing urban sectors fail to absorb new workers. Informalization may thus be regarded as a poverty trap and a way to reproduce socially destructive forms of accumulation. Informalization also exacerbates inequality since informal modes of provision are more frequently accessed by precarious workers and minorities. The lack of recognition of these dimensions of the problem clouds policy prescriptions and research on the topic.

The problems associated with informalization overlap with those discussed in the literature on structural change, class, and labor market discrimination. In addition, making use of ideas describing how institutions and structures in labor markets evolve improves the study of informalization by providing a language to discuss conflict and power. By conceptualizing informalization as 'institutional', the problem is envisioned as an economic outcome challenging developing economies.

Informalization, as it is related to productivity, job quality, and labor conditions has been central in the agenda of research supported and recognized by development organizations such as the International Labor Organization, the World Bank, and the World Trade Organization. It is important to continue providing visibility to the informal sector in a sensible way, understanding that informalization cannot be solely the product of individual choice for exit, but that new labor relations

and exclusion continue to be a part of the multiplicity of factors that define the evolution of this phenomenon.

2. Informalization and Conceptual Ambiguity

Anthropologist Keith Hart (1973) was one of the first social scientists to use the term 'informal' to describe casual transactions. It is useful to study the evolution of his thought. Hart's view of 'informality' reflects on a problem attributed to the way in which the division of labor takes place in an economy. He argued that the distinction between formal and informal employment is based on wage-earning and self-employment.

> Most enterprises that run with some measure of bureaucracy are amenable to enumeration by surveys, and -as such- constitute the modern sector of the urban economy. The remainder- that is those who escape enumeration- are variously classified as 'the low productivity urban sector', 'the reserve army of the underemployed and under-employed', 'the urban traditional sector', and so on. (p.68)

Since then, the reconceptualization of informal economies has taken drastic turns. For example, Hart's definition highlights a link between counting workers and defining employment sectors in an economy. The linkage between those who escape enumeration with productivity outcomes and under-employment, conceals surplus labor and exclusionary processes behind the problem. Many of the problems that limit the performativity of economic methodology in explaining the dynamics of informal economies can be reduced to this type of ambiguity.

Informal economies can and have been misrepresented through aggregating them with other types of non-formal economies. Recognizing the difference between informal economies and underground economies is crucial if one is to recognize a reason to study surplus labor and exclusion as they are related to informality. Feige (1990) for instance, clarifies this problem by splitting and disaggregating underground economies into four separate different economies:

> The *illegal* economy encompasses the production and distribution of legally prohibited goods and activities. This includes such activities as drug trafficking, prostitution, and

illegal gambling… The *unreported* economy consists of actions that "circumvent or evade established fiscal rules as codified in the tax code". The amount of income that should be reported to the tax authorities but is not represents a summary measure of this form… The *unrecorded* economy encompasses activities that circumvent reporting requirements of government statistical agencies. Its summary measure is the amount of income that should be recorded in national accounting systems but is not… The term "*informal economy*" has been used so frequently and inconsistently, in the development literature that it requires special attention. The informal economy comprises economic actions, workers or goods and services <u>that bypass the costs of and are excluded</u> from the protection of, laws and administrative rules covering property relationships, commercial licensing, labor contracts, torts, financial credit and social security systems. (p. 7)

Reading carefully, for Feige the process of bypassing institutions and the process of exclusion are not explicitly differenced, but they are combined, confounding the causes behind informalization. The problem of ambiguity is present. The motive behind informal economic activity is ambiguous since informal agents present the product of the tension between agency and structure in a radical way: they make the choice of bypassing the cost of regulation and taxes while in many instances, informals are members of groups that are actively and systematically excluded from the institutional system they are claimed to be bypassing. More clarity is needed.

Today, Hart's (2008) descriptions suggest that informalization should be brought back to its original structural analysis of development impacting labor and enterprises, but that the task may be more difficult due to the conceptual ambiguity the problem has developed over time.

The term 'informal economy' became current in the 1970s as a label for economic activities which take place outside the framework of corporate public and private sector establishments. It arose at first in response to the proliferation of self-employment and casual labor in Third World cities; but later the expression came to be used with reference to societies like Britain, where it competed with other adjectives describing deindustrialization – the 'hidden', 'underground', 'black' economy, and so on. Now its range of reference is very wide, embracing everything from high-level political corruption to home improvement. (p.1)

Hart's perspective reminds us that there exists a cost to the ambiguity about informality. The concept has so many different purposes in policy making and research that it is difficult to assess what it

actually stands for anymore. Perhaps the most ideologically significant digression taken in past decades with the concept of informalization is that of the 'shadow' economy, which reproduces the problem of aggregating informal economic activities to many other different types of underground economies.

3. Mainstream Economic Perspectives on Informalization

The Legalist view of informal economies was proposed by the Peruvian economist Hernando de Soto, (1989). He argues that informal economies reflect both economic as well as institutional problems. He argues that the process of informalization occurs in three stages: migration, confrontation, and invasion. The first stage is one in which a new sector of labor emerges in an economy. This could be due to migration or economic reasons, such as a minority participating to a larger extent in labor markets. De Soto recognizes, for example, the separation between the modern sector and a rural traditional one, consistent with many dualist views found in development economics.

De Soto's analysis starts expanding traditional dualist views by considering the city as a hostile place for migrants and new workers. In the second stage of the emergence of informalization, De Soto argues that social exclusion in the form of labor market discrimination emerges as the product of the clash between the old and the new sectors. It is in this stage that discrimination and exclusion play their most endemic influence. In a third stage, De Soto describes how legalistic informalization normalizes as informal economic agents settle in, and generate modes of distribution and production of goods and services that society obtains in formal sectors at a much higher cost. These new modes of production and distribution may solve many provisioning problems and generate new opportunities for employment and consumption, but fail to reflect formal institutions by circumventing regulations, contracts, and the rule of law.

De Soto illustrates the three-stage process of informalization by describing the process of land acquisition in cities in Peru. De Soto argues that the way in which land appropriation develops has the

opposite order in the formal, as compared to the informal sector. While in the formal sector, property is first registered, then built upon, and finally occupied and put to use, the informal sector operates in the reverse order - where use of land comes first, then infrastructure is installed, and finally we see the registration of these properties develop (De Soto, 1989). This process can be observed in the emergence of slums in multiple Latin American cities such as Rio de Janeiro and Guatemala City. De Soto's perspective highlights how the institutional and bureaucratic failures that give rise to the informal sector also bring about a reversal in the sequencing of urban development: from occupation and use to ownership. By doing this, de Soto's work puts the status of property rights at the core of his prescription to correct informalization, paying less attention to the two first steps of the development of informal sectors: the emergence and persistence of surplus labor, and discrimination and exclusion in labor markets.

De Soto's legalist view became a bastion of criticism of government and formal institutions in Latin America in the 1990s and early 2000s. The focus on the rule of law and property rights clouded questions about the creation of high-quality jobs for new entrants and improving inclusion in labor markets. Consequently, the legalistic approach to informality perceived that at the core of the persistence of informal sectors, the problem was one of institutional quality but neglected both the role of policy promoting inclusion and reach, and the typical structural consequences observed in early stages of industrialization. The emergence of new types of labor in the process of structural change and the changes in different social relations of power that are associated with labor conditions were rarely discussed in the literature of informalization in this decade, in part to the compatibility of the third stage to Neoliberal[1] paradigms that were dominant in Latin America at the time.

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[1] This essay understands neoliberalism along the same lines as Dani Rodrik (2017), who argues that in broad terms, it denotes a preference for markets over the government, economic incentives over cultural rules, and private enterprise over collective action.

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Some, using De Soto's legalist approach, went as far as to develop a romantic view of informality: since informalization is the product of a failed state in terms of labor market regulation and public goods provision, legalists see in the informal sector an element of heroic entrepreneurship. Informal economic agents face discrimination and take the risk of penalties and persecution by a corrupt formal sector supported by dysfunctional state governments, while still providing many different goods, services, enterprises, and other sources of jobs that many in the cities have used and valued for a long time (La Porta and Shleifer, 2014).

From a macroeconomic perspective, the framework that emerged in the early 2000s blends the logic of de Soto's dysfunctional state, new-institutional economics, and the framework presented in Hirschman's seminal work *Exit, Voice and Loyalty* (1970). This approach is known in the literature as the 'exit-option'. This conceptualization of informalization still portrays informal agents as rationally choosing to exit the formal sector purposefully. Schneider (2000) argues,

> A growing shadow economy can be seen as the reaction of individuals who feel overburdened by the state and who choose the "exit option" rather than the "voice option". If the increase of the shadow economy is caused by a rise in the overall tax and social security burden together with institutional sclerosis, then the consecutive 'flight' into the shadow economy may erode the tax and social security bases. The result can be a vicious circle of a further increase in the budget deficit or tax rates, additional growth of the shadow economy and gradual weakening of the economic and social basis of collective arrangements. (p.4).

Schneider's argument raises several questions about what the role of the state is in this context. Following Hirschman's metaphor, what the exit option does is equate the state with a particular firm that is trying to conserve clients despite reductions in product quality. However, it is difficult to identify if individuals exit this relation out of a drop in quality, or if many did not even have access to that market due to barriers of entry in the first place. In this sense, it is easy to see how this perspective misses the first two steps described by De Soto as necessary to the formation and persistence of informalization.

It is worth pointing out that the exit-option represents an operational opportunity on the study of informal economies. At the macroeconomic level, Schneider uses cash transactions, measures of labor policy and business regulation, and indicators of development to indirectly estimate an aggregate measurement of the shadow economy as a percentage of GDP. For Schneider, the shadow economy is simply a macroeconomic aggregate of production. Schneider (2010) produces an index of shadow economies from 1999 to 2007 measured in a consistent, complete, and comparable way for 162 developed and developing countries. Newer measurements of this estimate have included various methodologies, such as energy consumption and discrepancies in national accounting.

Indirect measures of shadow economies have become a standard in cross-country analysis of informalization. Retrospectively, we can see more clearly now how the conceptual ambiguity mentioned previously has serious consequences in how useful these indirect measures of the shadow economy actually are. In a more recent paper, Schneider and Medina (2018) argue that today, while other indirect methods like energy consumption estimates are being developed, the current state of this research is frustrating since all methods have different advantages and weaknesses in quantifying the size of the shadow economy. Estimation and validation of results still deserve more attention since it is hard to assess causal mechanisms on this type of estimations. The lack of an international standardized definition of the shadow economy remains a persistent problem.

It is easy to see the lack of effectiveness an ambiguous concept like the shadow economy will have addressing problems that may be ameliorated through policy associated with improvements in the productivity, inclusion, and lack of quality jobs in developing economies. Perhaps this is the largest blind spot of the mainstream approach: it fails to recognize how policy may influence the two first steps in the informalization process identified by De Soto.

4. The Political Economy of Informalization

The political economy of informalization approach identifies the informal economy as a macro outcome of social relations embedded in production and exchange. It is important to highlight that political economy views of informalization provide insights about how social relationships of power exist within and between formal and informal economies, and how they interact. This perspective allows the study of social factors that may foster or diminish informalization, as it does not target individual choice as the central determinant of informalization but considers policy and inclusion as relevant concerns in development. For simplicity, the following analysis reduces the contributions of the political economy of informalization to three broad approaches: Structuralism, Marxian, and Feminist perspectives. These views are characterized by conceptualizing informal economies in the dimension of conflictive social relationships of power that emerge within informality, as well as between the informal and the formal sectors.

4.1. Structural Development

Structural approaches emphasize how the processes and failures of structural change generate surplus labor and informality in the context of development. In this respect, they address the first step pointed out by De Soto. These perspectives highlight the role of surplus labor, migrant workers, changes in the labor force, and new workers transferring from different sectors in the economy. Structural perspectives can provide rich theoretical and empirical analysis on informalization as a labor outcome. While the methodology by which sectors are defined may vary - such as the focus on agriculture, industry, and services, or the classical development duality between the traditional and the modern sectors - the study of how these structural differences impact surplus labor is typically a point of connection that these approaches share.

Starting with Lewis' (1954) recognition of the existence of informal economic activities in developing economies as forms of 'casualization' of work, he argues that the lack of productivity

growth and excessive division of labor generates small enterprises in urban sectors and a persistent unemployed population with informal occupations. Lewis also considers labor market failures of 'separability' in the household and women's work as informal, hinting at issues that will later be examined by the feminist perspective with more depth. The following quote provides insight into his observations, in particular providing good examples of people we can still find today in informal economies around the world.

> Several writers have drawn attention to the existence of such 'disguised' unemployment in the agricultural sector, demonstrating in each case that the family holding is so small that if some members of the family obtained other employment, the remaining member could cultivate the holding just as well. The phenomenon is not, however, by any means confined to the countryside. Another large sector to which it applies is the whole range of casual jobs-the workers on the docks, the young men who rush forward asking to carry your bag as you appear, the jobbing gardener, and the like. These occupations usually have a multiple of the number they need, each of them earning very small sums from occasional employment; easily their number could be halved without reducing output in this sector. Petty retail trading is also exactly of this type; it is enormously expanded in overpopulated economies; each trader makes only a few sales; markets are crowded with stalls, and if the number of stalls were greatly reduced, the consumers would be no whit worse off. (p. 2)

Lewis identifies different sectors in which economists can observe the emergence of 'disguised' unemployment and casual jobs in the surpluses generated by modernization and structural changes in the development process. His work lays the foundation to take sectorial compositions of economies more seriously as we try to understand the problem of development and informalization.

Todaro's (1969) approach focuses on the relationship between internal migration and congestion in labor markets in developing countries. The main story of the origin of informal economies from this 'dualist' perspective can also be described as a labor surplus problem. However, the *Todarian* approach pointed out an interesting paradox that identifies a central cause of informal economies: As cities create employment, the payoffs of moving into them from a rural and less developed sector increase. This attracts more migrants into highly urbanized sectors and the problem is exacerbated as many developing countries experience high degrees of uneven development with

agglomerated cities. Very early in the development of this literature, this approach already proposed taking wage and migration policy more seriously to curtail the negative effects of this agglomeration process. This perspective is also associated with the first and second steps presented by De Soto, typically aggravated as economies do not develop or alter their composition, creating a successful link between informality, policy, and the process of structural change.

A modern application of dualist and labor surplus models with equilibrium unemployment can be seen in the application of the logic of the matching model framework in Yves Zenou's (2008) work. This work adapts Todaro's dynamics to the study of labor markets with informal sectors. For Zenou, the use of policies regarding minimum wage and internal migration ameliorate the incidence of informalization in the modern sector. This work shows that the structuralist view can be adapted to more conventional models of macroeconomic analysis, and that modeling labor markets accounting for formal and informal distinctions may provide insights about the long-run dynamics of employment in developing economies where this distinction persists.

Another potentially useful macroeconomic approach is the use of mainstream growth models with two sectors that can be found in Frenkel and Ros (2006) and Loayza's (2016) work. Coming from a growth framework, they model the evolution of two sector economies with the goal of developing policy analysis pertaining to labor market outcomes, adapting Todaro's dynamics to models considering equilibrium unemployment. A common attribute of these studies is their primary focus on explaining formal unemployment rather than exploring the role of informalization in development. However, in the process, they typically need to consider a residual sector that they attribute to informalization.

An emergent narrative from the structural literature suggests that the lack of industrial job growth is at the core of the lack of quality of jobs in developing economies, as well as their overall economic underperformance (Rodrik, 2009). This perspective highlights how the lack of

industrialization creates job scarcity that is never quick enough to absorb new workers into the labor market. Informal surplus labor is again seen as a consequence of this problem. The lack of industrial policies that could facilitate the absorption of surplus labor again becomes a crucial challenge to ameliorate informalization.

The structural logic is often applied in development research via multisector analysis. For example, focusing on how some economies urbanize without industrializing, Gollin et al. (2013) argue that commodity dependence interacts with the structure of developing economies by benefiting sectors that do not necessarily promote industrial enterprises, and consequently, do not promote industrial employment. In turn, labor is absorbed in the service sector and agriculture, sectors that typically have low levels of productivity per worker in developing economies. Gollin neglects how the informal sector can be equally important in absorbing workers as countries take longer to industrialize and develop higher quality jobs.

From Lewis to Gollin, we can perceive that the structuralist perspective of understanding informalization focuses on the labor surplus dimension. This rich literature highlights how the evolution in the size and relative importance of sectors is crucial in determining the incidence and persistence of informalization as a labor outcome, linking it with policy, industrialization, and development.

4.2. Neo-Marxian Perspectives

Marx and Engels write about "the 'rabble' of unorganized workers in towns, devoid of political power under their masters in early urbanization and industrialization stages" (Marx, 1939, p.23). From a Neo-Marxian perspective, informality is associated with the distribution of assets and the dynamics of class struggle within the framework of underdevelopment and deindustrialization. Neo-Marxian work highlights how informal labor can easily be abstracted as a class in capitalist market economies. Neo-Marxian perspectives tend to explain forms of exploitation that emerge from the institutional

exclusion found in informal economies. These forms of exploitation reflect prototypical power relationships in the dynamics of these economies. For example, Thomas Barnes (2012), applying a Neo-Marxian perspective evaluates various forms of exploitation that occur within informal economies. Among them, he includes the existence of few collective rights, low bargaining power, lower irregular incomes, low personal security, harassment, acceptance of poor employment conditions, and lack of regular work.

The Neo-Marxian analysis is also interested in studying how the existence of informal sectors represents an additional threat to formal labor, providing an immediate risk of destitution from formality. This can be done via class analysis. An example can be seen in the work by the sociologist Alejandro Portes (1989) who, for example, adapted the Marxian approach to class to include informal labor by defining class structures taking into account power over the means of production, power over labor, and mode of remuneration. Adding mode of remuneration to define classes allows the adaptation of class-based analytical framework to the exploration of informal labor and the types of exploitation proposed by Barnes.

In his classification, Portes includes the informal petty capitalist and the informal proletariat, highlighting labor and capitalist relations within the informal sector and potential conflicts between them. The main source of inequality between the formal and informal classes is the variability of the type of income and mode of remuneration of labor: casual wages in the case of workers and irregular profits in the case of the informal petty Bourgeoisie. Just as Bowles (2006) points out, adapting class analysis to the context of informal economies can highlight the way in which the initial distribution of assets impacts the types of contracts individuals engage in, and consequently, the accumulation schemes in which they engage that will persist in the long run.

The existence of informal classes can assist in considering how the logic of divide and conquer generates distributive processes of uneven development. Urban societies cannot revolt and generate

institutions from 'the bottom-up' since the power of negotiation of urban formal labor classes becomes jeopardized by the immediate threat of unemployment and the added threat of informality. This threat consists of a low-quality, low-productivity job that is void of a multiplicity of rights already won through belonging to the formal sector. This conflict creates a prisoner's dilemma in which class conflict makes the emancipation of the traditional proletariat impossible, and thus, revolutionary change is halted. This process is analyzed in more depth by the Neo-Marxian sociologist Michael Lowy (1981).

> Every sphere of society experiences defeat before it celebrates victory and asserts its narrow mindedness before it has had a chance to assert its generosity. As a result, even the opportunity of playing a great role has always passed by before it was every really available, and every class, as soon as it takes up the struggle against the class above it, is involved in a struggle with the class beneath it. Thus, princes struggle against kings, bureaucrats against aristocrats, and the bourgeoisie against all of these while the proletariat is already beginning to struggle against the bourgeoisie. The middle class scarcely dares to conceive the idea of emancipation from its own point of view and already the development of social conditions and the progress of political theory have demonstrated this point of view to be antiquated or at least problematic. It is, therefore, the working-class menace from below that makes the bourgeoisie conservative and prevents it from becoming a revolutionary force of any consequence. (p.10)

Lowy, following the case of developing economies, argues that this process of creating conflict between those in the middle - for example, between formal and informal enterprise owners - fosters the logic of divide and conquer, and prevents working classes from exiting this struggle; all while the powerful sit calmly and observe the scuffle while they exploit the situation to profit from it. Moreover, Lowy (Ibid.) highlights that the informal sector plays an important role, perpetuating in this manner the dynamics of uneven and combined development.

> For instance, many countries in Latin America one has seen a strong development in agribusiness. On the other side, in many big towns in the South, industrial development has been limited, and the majority of urban population, living in the slums, survives on the margins of the productive system in the so-called 'informal economy'. (p.147).

Lowy illustrates how, in the conversation about informalization, the Neo-Marxian perspective has a lot in common with structural thought. Just as structuralist perspectives, Lowy's focus on how the excessive investments in agriculture and low development of industrial sectors creates surplus labor and informal economies with serious implications for distribution and the resolution of class conflict. This common element allows us to link structuralist perspectives with distribution.

4.3. Feminist Perspectives

The feminist literature associates informalization with social categories or identities that impact the value of work, provisioning and remuneration, and the division of labor in society. Feminist Economics has dealt with conceptual and empirical problems behind the problem of informalization as it pertains to the value of informal work and the ways in which it impacts women and marginalized minorities, also recognizing informality as a dynamic social category of its own. Feminist perspectives have also developed useful theories about the role of women in labor as countries industrialize, labor market discrimination, and process of exclusion that perpetuates constraints on particular social groups. All these are useful concepts to tackle the second stage of informalization as described by De Soto.

From a feminist economics perspective, informalization may serve as a gateway to further understand how labor markets fail to deliver better gender equity outcomes in developing economies. A useful framework of analysis in the context of development and pre-industrial societies can be found in the work of Rau and Wazienzky (1999). They highlight the nature of the debate about informalization by integrating the dynamics of gender discrimination and exclusion into an analysis of the processes of structural change as the majority of an economy's production shifts from agriculture to industry and to services in the processes of development.

Rau and Wazienzky study how industrialization has impacted female labor force participation and investigate three hypotheses about the relationship between the two: emancipation, structural/U-shaped, and constancy hypotheses. The emancipation hypothesis maintains that as levels of industrialization increase, women participate in industry in higher numbers, so there is a positive relationship between employment and freedom for women – hence the term "emancipation". The structural view argues that as industrialization increases and agriculture is increasingly mechanized, women lose their traditional sources of work in agriculture and men dominate and take new jobs in factories and manufacturing, decreasing women's participation in the labor force until, in late stages of industrialization, a service sector emerges that is more closely aligned with women's traditional roles, such as in education and healthcare. Hence, there is a U-shaped pattern between industrialization and women's labor force participation. Finally, the constancy hypothesis reflects a more skeptical view that argues that women participate in the economy at all times, but problems of measurement and accounting of household work, care, and informal work do not appropriately account for the value of work in these activities. This means that women's declining labor force participation is a statistical artifact that misrepresents women's actual work participation, which is more constant across time.

Rau and Wazienzky conclude that the empirical evidence supports the U-shaped/structural hypothesis. They use data for 62 countries, evaluating this process at two points in time, in the 1960s and 1970s. They consider a mature industrial nation to have more than 50% of its workforce is non-agricultural sectors and early industrial nation as less than 50% of its workforce is non-agricultural. The correlations between industrialization and female labor force participation rates is around 0.20. Correlations double and signs change when disaggregating countries by level of industrialization: -0.45 for preindustrial nations and +0.41 for industrial nations. However, they highlight that there is a strong possibility for the constancy hypothesis to be correct. The lack of appropriate measurement of women's unvalued work in the household and in informal jobs remained a possibility since, at the

time of their writing, direct measures of these aggregates did not exist. A reproduction of their exercise, using World Bank Data is developed in Figure 1.2, which shows some evidence for the U-hypotheses to persist in the period between 1989 and 2016 in a sample of 207 countries around the world. This curve associates female labor force participation rates and agricultural employment, without considering informalization in these years.

Bose (1986), a proponent of the constancy hypothesis, expands on these ideas by arguing that questions about the extent of women's work are difficult to assess empirically since female labor force participation rates underreport care work that women perform in the household and in the informal economy. For this reason, she argues that the degree to which standard data can account for these contributions is questionable. While the resolution of this debate goes outside the scope of this essay, it clarifies how feminist thought has contributed to the study of how structural change and informalization are related in how the measurement of the value of work takes place. Rau and Wazienzky, and Bose's contributions would be mainly focused on how to measure and assess surplus labor, redundant labor, and labor whose value is difficult to measure.

From a macro perspective, Feminist Economics has also argued that informalization is associated with class, gender and other social categories, and that similar patterns of exclusion, exit, and exploitation exist at lower levels of these social hierarchies. For example, Marta Chen (2012) links informal occupations with a gendered structure of labor in which those jobs performed by informal workers with highest poverty levels and low earnings are performed by women. Qualitative and quantitative evidence confirms that female migrant workers tend to be more vulnerable workers, easier to exploit, and less likely to organize and unionize. Formal maquiladoras in the low levels of global value chains exploit the vulnerability of unemployed, migrant, and informal female workers (Klein, 1999). Benería (1989) argues that the process of informalization often occurs simultaneously with the penetration of multinationals into Latin American markets, where subcontracting enables extreme

exploitation a low standard in the quality of jobs developed. These can be processes associated with discrimination and exclusionary practices that impact particular groups in labor markets and that impact informal workers and enterprises in a pervasive way.

It is evident that the feminist perspective offers important insights into the problem of informalization. On one hand, it links the issues arising from the problem of measurement of value with insights linking the problem of measurement with structural perspectives and the roles that individuals and groups play at different stages of development. Additionally, feminist theory shows a way to identify informalization as a multidimensional social category that, through interacting with others, determines an individual's economic condition and rank in the multiple hierarchies created by social categories influencing and influenced by schemes of production and reproduction that exist in society.[2]

5. A Path Forward: Legalistic and Institutional Approaches to Informalization

As reviewed above, informalization can be understood in many ways, but in charting a path forward, it is helpful to focus on two approaches: legalistic and institutional. *Legalistic approaches to informalization* highlight how informalization is carried out by a conscious decision of individuals who 'exit' the formal sector. They do so after making an economic cost-benefit analysis of staying or exiting formality. This approach is then, one that understands and examines informal economies from a tax evasion perspective, and it involves De Soto's description of the problem in its third stage. All informal economic activities are the product of agents in an economy escaping the oversight of the state due to rational economic analysis. Legalistic approaches to informalization defend that informalization happens due to individual choice, and thus, requires a monitoring reaction from the

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[2] In this respect, it is useful to recall that social categories are understood as the combination of assets, the rules and norms they follow, and partially endogenous preferences of an economic situation (Folbre, 1994).

state to prevent the fallout and persecute those who leave. This view is consistent with the tenets of neoliberal policy prescriptions, and attributes informalization solely to a state failure.

Legalistic approaches to informalization recognize informal economies as a negative social outcome, a product of government inefficiencies in taxation, low provision and poor quality of public goods, and a lack of voice and representation in state institutions. From this point of view, the state plays the main role in resolving the problem of informalization, but it ignores how specific policies dealing with the other two earlier stages may influence the final outcome of persistent informalization. As a result, many names have been given to informal economies, including shadow, underground, and hidden economies. States are to be blamed for failing to persecute, to monitor, and to police informal economic agents.

Institutional approaches to informalization propose that informalization occurs when a segment of the population is driven towards informality because structural change, assets owned, and rules and incentives of organizations such as firms, markets, households, or governments, systematically put vulnerable groups at a disadvantage in the process of becoming formal. This view has been adapted from the literature of labor market discrimination (Shulman, 1986) and development economics (Lewis, 1954). This view emphasizes how structural change, the division of labor, class formation, and discrimination are important forces that influence the emergence of informal labor in the context of developing economies without assuming a motive for informal agents to become informal. In this way, it decriminalizes them and categorizes them as the victims of constraints imposed on them by society to conserve the *status quo.*

Nancy Folbre's framework of choice in the context of constraints is useful in better identifying and producing insights about the role of informalization in development (Folbre,1994). Mainstream economists, focusing solely on De Soto's third stage, typically follow a legalistic view of informalization and perceive it solely as a negative process due to the lack of compliance with the

state. Nevertheless, this approach misses the first two steps of informalization that are linked to structural change, exclusion, and discrimination. Mainstream economics lacks a portrayal of informalization as a feedback process between the choice of exit and historically exclusionary structures developed to decelerate the process of inclusive development.

Economic agents and sectors operating outside the formal sector of an economy should be seen as iterative with respect to the structures that shape the choice of 'exit'. Institutional approaches to informalization capture this feedback process in a better way than their legalistic counterpart does not. We must understand the choice of turning to the informal sector, as one that is influenced by individual interests, but shaped by the constraints imposed by institutional, normative, economic, and political social structures in developing economies' societies. An attractive aspect of an approach to informalization like the institutional approach discussed above is that different groups, such as the formal and informal sector, will not, *a priori*, be considered more important or virtuous than others. That is, it refrains itself from neither criminalizing informal sectors, nor idealizing them, while also not assuming that formalizing the economy will be a sufficient solution for inclusive development, as in practice, formal sectors may support policies that are not conducive to more integrative outcomes.

As opposed to attributing informalization solely to the lack of compliance or cooperation to bureaucracy, the political economy of institutional approaches to informalization asks how economic change impacts those in informality, and which historical, political, and economic conflicts fuel its persistence. While legalistic views could be considered historical, the assumption of a breaking point at which individuals 'exit' ignores the structural constraint, historical events, and the context that propitiated this strategy. Moreover, attributing all informalization to 'exit' neglects the evolution of exclusive formal institutions that may have created an informal sector without 'exit', keeping large sectors of the population outside of formality.

Institutional approaches to informalization account for the historical roots and the evolution of the process of informalization itself. These perspectives defend that constraints may evolve and embed themselves in formal institutions, making it difficult to resolve the problem through deregulation, as some may be benefiting from such large regulation via barriers of entry to the system. Lack of access to measurement, representation, and assets are some of the many ways in which informals may find themselves outside formal regulatory systems from the start, becoming marginalized under different constraints. Exclusion from these systems characterizes the condition of informal workers as vulnerable and voiceless.

In a way, institutional approaches to informalization also should study the self-fulfilling mechanisms that prevent people from entering the formal sector in the first place. Marginalized individuals who have never known anything but informal relations may act as if they 'choose' to not enter the formal sector and in reality, may be stuck in low-equilibrium trap, especially in light of witnessing, for instance, reasonable economic success of peers who operate in an informal context. It is the lack of attention paid to these cases by the mainstream view, what institutional approaches would aim to correct.

6. Concluding Remarks

Legalistic approaches to informalization propose that informalization occurs when there is agency in the process of 'exit'. An illustrating example of this approach can be found in Krakowsky's (2005) model of a firm's decision to become informal. Krakowsky states that if the sum of starting business costs *(s),* plus operational costs *(o),* times the duration of the business *(t),* and the present value of costs of labor regulation and taxes *PV (T)* are larger than the present value of the penalty of detection $\rho(\varphi)$ times the probability of getting detected*(a)* and the advantage to work in the formal sector *u(ζ),* then a worker would decide to be formal. Formally,

$$s + ot + PV(T) > PV[(\rho(\varphi)\, a + u(\zeta)]$$

where φ stands for government effectiveness, and ζ for the rule of law. This cost benefit analysis of informal economies conveys in multiple ways how the legalistic paradigm of informalization is conceptualized. However, it also tells us very little about the first two steps of the process: structural change and discrimination. In a way, this approach does not address the deeper sources of informalization, which tend to be the larger influencers in the process of development. All factors impacting the choice of informalization in a model like this are focused on the relation between a firm and the state. They speak less about the role of an informal worker or entrepreneur as they enter a new labor market and are rejected due to chosen and given characteristics. The main problem is that this perspective is so focused on the third stage of informality that it neglects its core condition: one cannot 'exit' a system one never belonged to.

Disregarding those new in labor markets and those excluded from formality creates a serious problem for the legalist narrative. Neglecting the deeper sources of informality is to neglect the conditions necessary for its existence. One significant risk of aggregating these types of microeconomic assumptions to analysis of macro-behavior of informal activity is that it may misrepresent individuals in the underground economy, as they may be informal due to a multiplicity of motives, preferences, and constraints outside of their control. Moreover, this confounds the prescription of solutions and the role of policy in the problem. In this way, concepts like the 'shadow economy', the 'murky sector', or 'gray markets' obscure and undermine the subtleties and heterogeneity of casual informal work and provisioning in developing economies. In many cases, this even promotes an exclusionary, discriminatory, and criminalizing attitude towards informals, undermining their contributions, value, and voice, and perpetuating negative cycles of economic and political disintegration of society.

Hirschman was knowledgeable and sensible about the dynamics before the 'exiting' stage of informalization,

> A normal pattern of change in the Andes is for the individual to become a mestizo by leaving his highland community of birth, rejecting his Indian background, and assuming all possible mestizo status symbols. The individual who becomes a mestizo by this route, however, finds himself part of a despised "cholo" minority in a world dominated by urban upper classes to which he cannot aspire. (Hirschman, 1970, p. 110)

One can argue that Hirschman would have rejected overlooking these deeper forces that shape the division of labor observed in the current conversation about informalization. While some of these forces may be related to rational choice, efficiency, and the opportunity cost of alternatives - as mainstream economics would defend - Hirschman was also well aware of the social constraints that force individuals to remain excluded. Hirschman's remark reminds us that economies don't occur in vacuums, and that structural factors and discriminatory forces are an important influence in the division of economic activities and class formation.

Institutional approaches to informalization study how structures, assets, institutions, and norms operate as constraints of formal and informal economic agents in developing economies. These approaches allow an escape from studying informalization from a methodologically individualistic way. These approaches also allow economic analysis about policies along formal-informal lines, since they confront us with the reality of dealing with the deeper causes of informalization. This facilitates the adaptability and flexibility of the discourse of informality to account for nuanced insights and more thoughtful and sensible prescriptions. The focus on institutional approaches to informalization also help in identifying institutional historical cycles that operate to perpetuate conflict and power in developing economies. There is hope that the reevaluation of the narratives of informalization from institutional perspectives will be conducive to generate knowledge about the improvement of livelihoods in developing economies.
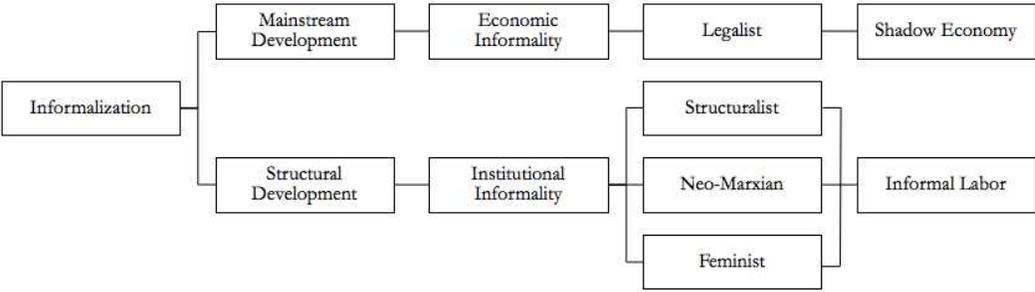
7. Tables and Figures

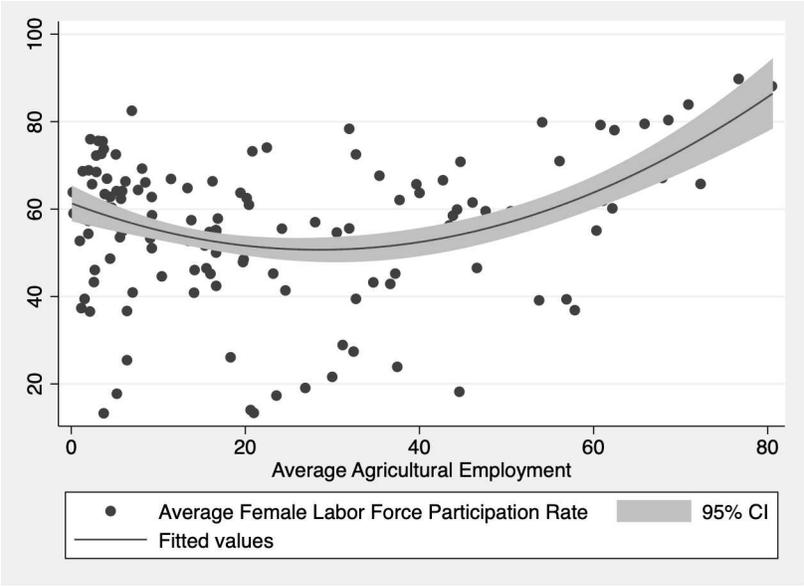**Figure 1.1. Taxonomy of Approaches to Informalization**

Figure 1.2. Update on Rau and Wazienzky's Methodology: Results for 207 countries, Taking Averages from 1989 to 2016

REFERENCES

Barnes, Thomas. 2012. "Marxism and Informal Labor." *Journal of Australian Political Economy.* No. 70.

Benería, Lourdes, and Martha Roldán. 1987. *The Crossroads of Class and Gender.* University of Chicago Press.

Bose, Christine E. 1986. "Devaluing Women's Work." in Hidden Aspects of Women's Work. Edited by C. E. Bose, N. Sokoloff, and R. Feldberg. New York: Praeger.

Bowles, Samuel. 2006. *Microeconomics: Behavior, Institutions, and Evolution.* Princeton, NJ ; New York : Princeton University Press, Oxfordshire.

Chen, Martha. 2012. "The Informal Economy: Definitions, Theories and Policies". WIEGO working paper No.1.

De Soto, Hernando. 1989. *The Other Path: The Invisible Revolution in the Third World.* New York: Harper and Row.

Feige, Edgar L. 1990. "Defining and Estimating Underground and Informal Economies: The New Institutional Economics Approach." *World Development,* Elsevier, vol. 18(7), pages 989-1002, July.

Folbre, Nancy. 1994. "*Who Pays for the Kids?"* Routledge. London.

Frenkel, Robert and Jaime, Ros. 2006. "Unemployment and the Real Exchange Rate in Latin America." World Development 34(4), pages 631-646, April.

Gollin D. Jedwab R., Vollrath D. 2013. "Urbanization with and without Industrialization." Working Papers 2013-290-26, Department of Economics, University of Houston.

Hart, Keith. 1973. "Informal Income Opportunities and Urban Employment in Ghana." *The Journal of Modern African Studies.* Volume 11. Issue 1, pages 61-89. Cambridge University Press.

Hart, Keith. 2008. "Informal Economy." in Palgrave Macmillan (eds) *The New Palgrave Dictionary of Economics.* Palgrave Macmillan, London.

Hirschman, Albert O. 1970. *Exit, Voice, and Loyalty: Responses to Decline in Firms, Organizations, and States.* Cambridge, MA: Harvard University Press.

Klein, Naomi. 2000. *No Logo: Taking Aim at the Brand Bullies.* Toronto: Knopf Canada.

Krakowski, Michael. 2005. "Determinants of the Informal Economy: The Importance of Regional Factors." Discussion Paper Series 26313, Hamburg Institute of International Economics.

La Porta, Rafael, and Shleifer, Andrei. 2014. "Informality and Development." Scholarly Articles 12343780, Harvard University Department of Economics.

Lewis, W.A. 1954. "Economic Development with Unlimited Supplies of Labor." The Manchester School, Vol. 22, No. 2, 1954, pp. 139-191.

Loayza, Norman. 2016. "Informality in the Process of Development and Growth." Working Papers 2016-76, Peruvian Economic Association.

Lowy, Michael. 1981. *The Politics of Combined and Uneven Development: The Theory of Permanent Revolution.* London: Verso; dist. by Schocken, New York. Pp. 242.

Marx, Karl. Friedrich Engels. 1939. "The City, the Division of Labor and the Emergence Capitalism." The German Ideology. New York Publishers.

McMillan, Margaret and Rodrik, Dani, 2012. "Globalization, structural change, and productivity growth." IFPRI discussion papers 1160, International Food Policy Research Institute (IFPRI).

Medina, Leandro and Schneider, Friedrich G. 2017. "Shadow Economies around the World: New Results for 158 Countries over 1991-2015." CESifo Working Paper Series 6430, CESifo Group Munich.

Portes, Alejandro Castells, Manuel and Benton, Lauren. 1989. *The Informal Economy: Studies in Advanced and Less Developed Countries.* Johns Hopkins University Press. Baltimore, viii, 327 pp.

Rau, William and Waziensky, Robert. 1999. "Industrialization, Female Labor Force Participation and Modern Division of Labor By Sex." *Industrial Relations*, Vol. 38, No.4, p.504-521.

Rodrik, Dani. 2009. "The Real Exchange Rate and Economic Growth." Brookings Papers on Economic Activity (2): 365–412.

Rodrik, Dani. 2017. "Rescuing Economics from Neoliberalism." Boston Review. November 06, 2017. http://bostonreview.net/class-inequality/dani-rodrik- rescuing-economics-neoliberalism.

Schneider, Friedrich and Enste, Dominik H. 2000. "Shadow economies: sizes, causes and consequences." *Journal of Economic Perspectives* 38, no. 1, pp. 77-114.

Schneider, Friedrich; Buehn, Andreas; Montenegro, Claudio E. 2010. "Shadow economies all over the world: new estimates for 162 countries from 1999 to 2007." *Policy Research working paper*; no. WPS 5356. Washington, DC: World Bank.

Schneider, Friedrich. Leandro Medina. 2018. "Shadow Economies Around the World: What did we Learn the last 20 years?" International Monetary Fund. WP/18/17.

Shulman, Steven. 1996. "The political economy of labor market discrimination: a classroom-friendly presentation of the theory." *Review of Black Political Economy*, 24:47-64.

Todaro, Michael P. 1969. "A model of labor migration and urban unemployment in less developed countries." *American Economic Review,* American Economic Association, vol. 59(1), pages 138-148, March.

Zenou, Ives. 2008. "Job search and mobility in developing countries: Theory and policy implications." Journal of Development Economics, 86, (2), 336-355.

CHAPTER 2: INFORMAL EMPLOYMENT AND REAL EXCHANGE RATES IN
18 LATIN AMERICAN ECONOMIES

1. Introduction

This chapter emerges from a concern about persistently high levels of informal employment in Latin American cities, an important indication of some of the challenges these economies face in creating high-quality jobs. The chapter asks if there exists an association between macroeconomic policy and structure and informalization of employment in the region. In particular, it focuses on the impact of real exchange rates because of their importance in mediating the impact of globalization on domestic economies. Research in the development macroeconomics literature has found that currency undervaluation may foster economic growth and less formal sector unemployment by making domestic producers more internationally competitive and discouraging imports (Frenkel and Ros, 2006; Rodrik, 2009). However, this research has not clearly addressed the impact of this policy on employment informalization, an indicator of the extent to which workers experience low employment quality, thus their marginalization from the benefits of development.

Previous research about informalization has focused on how policy in the region distorts labor markets and worsens employment outcomes through increasing the costs of formality by inefficient regulatory requirements, high bureaucratic costs and taxes, failing to expand the tax base, and so on (Loayza, 1996). Much of this literature has emphasized how informalization is an expected employment outcome if an economy has high transaction costs in accessing and remaining in the formal sector and tends towards promoting market-based reforms as a solution. These approaches largely neglect the role that macroeconomic policy plays in determining labor market conditions and outcomes. More recent approaches emphasize failed macro and anti-poverty policies, as well as the implementation of neoliberal systems of urban governance that have been ineffective at improving

employment conditions in the region (Brown, 2016). This debate underscores the need for empirical analysis of these hypothesized linkages.

While the literature on informalization has emphasized transaction costs of formalization, less has been done considering other types of policies impacting formal and informal labor outcomes. Informal social arrangements may be not only associated with high transaction costs of formality. It may also be associated with structural and discriminatory factors that constraint economic agents prior to economic transactions. The lack of public goods provision by local government, low reach in government social policies, discrimination in labor markets, and other structural components, are relevant in considering a broader set of factors potentially associated to informalization. In this chapter, particular attention is paid to real exchange rates and the composition of net exports as a potential factor impacting the quality of labor in Latin America.

From a macroeconomic perspective, informal employment has many costs and represents multiple challenges for development. Consigning labor and other resources to low productivity activities limits innovation and productivity growth. The associated social exclusion marginalizes communities from the benefits of growth that does occur. From a fiscal perspective, high levels of informalization are associated with low tax revenues, as well as low-quality provision of public goods (Loayza, 1996), fostering questions about the state's legitimacy and limiting its ability to invest in development. Beyond the fiscal and political, Chen (2012) argues that informal workers lack access to legal and social protections, holidays and incentive packages, and a politically representative voice, making them invisible and illegitimate actors in cities in the region. Franks (1994) argues that its sheer size makes it absurd to ignore the informal sector in macroeconomic policy, that contrary to popular belief, the informal sector can be managed through economic policy and suggests that the effort of doing so can provide benefits, social and economic. Identifying the association between macro-policy and informal labor outcomes represents a step in this direction.

The theoretical framework used in this chapter follows Frenkel and Ros (2006). Their approach focuses on identifying and empirically testing channels between the real exchange rate and unemployment. In their analysis, they propose a model for informal labor markets. The empirical analysis in this chapter explores the association between real exchange rates and informalization as proposed in Frenkel and Ros' model. Controlling for per capita GDP, inequality, and other economic and structural characteristics, results show that improving real exchange rate competitiveness is associated with lower shares of informal employment in total employment. Thus, policies which promote real exchange rate competitiveness offer an opportunity to target the development challenges presented by informalization in Latin America.

2. Literature Review

2.1. Informalization in Development Economics

Lewis (1954), Todaro (1969) and Fields (1972) among many others in the history of development economics, have recognized the importance of urban concentrations of informal or casual workers in economies around the world. With the rise of neoliberalism in the 1980s, research about structural factors and macro-policy influencing the quality of employment in an economy became secondary to the emphasis on liberalization and market-based reforms. In this vein, informalization was understood as a vent for surplus labor, a product of congested labor markets in cities.

Looking at the Peruvian case, de Soto and Ghersi (1989) develop arguments on informalization from a new-institutional perspective using public choice theory. The idea developed in their book is that informalization is caused by a rational choice to 'exit' formal institutions and organizations. States, then, should deregulate labor markets and improve the protection of property rights in order to facilitate the formalization of the informal sector.

An influential idea in de Soto's and subsequent approaches to informality is found in Albert O. Hirschman's *Exit, Voice, and Loyalty* (1970). Hirschman argues that informalization can be understood as the product of economic agents that exit a dysfunctional formal system, as opposed to voicing their concerns and promoting social change or showing loyalty to the rules and norms that govern the formal sector. It should be noted that Hirschman argument is embedded in the assumption that the individual originally belongs and is an active participant in the dysfunctional institution, and thus faces a choice on whether to exit or not. However, many economic systems suffer from institutional discrimination, bearing rules and norms that systematically exclude certain groups from the start (Shulman, 1996). This discrimination better captures the conditions of many workers in informal sectors in Latin America face and has been clearly overlooked by the 'exit' literature.

By the end of the 1990s and early 2000s, the research agenda in development economics became ambitious in producing macro-models that incorporated "indirect" measurements of informality, such as the 'shadow economy' proposed by Loayza (1996), Schneider (2000, 2005, 2007, 2010, 2011, 2014), and Elgin (2012, 2013.a, 2013.b, 2014). Indirect approaches to measuring informalization largely adopt the 'exit' perspective, but as pointed out above, they tend to ignore the exclusionary dimensions of the problem. Proponents of this viewpoint emphasize how labor outcomes are best explained through the economic, institutional, and transactional choices between citizen and states, and not as the product of exclusionary institutions, poorly managed structural change, misguided macro-policy, and/or failed industrialization efforts.

2.2. Informalization as a Social Category

Chen's (2012) work consists of a structural employment stratification of informalization. She presents a perspective that is consistent with development economics and political economy, focused on the categorization of informal workers. Chen argues that informalization is not that different from other social categories applied to labor, and that many insights can be gained from understanding it

intersectionally in Latin America. She associates informal labor with other social categories, such as class, gender, and race. For Chen, exclusion plays an important role in informalization, thus understanding informalization solely from an 'exit' perspective produces incomplete answers.

Chen's argument looks at the segmentation of informal employment as related to class, race and gender. Chen's analysis indicates that, while members at the top of informal labor hierarchies may experience higher earnings and therefore be understood as exiting the formal sector, the majority of informal workers are in the bottom of this hierarchy due to exclusion from formal institutions. These labor outcomes are also consistent with hierarchies based on gender, race, and class. Excluded workers tend to be the most vulnerable and precarious. The key insight is that seeing informalization as a social category allows framing the issue as a structural and institutional outcome of exclusionary dynamics in labor markets, regardless of individual choice.

An example of an empirical literature analysis of employment outcomes as a reflection of social exclusion is found in Braunstein and Seguino (2018). Using panel data analysis, they explore how macroeconomic policy, economic structure, and social policy impact gendered outcomes in employment and unemployment in Latin America from 1990 to 2010. In particular, minimum wages and public social expenditures are positively associated with women's employment relative to men's employment, suggesting that progressive social policies can have positive effects on gender equality in Latin America. Their contribution is instructive in considering how linkages between specific sets of policies and structural characteristics at the macro-level may be associated with social categories or group identity and the consequences for labor outcomes.

The Economic Commission for Latin America and the Caribbean conceptualizes and measures informalization as an employment aggregate that estimates the share of urban workers with low productivity and exclusion from social safety nets (CEPAL, 2017). This working definition of informalization is consistent with the one used by Women in Informal Employment: Globalizing and

Organizing (Chen, 2012). It is also consistent with direct measurements of informality in Latin America presented in the dataset on Income Distribution in Latin America (IDLA) developed by Cornia and Matorano (2011).

2.3. Informalization, Structural Change and Latin America's Political Economy

Reflection upon the deeper processes behind push-and-pull factors that contribute to informality and structural processes such as urbanization and industrialization is useful. Rapid urbanization accompanied by extreme inequality in the early stages of development may be crucial in delaying processes of industrialization in structural change, with negative consequences for economic growth and development. Mal-distribution accompanied by slow or stalled industrialization in developing economies slows down the absorption of workers in urban centers, and consequently, the surplus labor will give rise to many informal workers in casual occupations.

Elgin's (2012, 2013.a, 2013.b) contribution to the literature about informalization is extensive and often associated with the 'exit' approach. Some of his work, however, asks about the impact of structural characteristics on shadow economies. For example, Elgin (2013.a) argues that informal economies are associated with a country's level of urbanization in a non-linear way. As societies urbanize, informalization increases quickly, but after reaching a peak, as urbanization and development proceeds then informalization may decline. Other macroeconomics literature suggests that the effects of urbanization on informalization are more ambiguous and policy-based, since urbanization may occur independently from industrialization; thus, informalization may persist in time regardless of urbanization levels.

Extending the emphasis on urbanization but adding elements of economic structure and distribution, Gollin, Jedwab, and Vollrath (2013) argue that industrial jobs and resource extraction are critical drivers of urban development. They argue that the service sector has taken the lead in absorbing surplus labor in Latin America due to the region's continued dependency on agricultural commodity

exports and resource extraction. This approach suggests a type of "resource-curse" or "Dutch disease" in which resource extraction and service sector job growth occur at the cost of industrialization in the long-run. Demand for services comes from landowners and oligopolies operating in global and domestic commodity markets while industrial job growth and industrial productivity stagnate. This means that the economies will fail to absorb large quantities of labor in industrial sectors and produce growing and persistent urban informalization.

In line with this perspective on the sources of informalization and the connection with Dutch Disease-type dynamics, Leamer et al. (1999) argue that there is a linkage between labor outcomes, distribution, and production in Latin America. They claim that there is a fundamental political economy problem that emerges from investing in large-scale food, mining, and agricultural production at the expense of industry. Consequently, industrialization stalls. The results for distribution, with oligopolies and the increasing concentration and globalization of land ownership, as well as the associated vulnerability to commodity price shocks, have contributed to the rise of informalization in the region.

2.4. Informalization, Development and Economic Growth

Pollin and Heintz (2003) take a macroeconomic perspective on informal employment and consider how informality of labor relates to output levels and economic growth. They attribute the emergence of informality in Latin America to globalization and the adoption of neoliberal policies. Pollin and Heintz highlight that the lack of public employment options, the promotion of unmanaged trade liberalization, the flight of foreign direct investment, and inflation targeting, are among many macroeconomic policy strategies that may contribute to the persistence of informal labor. They conclude that while economic growth may help reduce informalization, it is the broader policy efforts and structural conditions in the domestic economy that determine its extent and persistence.

Another contribution with a focus on productivity is found in Loayza (2016), who applies a Harris-Todaro dualist labor market model to an economy where access to technology is lower for the informal sector. His solution assumes full employment in the formal and the informal sectors. While productivity differentials and the minimum wage close the model, Loayza's specification does not account for the role of other policy or distribution variables. His approach focuses entirely on labor productivity to derive the informal labor supply.

2.5. Globalization, Real Exchange Rates and Informal Labor Outcomes

Bachetta (2009) claims openness may initially worsen informalization by displacing formal workers from sectors that face more competition from foreign firms. Nevertheless, he claims that in the long run, openness will foster economic growth through making domestic firms more specialized and profitable, increasing their productivity, and increasing net exports. Bachetta finds that openness is secondary to levels of development as measured by GDP per capita in determining informalization. Bachetta shows how structural factors, globalization and macro-policy interact, generating higher informalization of labor in developing economies.

Lourdes Benería (1987) argues that informalization can be understood in the context of how globalization has restructured firms, rearranging their size, hierarchical structures, and levels within them, along with the division of activities performed in them. The informal sector has clearly been impacted by these dynamics since, as industrialization has stagnated or declined, opportunities for lower-skill workers have also declined, while urban service-sector firms demand more high-skill workers. Consequently, globalization has increased informalization of labor in the lower sections of the value chain. Benería argues that the formal sector in Latin America is not cooperative with industrial reforms. Unstable contracts and the preservation of the *status quo* push formal production to advocate for policy protecting their rents, pushing industrial production towards other regions of

the world. The real cost of this development strategy is low industrialization and high levels of informal employment in the region.

While Bachetta and Benería focus on how globalization has impacted labor outcomes, others have focused on real exchange rates. Franks (1994), for example, identifies two channels by which real exchange rates may affect the informal sector. First, real exchange rates impact the economy as a whole. There is a commonality between the formal and the informal sector: local currency use. While fiscal and monetary policy impacts sectors differently due to access to social safety nets and credit, everyone uses the same currency. Franks also argues that informal workers use less foreign inputs, and that many of the goods produced by the informal sector are import substituting. Franks' work highlights the close links between informal employment, macroeconomic policy and the international economic conditions. This work has evolved into more rigorous macroeconomic modeling and empirics.

Frenkel and Rapetti (2010) focus on macro-policy integration efforts, arguing that exchange rate regimes have impacted Latin America in terms of price stability, domestic finance, external and internal balances and industrialization. Their work focuses on how changes in real exchange rates impact the composition and dynamics of labor markets and the composition of exports. They argue that real exchange rate undervaluation shifts incentives from importers to exporters, changing the relative political and economic position between sectors. The analysis by Frenkel and Rapetti emphasizes the role real exchange rates have played in Latin America as a fundamental anchor whose dynamic unveils multiple structural conflicts in the region.

Using a related perspective that predates this work, Frenkel and Ros (2006) build a useful formal theoretical model with the purpose of understanding the linkages between real exchange rates and formal urban unemployment. The main distinction between how formal and informal labor differ in the model is in terms of access to capital and production of tradeable and non-tradeable goods. The

formal sector is paid based on its marginal productivity and uses capital in production; the informal sector is paid based on its average productivity, has no access to capital, and produces non-tradeable goods. Frenkel and Ros' approach takes a pragmatic stance in linking production, distribution, and formal labor market outcomes with the macroeconomic policy at hand, the real exchange rate.

Frenkel and Ros model the labor market using dualist processes, as does Fields (1972), who adapts *Todarian* logic to the 'murky' or informal sector in cities. They combine the Harris and Todaro logic with mainstream production theory, which allows a logical linkage between conditions in informal labor markets and standard growth theory as in Loayza (2016). However, by conserving the dualist logic of tradable and non-tradeable sectors, a by-product of their analysis is the development of an informal labor market model. Its dynamics are described in a way that allows the empirical testing of its determinants.

From literature review, a question that emerges is if real exchange rates are associated with informal employment in Latin America. Real exchange rates capture the composition of net exports, structural change, the industrialization strategy and global competitiveness of economies in the region. Consequently, real exchange rates may provide a policy linkage between global and structural conditions and the quality of employment domestically as it is reflected in informal employment.

3. Analytical Framework:

3.1. Modeling Informal Labor Markets in Latin America

In terms of the analytical framework, a starting point is the mathematical exposition of the supply equation in the model proposed by Frenkel and Ros (2006), which links informalization to the level of development through the stock of capital and the size of the labor force, as well as levels of inequality. It also looks at macroeconomic policy through the product wage which, since it is affected by the real exchange rate, provides a linkage with the policy of interest. A formal explanation of the model is presented in the Appendix.

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1. *Informal Labor Outcome* $= F[Production, Distribution, Policy]$

Following Frenkel and Ros (2006),

2. $Li = f\left(K, L, \frac{Wi}{Wf}, e\right)$ where $\frac{\partial Li}{\partial L}, \frac{\partial Li}{\partial \frac{Wi}{Wf}} > 0$ and $\frac{\partial Li}{\partial K}, \frac{\partial Li}{\partial e} < 0$

K stands for the level of capital stock; *L* stands for labor; *e* refers to real exchange rates, and $\frac{Wi}{Wf}$ comes from a function that reflects unequal distribution of income between the formal and informal sector. The subscripts *i* and *f* refer to informal and formal, respectively.

It should be clarified that more capital in the formal sector will decrease urban informal labor employment. In Frenkel and Ros' model, this result comes from an increase in formal labor employment demand, which is derived from the solution with respect to the optimization problem faced by the formal monopolistically competitive firm. The model assumes that more capital in the formal sector induces job creation in this sector, absorbing informal workers. Higher capital levels imply higher industrialization, and thus higher levels of formal employment.

At the same time, the product wage—the formal wage at international prices divided by the real exchange rate—includes the policy variable of interest. As the real exchange increases, it lowers the product wage, increasing profitability and creating advantages, at least theoretically, to exporters of tradeable goods that may generate employment and decrease informalization.

3.2. Econometric Approach

How well are the theoretical linkages established in this literature supported by empirical evidence? To further the understanding of factors impacting the size of urban informal labor shares in Latin America, the following empirical approach uses regression analysis, and explores potential

factors associated with informalization informed by theory. Initially, we can translate equation 2. to its empirical form. The regression equation considering country as well as the time dimensions as sources of potential heterogeneity in these variables is given in equation 3,

3. $\ln(Informal_{it}) = \beta_0 + \beta_1 \ln(Y_{i,t-1}) + \beta_2 \ln(D_{i,t-1}) + \beta_3 \ln(reer_{i,t-1}) + X_{i,t-1}$

$$+\mu_i + y_t + \varepsilon_{it}$$

Informal refers to the urban informal labor share of total urban employed; Y to production factors; D to measures of distribution; and *reer* to the real exchange rate. Vector X represents a number of other factors, including government social spending, trade volume, and other structural characteristics that may also impact the informal share. Regressions include country (μ) and time (y) fixed effects. Many macroeconomic data capturing these phenomena is non-stationary, implying that its mean changes over time and thus the variable is partly a function of its lagged value. A first alternative to deal with this problem is to consider the first-differenced regression specification to check if results are consistent. An OLS specification of first-differenced results is included as a robustness check.

Potentially interesting and meaningful interaction terms that are left for future work may consider the logic in Gollin (2013) in which the effects of urbanization with and without industrialization may have effects on the quality of employment. Additionally, informalization may be associated with a combination of high levels of development with also high levels on inequality which may not be captured in a non-interactive specification of the regression.

4. Data

4.1. Dependent Variable

The data used to measure **informalization** combines CEPAL's dataset on Latin American macro-

level statistics (2017) and Cornia's IDLA dataset (2011). This choice is driven by the intent of building a longer series for urban informal employment given data availability. This data is comparable, complete, and suitable for panel data analysis. The time period is 1990 to 2014. This measure of informalization is defined as:

> Urban population employed in jobs characterized by insecurity with respect to salaries, duration, social security, and so on. A person is defined as employed in the low productivity sector (informal) if he or she is an employer or salaried employee (professional, technical, or neither) who works for an establishment employing up to five persons (micro enterprise), who works in a domestic employment, or who is an independent non-qualified worker (own-account and unpaid family workers with neither professional nor technical qualification). The index is measured as percentage of total urban employed population. Some missing data are obtained by interpolation.
> (Cornia 2011: 15)

CEPALSTAT, Labor Overview (ILO), SEDLAC, and national data are cited among the different resources used in the construction of IDLA's panel. CEPALSTAT offers a longer dataset, but the series is unbalanced. For this reason, an interpolation is also applied in the CEPALSTAT and a row mean between the two estimates is calculated. This creates a series with 23-24 years and 18 countries.

4.2. Explanatory Variables: Production, Distribution and Real Exchange Rates

GDP per capita is obtained from WDI (2020) and is represented in constant 2005 prices. The **mean annual growth rate of GDP per capita** also is taken from WDI. Other measures of production factors include the capital stock, urbanization and indicators for population, human capital, and the economically active population. However, correlation analysis shows that all these variables move collectively with respect to GDP per capita in this region. Given that informalization is associated with low productivity, it is expected that GDP per capita is associated negatively with respect to informalization.

According to Frenkel and Ros (2006), a determining factor in the informal labor supply is the earnings ratio between formal and informal employment via the determination of formal unemployment in the urban sector. CEPAL's dataset has incomplete information on earnings in

formal and informal urban sectors in Latin America. measuring income for each category of occupation as the relative distance from the poverty line in local currency. **Inequality** may be associated with informalization due to the exclusion occurring in the process of informalization. This exclusion may hamper the reach of the state in lifting those in poverty as well as conserve current structures protecting those at the top of the income distribution. Due to the incompleteness of this series, inequality is proxied with an alternative measure proposed by Jose Gabriel Palma (2011).

The Palma ratio is an alternative measure of distribution that accounts for inequality between the 'tails' of the income distribution at the macro-level. The Palma ratio is calculated by dividing the cumulative income share going to the top 10% by the cumulative share of income going to the bottom 40% of the population. Some drawbacks of measuring inequality using the Palma ratio as pointed out by Cobham et al. (2014) are that, given that it considers inequality at the tails, it is blind with respect to inequality in the middle of the income distribution as well as to inequality within the two groups it explores: the very rich and the very poor. Another problem encountered is that the Palma ratio is a measure of inequality usually correlated with GDP per capita levels. In this data, the correlation coefficient of GDP per capita levels with Palma ratios is -0.34. Higher GDP per capita implies less income inequality. Alternative measurements of distribution such as the GINI coefficient are used in robustness checks.

The literature of development has also looked at the **percent of population living in urban areas**, since it may reflect how development in cities can be an attractor for informal workers. Urbanization rates have been an important indicator of development, as the development of settlements may be associated with other important social processes related to development. Arouri (2014) for example, identifies four linkages between economic development and urbanization. First, cities may offer opportunities for employment, education, and healthcare. Second, cities imply

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agglomeration of people and firms permitting economies of scope and scale. Third, urbanization seems to be a key factor in entrepreneurship and business development due to easier access to finance, ideas, and markets. Fourth, there are positive externalities and spillover effects from urban areas to rural ones. For these reasons, urbanization levels are tested as an alternative measure of although it recognizes that the processes have important differences to be accounted for.

The **real effective exchange rate** used in this analysis is the nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs. Real exchange rates come from the WDI and are collected from reported rates in the Economic Survey of Latin America and the Caribbean (Cornia 2011). The real exchange rate is indicative of a country's overall level of competitiveness. According to Rodrik (2009), real exchange rates have been crucial in determining the state of macroeconomic health and growth in Latin America. For Rodrik, the real exchange is a macroeconomic variable that links the structure of production with globalization. In this data, an increase in the real exchange rate represents a devaluation of currency.

Braunstein and Seguino (2018) point out that the association between real exchange rates and employment outcomes should be taken carefully. Competitive real exchange rates may allow formal enterprise growth, but this may create more informal job opportunities especially in the context of short-term changes in export demand. This implies that the relationship between real exchange rates and employment growth in the formal versus the informal sector is ambiguous.

4.3. Other Explanatory Variables: Structure, Integration and Social Policy

The literature on **economic structure** provides multiple ways of approaching the problem of understanding labor outcomes. We can recognize three ways in which this literature conventionally operationalizes the process of structural change from a macroeconometric perspective: the

composition of employment, value added in production and the composition of exports. Structurally, the economy is divided into three main sectors: services, industry, and agriculture. Furthermore, each sector has two macro-level indicators—employment and output—allowing for the calculation of sector-specific productivity.

Value Added in GDP by sector provides insight about the composition of production and the stage of structural change. Most economies in Latin America have the service sector as the highest source of value added. This implies that the logic by Gollin in which we observe that the development path is through high levels of agricultural output whose surplus labor is absorbed in services may apply, as well as a large predominance of informal services. The implications of a large service sector are that the development of a growing industrial sector is stalled, and this is reflected in output. This would imply that in the context of development, services are not necessarily linked with high quality jobs, as is the case of call centers, retail, and food preparation. Hours in this context are long, and the service sector frequently employs workers informally. Agricultural value added in the period studied is declining for all countries. Not all countries have increasing value added in industry, and some even suffer negative shocks like Brazil in the 1990s or Argentina in the early 2000s. In the rest of the empirical analysis, I will focus on agricultural value added to obtain an estimate of labor productivity in this sector.

Employment by sector alludes to the distribution of labor in the economy. While we see a low level of industrial job creation in the formal sector in all countries, it is clear that agricultural jobs and service sector jobs interact. For this sample, employment in the service sector has a negative significant correlation with respect to employment in the agricultural sector of -0.74, while the correlation between service and industrial sector employment is lower at -0.50. Clearly, when agricultural workers move into other sectors, both services and industry provide alternatives, but services are much more

important in the region. In particular, I include a measurement of industrial employment as a macroeconomic estimate in the model as control a control variable. This is also a control variable for Frenkel and Ros'.

Agricultural productivity per worker represents a way of capturing the structural stage in these economies. Agricultural production influences migration to cities and may exacerbate informal employment outcomes as cities cannot absorb workers as proposed by development theory. Agricultural productivity also represents the reservation wage of many workers, who after migrating from rural sectors to urban, may stay in cities due to better employment opportunities. Agricultural productivity is calculated by dividing the value added in agriculture, which includes the net output minus intermediate inputs, in forestry, hunting, and fishing, as well as cultivation of crops and livestock production, by the number of employed individuals in this sector. This latter number is found by first, multiplying the population over 15 years of age by the employment to population ratio, and multiplying this product by the percentage of employed individuals in agriculture. The result should provide an estimate of productivity per-worker in this sector.

Trade volume is measured as the sum of exports plus imports as a share of total GDP. This estimate proxies the relative degree of integration countries show with respect to global trade in goods and services. It is important to recall that one of the main purposes of empirically evaluating this variable lies on the assumption that the degree of integration, as Bachetta points out, may be associated with employment outcomes. While higher levels of integration may represent new opportunities to expand economies of scale, exploit comparative advantages, and allow a higher level of adoption of new technologies, it may also imply higher levels of competition for workers in multiple sectors. In this sense, it is difficult to develop hypotheses about the degree to which integration as measured by trade volumes will impact informalization in the long run.

While trade volume gives a relative sense of the degree of integration, qualitative aspects of integration can be better understood by looking at different categories of merchandise exports. In particular, four are important as key types of primary commodities: **agricultural prime inputs, food, oils and fuels, and metals, all measured as a share of merchandise exports.** These industries capture the degree of resource extraction and commodity exports. These estimates may control for the extent to which an economy may be vulnerable to changes in commodity prices, domestic oligopolistic practices, and higher service demand via higher urbanization without industrialization (Gollin, 2013). In particular, the data capturing the composition of merchandise exports in this section is used to develop a weighted price index in the difference in difference section. Fixed and random regression results only explore associations with respect to food production.

With respect to different commodities exported, Gollin highlights the importance of food exports. Industries dedicated to food production in Latin American economies are characterized by factors that can be linked to the discussion on informalization. First, food exports industries tend to be governed by oligopolistic practices. Second, given that many food products from Latin America are agricultural, food exports are related to high concentrations and foreignization of land ownership that can produce precarious conditions in rural areas. Third, food products can be particularly vulnerable to commodity price shocks, that can be particularly severe in countries that engage in monoculture practices (Guerena, 2016). Finally, exported food tends to be the highest quality output, creating difficulty in provisioning food at the domestic level with high nutritious value and low prices, increasing the precariousness of workers in these economies. These forces complement the pivotal role in global food and agricultural production that the Latin American region represents. Food exports as a proportion of overall merchandise exports can capture how these forces perpetuate low-quality labor outcomes in the form of informal employment. For this reason, a particular attention to **food as a share of merchandise exports** is explored in the regression analysis and is included as part

of primary commodities description.

Government social expenditures on health and education should improve worker productivity through increases in human capital. On the other hand, **government social expenditures on social security and housing** also may provide incentives for people to join the formal sector, given that they represent increases in real earnings obtained with a formal job through the inclusion to social safety nets. Hypothetically, we would associate these expenditures with lower levels of informalization.

Minimum wage policy can be important in determining labor market outcomes. Evidence for this type of relation between minimum wage levels and unemployment is still not conclusive (Braunstein and Seguino 2018). The relation between minimum wages and informal employment is very complex. Higher minimum wages may have a positive effect on the size of the informal sector if we consider that informalization is an alternative to being unemployed, and higher minimum wages raise formal unemployment. On the other hand, we may find a negative association between the minimum wages and informalization, since higher minimum wages could make formal jobs more attractive.

Minimum wage policy is measured as in Braunstein and Seguino (2018). This measurement uses the ratio of the minimum wage to the average wage to account for the issue that minimum wages may be too low to be a binding constraint in some of these economies. A drawback of this index is that it only covers the period from 1990 to 2010. Fewer observations exist for this measure as compared to others due to the lack of data in some countries. Most regressions include 18 countries, while the ones including minimum wages have 14.

5. Summary Statistics

The main sources for all variables include different datasets such as WDI, CEPAL, CELADE as well as other papers and author's calculations. A brief summarized description of variable descriptions and sources is provided in Table 2.1. The summary statistics presented in table 2.2 show that, on average, at least half of urban workers in Latin America during the time period studied are in the informal sector. Paraguay presents the highest amount of informal employment reported, with 77.12% of its urban labor in informality. This table also shows summary statistics for all the main explanatory variables. The region is low to medium income, with an average GDP per capita of approximately $3750. The Palma ratios seem to be relatively high in the region, suggesting high income inequality. None of them go below 1 and the highest is 8.6. This suggests that a very large proportion of income is going to the top 10% share.

`Table 2.3 lists averages for the main explanatory variables by country for two periods, 1990-2001 and 2002-2013. As can be observed, the macroeconomic evolution of these economies in these two decades shows a wide diversity of outcomes. Decreases in informalization were experienced in countries such as Argentina, Brazil, and Chile. In contrast, we can observe that informalization is persistent in countries like Bolivia, Guatemala, Peru and Ecuador, showing little to no movement in these two decades. Venezuela and the Dominican Republic exhibit sharp increases.

All of the countries in the region show an increase in GDP per capita levels between the two decades. However, countries like Bolivia, Chile, Dominican Republic, Peru and Panama show more formidable growth, with an increase of more than 30% over the two periods. On the other hand, it can also be seen in Table 2.2 that Palma Ratios have a diverse evolution in time in the region. With respect to inequality, the main trend observed is that countries that had very high-income inequality levels in the 1990s, saw a reduction in this inequality measures, while countries with medium to low

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inequality have either remained the same or experienced slightly higher inequality. Countries with high inequality experiencing a reduction are Bolivia, Brazil, Guatemala, Nicaragua, Panama and Peru. In terms of real exchange rates, only five of the countries in the sample show depreciation of the real exchange rate between the decade-long averages: Argentina, Brazil, Nicaragua, Panama and Peru. All other countries in sample show a decrease in real exchange rates, indicating appreciation.

6. Discussion of Results

6.1. Regression Analysis

Table 2.4 includes correlations between the main dependent and explanatory variables, as well as correlations with urbanization and the Gini coefficient. As this table shows, urbanization and GDP per capita levels have a very strong correlation, with a coefficient of 0.76. The same can be said about the Gini coefficient and the Palma ratio, with a correlation of 0.84. The main reason why urbanization and the Gini coefficient are tested here is due to the fact that these variables represent alternative ways to measure distribution and levels of development. While urbanization is not a perfect measure of development, for reasons treated in the description of the variable above, its correlation with levels of development is expected. We should expect a consistent association of urbanization and Gini coefficients with informalization if these are variables that capture levels of development and inequality alternatively in Latin America. This check is left at the end as a potential confirmation of how informality is related to these two factors. The results indicate that these alternative specifications conserve the expected signs but have no statistical significance. However, it can be observed that the policy variable of interest, the real exchange rate, continues to be relevant, even if these two other factors are consistent with the previous analysis.

Table 2.5 presents fixed and random effects regression results. Variables are transformed logarithmically for ease of interpretation of the results. The Hausman test in Table 2.6 suggest that in Table 2.5, results in the random-effects model are more appropriate than the fixed effects model, but

the latter is included for completeness and comparison. In particular, they are included as they reproduce the empirical analysis developed in Frenkel and Ros' analysis. Overall regression statistics show that these regressions explain between 30% and 40% of the variation in informalization outcomes.

Four specifications are tested. In column (1) and (5) in Table 2.5, we can see the core variables: production as measured by per capita GDP, inequality as measured by the Palma Ratio, and the real exchange rate. Column (2) and (6) reproduce Frenkel and Ros' results accounting for the share of industrial employment in total employment. Columns (3) and (7) include a more extended set of controls: trade volume, agricultural productivity, food exports as a share of merchandise exports, and government social spending as a share of GDP. Finally, columns (4) and (8) focus on social policy, which includes government social spending as a share of GDP and minimum wages as a share of the average wage. The decline in data availability on government social spending and agricultural productivity after 2010 effectively limits the sample size. In particular, it is important to highlight that the latter estimate has incomplete values for multiple values in terms of employment sectors. While all countries have some data in terms of these two variables, the time series has become shorter. Additionally, data for minimum wages as a share of average wages is not available for Venezuela, Honduras, the Dominican Republic, and El Salvador. The behavior of these countries with respect to policy regarding minimum wage policy may affect the results. Nevertheless, even when omitting them from the sample, we see an association between real exchange rates and informalization in the remaining economies.

Results in Table 2.5 show that there is a negative association between real exchange rates and informalization, meaning that exchange rate appreciation (a decline in the index) is associated with a higher share of informal employment in total employment. This association is statistically significant and robust across specifications, with coefficient estimates ranging between -0.7 and -0.12. Taking the

full random effects model in column (6) as a baseline, a 1.0 percent increase in the real exchange rate (a depreciation) would lower the urban informal employment share by 0.12 percent. These effects become smaller in terms of their economic significance as we consider more control variables.

The associations found with respect to inequality and development levels are as expected. The literature on informalization has emphasized the role of economic development as it is associated with informalization. We should expect that higher levels of development are associated with lower levels of informalization of labor. Additionally, it could be expected, as discussed above, that inequality may reinforce different structures that contribute to the persistence of informalization. Results in columns (1) and (5), in table 2.5 show, that a 1 percent increase in the Palma ratio is associated with an increase in the informalization share up to approximately 0.15-0.16 percent. A 1 percent increase in per capita GDP is associated with a reduction in informalization of between 0.14 and 0.15 percent. This confirms that informalization is positively associated with inequality and negatively associated with output per capita levels. Thus, these results are consistent with the analytical framework adopted in this chapter.

Additionally, as we consider results in column (7), we can observe that higher industrial employment shares and higher levels of integration are associated with lower levels of informalization. These results are not statistically significant using fixed effects. Even considering these two variables, we can see a significant negative association between real exchange rates and informalization. As we consider all control variables, we see that the association found between development, real exchange rates, and informalization remains, but distribution becomes statistically insignificant. The sign of the distribution variable is still consistent along all specifications: higher inequality is associated positively with higher informalization. A reduction in sample size due to the limitations described above seems to be driving these results. The economic strength of associations found between real exchange rates and informalization in this table, as compared with production and distribution, is indicative of policy having a weaker linkage with informalization as compared to the other two other indicators. Only in

column (7) do we see a higher association between real exchange rates as compared to inequality. Development levels seem to have the highest level of association with respect to informalization. None of the other factors appear to be statistically or economically significant, with the exception of the government social spending in column (4). This suggests that social policy should not be neglected as it may be associated with lower levels of informalization.

The weak association between trade and informalization in this section should not be taken lightly. Trade may influence the quality of labor in an indirect way, particularly when considering the comparative advantage and the composition of trade in Latin American economies. As it is explored in the next section, trade and informalization may be associated indirectly. It can be argued that trade volume, capturing the level of openness of Latin American economies, may also conceal the compositional changes that create sectors that absorb workers in higher quality jobs. This justifies the analysis of agricultural production, industrial labor, and the composition of merchandise exports in a more disaggregated way. Another weak association should be that of social spending, which comes out mostly as statistically insignificant. However, in this may be due to the limiting sample size when evaluating social policy. It should be highlighted, however, that when considering all factors in the fixed-effects specification in Table 2.5, we can observe a negative association between government social spending and informalization.

As a robustness check, the first differenced results in Table 2.7 confirm that higher per capita GDP and lower inequality have a negative association with informalization. At the same time, we can observe that real exchange rates remain statistically relevant in these specifications and conserve their expected sign. The significance of other factors as well as the overall explanatory power of regressions using first differenced data are low, but the results support the main results with the exception of integration and food as share of merchandise exports. While first differencing shows that food as a percentage of merchandise exports is positively associated with informalization in the smaller sample,

the fuller models in columns (5) and (6) show a positive association between integration and informalization. Even accounting for trends and non-stationarity of the data by first differencing, informalization and real exchange rate competitiveness are negatively associated across different specifications. Dickey-Fuller tests for stationarity and Arellano-Bond estimations were performed to account for trends and non-stationarity but excluded from final results. In terms of economic significance, first differenced results highlight levels of development as being the characteristic with the highest association with informalization.

Table 2.8 shows regression results using alternative measures for development and distribution. As it can be observed, the best models, in terms of overall statistics is the one including GDP per capita and Palma ratios in column 2. While the Gini and urbanization have the correct signs, they don't seem to be statistically relevant and they negatively impact the overall statistics in the results. Natural logs are used in all these variables for ease of interpretation. These results are indicative that the specifications developed using GDP per capita and the Palma ratio provide more insightful results in terms of economic and statistical significance, as well as and overall regression statistics. While it is understood that the percent of individuals living in urban areas is not directly equivalent to development, this variable holds a close association with GDP per capita, as these two variables hold a correlation of 76%. It is then, important to highlight how in regressions, they might be highly correlated and those, presenting a problem of multicollinearity. The same potential issue is present with the GINI and the Palma ratio. These two measures are associated, having a statistically significant correlation coefficient of 0.83. The purpose of including this table is to assess if the real exchange rate is robust using alternative measures of production and distribution. Results confirm this association.

6.2. Commodity Price Increases, Real Exchange Rate Policy, and Informalization

Going beyond correlation and linking the theory with empirical results more closely, it can be argued that real exchange rates may be used to exploit favorable primary commodity price increases.

According to macroeconomic theory, changes in the real exchange rate policy may have impacts on exports and imports. According to Gollin (2013), commodity price increases should have an impact on the economy by making it attractive to give benefits to the sector that produces tradable goods. However, Rodrik (2009) points out that the composition or type of exports matters. Exports can be agricultural resources or manufacturing tradeable goods. Favoring agricultural sectors may not be conducive to industrialization and growth.

Since 2001, all Latin American countries saw a steady price increase in primary commodity exports. The price of oil, as well as all other categories, increased until around 2007 when the effects of the U.S. recession reached the region. Commodity price increases in the context of structural change are important since they allow a test of whether economies dependent on primary commodity exports are able to utilize favorable international prices in ways that benefit development. The hypothesis to test is whether in Latin American economies experiencing a transition from a low commodity-price equilibrium to a boom, changes (appreciations) in the real exchange rate benefit the agricultural and extractive sectors, detracting from industrialization and structural change and contributing to informalization.

Commodity price fluctuations create an incentive to channel investments into agricultural and resource extracting sectors, as opposed to industrial urban sectors (Leamer, 1999). A potential opportunity cost of this development strategy is that the service and agricultural sectors cannot absorb all workers in urban centers, and industrialization stalls or takes longer to occur - if it occurs at all. In particular, these processes may create large numbers of excluded individuals whose only option is informal sector work, most strongly affecting those workers with lower human and social capital, such as rural-urban migrants, surplus agricultural workers, and traditional-sector workers, thus fueling the process of informalization.

The commodity price increase experienced throughout Latin America in 2001 serves as a natural experiment to explore the impact of real exchange rate policy on informal employment. Figure 2.1 shows a weighted price index of food, agricultural inputs, metals, and oil for Latin America. As can easily be observed, commodity prices for the region's exports show a price increase. Although the commodity price increase impacts all countries in a similar way, the identifying strategy uses countries where the real exchange rate also appreciated, as the failure of governments to intervene and manage the exchange rate is then a test of this commodity price increase-real exchange rate appreciation-primary sector investment-informalization link.

For a summary version of the argument, the linkage between real exchange rates and informalization can be established as shown in Figure 2.2. This figure follows the linkages from the literature of exchange rates to the composition of exports and imports. According to Rodrik (2009), this composition is also associated with a sectorial difference: economies may benefit manufacturing or services depending on commodity prices at that time. It is here where we see this temporary increase in commodity price. This is then related to the theory of deindustrialization, and consequently with the role of the Marxian *'rabble'* and surplus labor that leads to informalization.

In terms of the connections established by this framework, this test assumes that real exchange rate policy is linked with the composition of exports as it shifts incentives to produce commodities in the economy for which there is competitiveness in the global market, regardless of its consequences towards development. For this reason, a lack of competitive exchange rate policy is conducive to taking advantage of price increases of primary commodities, especially by those involved in primary commodity production. This is not conducive to industrialization since manufactures may face more international competition, and thus have fewer incentives to expand and produce jobs in the context of a global price surge. Consequently, the benefits of relying on international commodities as opposed to manufactures in the global economy creates the challenge of stalling industrialization, which

incentivizes the reliance of the economy on resources and primary commodities, not in manufacturing. Closing the link, factories do not absorb workers and a surge in informal employment persists, while economies stay in low levels of industrial development.

In order to explore whether real exchange rate appreciation in the context of commodity price increases impacts informalization, I examine equation 4.

$$4.\ \ln(\ Informal_{it}) = \beta_0 + \beta_1 \ln(y_{i,t-1}) + \beta_2 \ln(D_{i,t-1}) + d_1 Appreciation + d_2 Time + d_3 Interaction$$

$$+\mu_i + y_t + \varepsilon_{it}$$

Where *Time* is an indicator of the time period, 0 if it is before 2001 and 1 otherwise. *Appreciation* is an indicator equal to 1 if the change in real exchange rates is less than 0 implying an appreciation. It is useful to recall that the measurement of the real exchange rate used in this chapter is indicative of its competitiveness. That is, a higher real exchange rate index implies a more depreciated one. If the *Interaction* coefficient *d₃* is negative and significant, we can confirm that appreciated real exchange rates, when driven by commodity price shocks, are associated with decreasing urban informal employment. Results in Table 2.9 are consistent with this outcome.

The coefficient interacting devaluations with commodity price shocks indicates that the effect of exchange rate policies that manage the domestic impact of increases in commodity price tends to lessen the impact of competitive real exchange rates on informalization. These results imply a nuanced outcome with respect to real exchange rates, and it must be highlighted that they should be taken with caution. Because of conceptual and data limitations, changes in real effective exchange rates should be interpreted with caution. Going forward, it is perhaps a better alternative to use deviations from the median or mean to test this type of hypotheses. Additional robustness checks should include evaluating different time periods, for instance, going back a couple of years.

7. Concluding Remarks

In line with other accounts that have emphasized the growth and development costs of noncompetitive real exchange rates in Latin America, this chapter finds that appreciated real exchange rates discourage the creation of higher quality jobs in the region. Structural and global factors impacting labor market outcomes are also relevant in understanding informal employment. Results reflect that higher levels of development as reflected in per capita GDP and equality as measured by the Palma Ratio are negatively associated with informalization. Particularly through the difference in differences results, some causal evidence about the reaction of informalization of employment to appreciation of real exchange rates exists but are nuanced. Trends may reflect deeper structural problems in developing economies as suggested by the literature.

A better identification of the channels through which real exchange rates have impacts on informal employment can be achieved, as well as the identification of other variables that through production and distribution may impact informalization. For example, here we explored how commodity price surges may impact policy reactions that affect informal employment. Other sources of shocks may be political instability and the implementation of other government social policies. That work is left for future research. On the other hand, questions about differences in earnings, productivity or income between the two sectors, formal and informal, seem to impose difficult analytical challenges in terms of data availability and the limited number of formal models of macroeconomic development about policy impacts on informalization.

More specifically, this analysis calls on the role that real exchange rates have in producing informal employment outcomes in Latin American economies. Since the 1990s, real exchange policy has not been managed and geared towards industrialization of these economies. This has exacerbated a lot of the problems of underdevelopment, such as the overreliance on agricultural and food exports,

low productivity in industry - particularly in manufacturing - and consequently, high levels of low-quality informal jobs in urban areas. Real exchange rate policy reflects a preference to protect landowners and oligopolies, economic actors that typically rely on cheap labor and have no interest in the creation of high-quality jobs, leading to inefficient and unfair economic outcomes such as the perpetuation of informal employment. Whether Latin American countries are willing to defy these economically powerful actors, remains to be seen.

It is important to consider broader implications of this research. Informalization of employment represents a constraint to inclusive development and unveils how conventional macro-policy is limited in impact and assessment. Even if the evidence presented in this chapter suggests that real exchange rates are theoretically and empirically associated with informalization, levels of development and inequality do hold an association with the informal employment measure used. This suggests that policy improving production and distribution should not be discarded.

The linkage between short-run and medium-run solutions such as fiscal, social, and monetary policies may impact the quality of employment indirectly, and the long-run consequences of these approaches still remains to be explored. The lack of knowledge about the real economy generated by large informal employment represents today a serious and important challenge to economists and policy makers. Rarely do we find the considerations of the informal sector in standard macroeconomic models focused in short-term policy solutions. Typically, if at all, it is considered a long-run persistent issue.

The associations found between real exchange rate policy and urban informal employment, may serve as a starting point to first, highlight the role of policy in conjunction with structural change in creating low-quality of employment in the region. Secondly, the analysis highlights the role that misguided economic policy can have in worsening unresolved development challenges such as informalization in Latin America. The formal analysis developed in this chapter attempts to make

sense of these linkages using, in a sensible way, available data and analytical frameworks consistent with the lessons found in the development economics literature.

Perhaps the most important insight is found in the shift of perspective of informalization from solely a fiscal issue, to an overarching challenge in the process of creating inclusive development in Latin America. From a macroeconomics perspective, the study of informalization and its role in development has been relegated to either, a focus on measurement, or to the theoretical treatment without application of more rigorous empirical analysis. Through the use of recent macroeconomic models and available data, the possibility of more powerful insights and a better understanding of informalization as an outcome of dysfunctional economic development can be rigorously developed. This analysis, however, must be done with sensibility with respect to the actual role and not the ideological portrayal of informalization in development.

Informalization continues to be of importance since it is reflective of low standards of living in Latin America. It makes policy making, provisioning, and inclusion more difficult. Informalization makes work more precarious and creates challenges in the livelihood of individuals and communities. It may also provide flexible alternatives against dysfunctional social systems that accentuate tensions and continue to perpetuate low-quality of labor conditions and discrimination in the region. The approach taken in this essay has been that of evaluating if real exchange rate policy is associated with informalization.

8. Tables and Figures

Table 2.1. Variable Definitions and Sources: 18 countries, 1990-2014

Variable	Source	Explanation
Informal	Author's Calculation based on CEPAL and IDLA's Data	Urban population employed in in informal jobs as a share of total urban employment. These jobs are characterized by insecurity with respect to salaries, duration, social security, and so on. Some missing data are obtained by interpolation.
Palma Ratio	WDI	Ratio of the richest 10% of the population's share of gross national income divided by the poorest 40%'s share.
GDP growth	WDI	Annual percentage growth rate of real GDP per capita based on constant local currency. Aggregates are based on constant 2005 U.S. dollars.
GDPpc	WDI	Gross domestic product divided by midyear population (thousands 2005 US$).
Trade Volume	WDI	Total exports plus imports divided by GDP.
REER	IDLA and WDI	Index of Real Effective Exchange Rate (2000 = 100). Real effective exchange rate is the nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs.
Urbanization	WDI	Percent of people living in urban areas as defined by national statistical offices. The data are collected and smoothed by United Nations Population Division.
Primary Commodities	WDI and IDLA	Merchandise exports show the f.o.b. value of goods provided to the rest of the world valued in current U.S. dollars. Different categories exist for these types of exports depending on the commodity classification used. These categories include food, fuel, metal and agricultural inputs. This measure is a measure of primary commodities. Regressions focus on food as a share of merchandise exports.
Gov. Social Spend	WDI and IDLA	Social public expenditure as percentage of GDP, including public spending on education, housing, health and social security.
L. Ind.	WDI	Percentage of the labor force working in industry.
Agricultural Productivity per-Worker	WDI	Yearly output per worker. Is estimated by dividing value added in GDP in this sector by an estimate of the number of workers in this sector.
Constructed Price Index	CEPAL	Constructed price index. It is the sum of the reported primary commodity price index by the CEPAL, weighted by the relative percentage of a primary commodity category as a proportion of merchandise exports. Four categories are included and composed the index: food, fuel, metal and agricultural inputs.
Min w/ Ave w.	Braunstein and Seguino (2018)	Monthly real minimum wage divided by monthly real average wage.
Gini	IDLA	Gini index on income. The Gini coefficients for Latin American countries are calculated on a mixture of net income and gross income concept.

Table 2.2. Summary Statistics: 18 countries, 1990-2014

Variable	Mean	Std. Dev.	Min	Max	Observations
Informal (percent, Author's Calculation)	49.61	10.60	26.70	74.22	415
Informal (percent, CEPAL)	47.29	9.36	26.70	69.90	236
Informal (percent, IDLA)	51.89	11.89	30.90	77.12	314
Palma Ratio	3.66	1.08	1.91	8.60	443
GDP growth (percent)	2.15	3.60	-14.20	16.23	468
GDP pc (thousands)	3.75	2.11	0.805	9.85	468
Trade Volume (percent)	65.39	34.77	12.25	253.74	463
Real Exchange Rate	107.99	21.84	72.04	237.10	415
Food Exports/Merch. Exports	39.47	24.06	0.00	89.60	455
Gov. Social Spend (percent)	11.80	5.49	2.86	27.79	392
Primary Commodity Price Index	67.43	27.52	0	128.61	438
Agr. Prod. Per Worker(thousands)	18.07	43.05	0.731	32.7	375
L. Ind. (percent)	22.51	4.51	12.90	42.30	416
Min w/ Ave w.	0.41	0.20	0.06	1.59	284
Gini	52,25	4.64	41.2	61.7	323
Urbanization (percent)	68.25	14.66	40	95	468

Table 2.3. Means of relevant variables by country and time period

Country	Informal (percent)		GDPpc (2005 US$)		Palma Ratio		REER	
	1990-2001	2001-2013	1990-2001	2001-2013	1990-2001	2001-2013	1990-2001	2001-2013
Argentina	43	39	5084	6223	3	3	110	204
Bolivia	63	64	920	1127	5	4	103	103
Brazil	45	40	4201	5094	6	5	105	114
Chile	35	31	5741	8150	4	3	105	104
Colombia	72	65	2976	3693	5	4	108	105
Costa Rica	41	38	3686	5092	3	3	109	104
Dom. Rep	43	47	2746	4115	3	3	107	103
Ecuador	57	59	2680	3144	4	4	93	88
Guatemala	57	57	1868	2152	5	4	98	84
Honduras	50	52	1197	1462	4	5	116	98
Mexico	48	47	7092	8000	3	3	106	98
Nicaragua	60	56	965	1221	4	3	93	102
Panama	40	39	3726	5541	6	4	100	112
Peru	64	62	2151	3114	4	3	95	101
Paraguay	61	61	1552	1639	4	4	105	103
El Salvador	54	56	2299	2954	4	3	111	101
Uruguay	38	39	4765	5945	2	3	120	114
Venezuela	42	51	5491	5752	3	3	148	124

Table 2.4. Correlation and Alternative Measures of Production and Distribution 18 countries, 1990-2014

	Informalization	Palma Ratio	GINI	GDPpc	Urbanization	REER
Informalization	1					
	(415)					
Palma Ratio	0.32	1				
	(400)	(443)				
GINI	0.41	0.84	1			
	(311)	(308)	(323)			
GDPpc.	-0.70	-0.36	-0.34	1		
	(415)	(430)	(323)	(468)		
Urbanization	-0.47	-0.35	-0.41	0.76	1	
	(415)	(430)	(323)	(468)	(468)	
REER	-0.28	-0.18	-0.37	0.19	0.34	1
	(380)	(384)	(313)	(415)	(415)	(415)

Number of Observations in parenthesis
All correlations are statistically significant.

Table 2.5. Fixed Effects and Random Effects Regression Results, 1990-2014
Dependent Variable: ln Urban Informal Employment Share

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ln Palma Ratio	0.16***	0.13**	0.13*	0.11	0.15***	0.12***	0.11*	0.10
	(0.04)	(0.05)	(0.06)	(0.06)	(0.04)	(0.05)	(0.06)	(0.11)
ln GDPpc	-0.14**	-0.16**	-0.13	-0.09**	-0.15**	-0.17***	-0.20***	-0.21***
	(0.09)	(0.07)	(0.12)	(0.09)	(0.07)	(0.07)	(0.06)	(0.04)
ln REER	-0.11**	-0.11**	-0.06**	-0.07**	-0.11**	-0.11**	-0.12***	-0.10***
	(0.05)	(0.05)	(0.03)	(0.03)	(0.04)	(0.05)	(0.04)	(0.00)
ln Ind. Emp.		-0.08	-0.11	-0.05		-0.08	-0.14*	-0.06
		(0.05)	(0.08)	(0.06)		(0.06)	(0.07)	(0.05)
ln Trade Volume			-0.11	-0.02			-0.08*	-0.06
			(0.08)	(0.09)			(0.04)	(0.29)
ln Gov. Social			0.02	-0.08**			-0.01	-0.05
			(0.04)	(0.02)			(0.02)	(0.11)
ln Food Exports			-0.01	0.08			-0.03	-0.01
			(0.02)	(0.01)			(0.02)	(0.711)
ln Agr. Prod. per worker			0.02	0.01			0.02	0.01
			(0.02)	(0.01)			(0.02)	0.626
ln. Min w/ Ave w.				-0.04				-0.01
				(0.04)				(0.04)
Constant	5.34***	5.78***	5.82***	5.76***	5.45***	5.88***	6.66***	5.92***
	(0.75)	(0.63)	(0.88)	(0.44)	(0.64)	(0.51)	(0.52)	(0.38)
N	361	337	303	218	361	337	303	218
Effects	FE	FE	FE	FE	RE	RE	RE	RE
Countries	18	18	18	14	18	18	18	14
R^2	0.30	0.30	0.35	0.45	0.30	0.30	0.34	0.41

Robust standard errors, clustered by country, in parentheses.
Explanatory variables lagged one period.
$^* p < 0.10,$ $^{**} p < 0.05,$ $^{***} p < 0.01$

Table 2.6. Hausman Test using FE and RE.
18 Latin American Economies, 1990-2014
Dependent Variable: ln Urban Informal Labor Share

	Fixed Effects	Random Effects	Difference	S.E.
	Coefficients	Coefficients		
ln Palma Ratio	0.15	0.15	0.01	0.00
ln GDP pc	-0.07	-0.11	0.04	0.02
ln REER	-0.11	-0.12	0.01	0.00
ln Trade Vol.	-0.10	-0.08	-0.02	0.01
$\chi 2 =$ 7.87		Prob>$\chi 2 =$ 0.0966		

Explanatory variables are lagged one period.

Table 2.7. First Differenced OLS Regression Results, 1990-2014
Dependent Variable: Δ ln Urban Informal Labor Share

	(1)	(2)	(3)	(4)	(5)	(6)
Δ ln Palma Ratio	0.05***	0.06***	0.06***	0.05**	0.05**	0.06**
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)
Δ ln GDPpc	-0.18***	-0.18***	-0.22***	-0.23***	-0.24***	-0.30 ***
	(0.05)	(0.05)	(0.06)	(0.06)	(0.06)	(0.07)
Δ ln REER	-0.05**	-0.05**	-0.05**	-0.05**	-0.06**	-0.06**
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)
Δ ln Ind. Emp.	0.02	0.02	0.02	0.02	0.03	0.03
	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.24)
Δ ln Agr. Prod. per worker		-0.01	-0.01	-0.01	-0.01	0.01
		(0.01)	(0.01)	(0.01)	(0.01)	(0.05)
Δ ln Trade Volume			0.06	0.06	0.07*	0.08**
			(0.04)	(0.04)	(0.04)	(0.03)
Δ ln Gov. Social				-0.01	-0.01	-0.01
				(0.02)	(0.02)	(0.61)
Δ ln Food Exp/merch. Exp.					0.01	0.03*
					(0.01)	(0.08)
Δ ln. Min w/ Ave w.						-0.01
						(0.621)
N	306	292	292	280	274	203
R^2	0.08	0.09	0.09	0.10	0.11	0.11
F-Stat p-value	0.000	0.000	0.000	0.000	0.000	0.000

Explanatory variables are lagged one
period. Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2.8. Fixed Effects and Random Effects Regression Results, 1990-2014
Dependent Variable: ln Urban Informal Employment Share, Alternative Measurements of Production and Distribution

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ln REER	-0.14**	-0.11**	-0.08*	-0.15**	-0.14***	-0.11**	-0.09*	-0.15***
	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.04)	(0.05)	(0.05)
ln Palma Ratio		0.15***	0.19***			0.15***	0.19***	
		(0.04)	(0.04)			(0.04)	(0.04)	
ln GDP pc		-0.142*		-0.10		-0.15**		-0.12**
		(0.09)		(0.06)		(0.07)		(0.06)
ln Urbanization	-0.01		-0.11		-0.05		-0.13	
	(0.14)		(0.21)		(0.14)		(0.20)	
ln Gini	0.27			0.23	0.29*			0.23
	(0.18)			(0.18)	(0.17)			(0.17)
Constant	3.541***	5.340***	4.498***	4.501***	3.658***	5.454***	4.614***	4.666***
	(0.87)	(0.75)	(0.93)	(0.88)	(0.80)	(0.64)	(0.84)	(0.82)
N	305	361	361	305	305	361	361	305
Effects	FE	FE	FE	FE	RE	RE	RE	RE
R^2	0.13	0.30	0.24	0.16	0.12	0.30	0.24	0.16
F-Statistic	0.088	0.002	0.004	0.056	0.035	0.000	0.000	0.003

Explanatory variables are lagged one
period. Robust standard errors in parentheses
$^*\ p < 0.10,\ ^{**}\ p < 0.05,\ ^{***}\ p < 0.01$
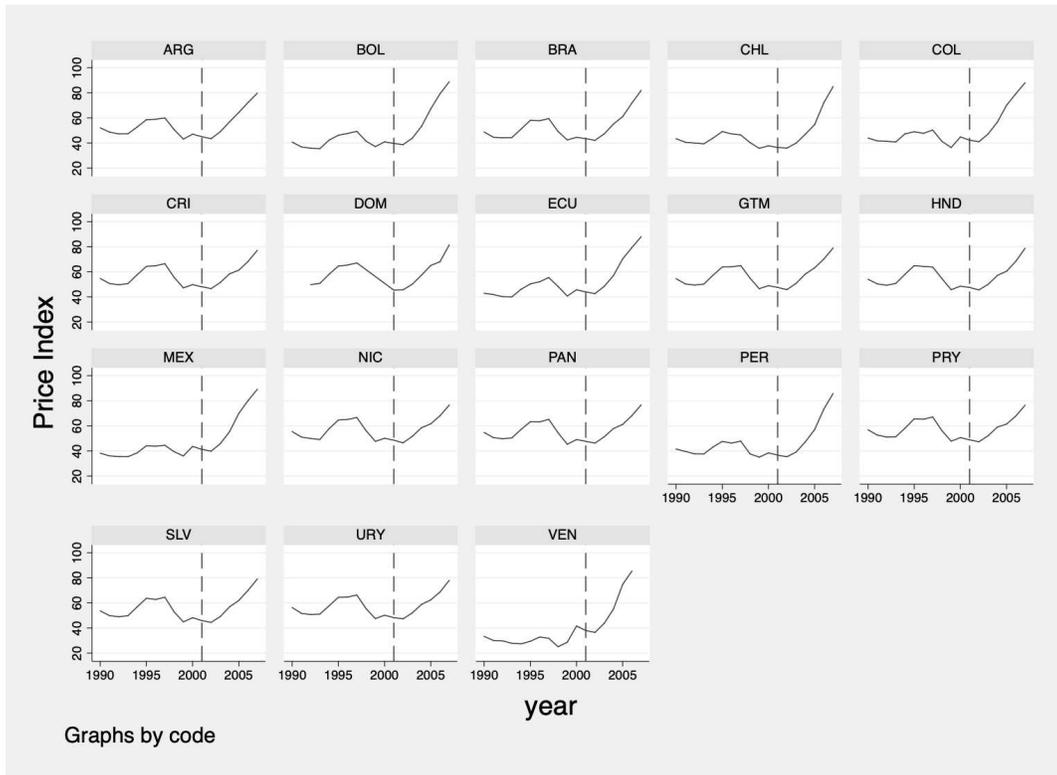
Figure 2.1. Weighted Commodity Price Index,
Sum of the product of share of merchandise exports times price index of exports in food, agricultural inputs, metals and oil.
Latin America 1990-2007
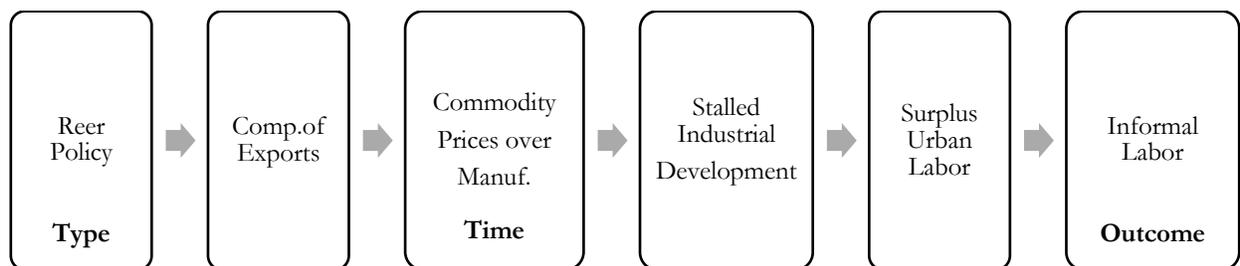
Figure 2. Shock Description, Literature Summary

Table 2.9. Difference in Difference Results, 1990-2007
Dependent Variable: ln Urban Informal Employment Share

	Fixed Effects	*Random Effects*
ln GDPpc	-0.123***	-0.158***
	(0.043)	(0.036)
ln Palma Ratio	0.0678***	0.0646**
	(0.026)	(0.0253)
Appreciation	0.0178*	0.0183**
	(0.009)	(0.009)
Time	0.0453***	0.0485***
	(0.010)	(0.009)
Interaction	-0.0364***	-0.0364***
	(0.012)	(0.012)
Constant	4.790***	5.076***
	(0.355)	(0.302)
N	247	247
R-sq	0.12	0.12
F-Stat	0.000	0.000

Explanatory variables are lagged one
period. Robust standard errors in parentheses
$^{*}\,p < 0.10$, $^{**}\,p < 0.05$, $^{***}\,p < 0.01$

REFERENCES

Arouri, Mohammed. Adel Ben Youssef. Cuon Nguyen-Viet. Agnes Soucat. 2014. "Effects of Urbanization on Economic Growth and Human Capital Formation in Africa". halshs-01068271

Bacchetta, Marc, Ekkehard Ernst, and Juana P. Bustamante. 2009. *Globalization and Informal Jobs in Developing Countries*. International Labour Organisation.

Benería, Lourdes, and Martha Roldán. 1987. *The Crossroads of Class and Gender*. University of Chicago Press.

Braunstein. Elissa and Stephanie Seguino. "The impact of economic policy and structural change on gender employment inequality in Latin America, 1990-2010." Review of Keynesian Economics, 6(3): 307-332. 2018.

Brown, Donald. Gordon McGranahan. "The Urban Informal Economy, Local Inclusion and Achieving a Global Green Transformation." Habitat International 53. Pp. 97-105. 2016.

Comisión Económica para América Latina y el Caribe (CEPAL). 2017. "Base de Datos CEPALSTAT/Economic Commission for Latin America and the Caribbean (ECLAC)", CEPALSTAT database.

Cornia, Giovanni. Bruno Martorano. 2011. "The IDLA Dataset: a Tool to Analyze Recent Changes in Income Inequality in L.A." United Nations University. UNU-WIDER.

Chen, Martha. 2012. "The Informal Economy: Definitions, Theories and Policies." WIEGO working paper No.1.

Cobham, A. 2014. "Uncounted: Power, inequalities and the post-2015 data revolution." Development 57, 320–337 (2014). https://doi.org/10.1057/dev.2015.28

De Soto, Hernando. Enrique Ghersi. 1989. *The Other Path: The Invisible Revolution in the Third*. World. New York: Harper and Row.

Dreher, Axel & Schneider, Friedrich. 2010. "Corruption and the Shadow Economy: An Empirical Analysis." Public Choice. 144. 215-238. 10.1007/s11127-009-9513-0.

Elgin, Ceyhun, and Oguz Oztunali. 2012. "Shadow economies around the world: model based estimates." Bogazici University Department of Economics Working Papers 5.

Elgin, Ceyhun, Cem Oyvat. 2013.a. "Lurking in the Cities: Urbanization and the Informal Economy. Structural Change and Economic Dynamics." Elsevier, vol. 27(C), pages 36-47.

Elgin, Ceyghun. Oguz Oztunali. 2013.b. "Institutions, Informal Economy and Economic Development." WP. Paper provided by Bogazici University, Department of Economics in its series Working Papers.

Elgin, Ceygun, M. Arouri, M and A. Ben Youssef. 2014. "Informal economy in Africa: Building human capital to set the Gazelles free." Working Papers, Bogazici University, Department of Economics.

Fields, Gary S. 1972. "Rural-Urban Migration, Urban Employment and Underemployment." Job Search Activity in LDC's. Center Discussion Paper No. 168.

Franks, Jeffrey. 1994. "Macroeconomic Policy and the Informal Sector, Contrapunto: The Informal Sector Debate in Latin America." State University of New York Press.

Frenkel, Roberto and Jaime Ros. 2006. "Unemployment and the Real Exchange Rate in Latin America." World Development 34(4): 631-646.

Frenkel, Roberto and Rapetti, Martin. 2010. "A Concise History of Exchange Rate Regimes in Latin America." Economics Department Working Paper Series. 97

Gollin D. Jedwab R., Vollrath D. 2013. "Urbanization with and without Industrialization." George Washington University. Washington, DC.

Guerena, Arantxa. 2016. *Unearthed: Land Power and Inequality in Latin America.* Oxfam International.

Gutiérrez- Romero, Roxana. 2010. "The Dynamics of the Informal Economy, CSAE WPS/2010-07." Department of International Development. Oxford University.

Heintz, James. 2012. "Informality, Inclusiveness, and Economic Growth: An Overview of Key Issues." IDRC. CRDI. University of Massachusetts, Amherst, USA. Political Economy Research Institute.

Hirschman, Albert O. 1970. *Exit, Voice, and Loyalty: Responses to Decline in Firms, Organizations, and States.* Cambridge, MA: Harvard University Press.

Leamer, Edward. Hugo Maul. Sergio Rodriguez, Peter K. Schott. 1999. "Does Natural Resource Abundance Increase Latin American Income Inequality." Journal of Development Economics. 3-42.

Lewis, W.A. 1954. "Economic Development with Unlimited Supplies of Labor." The Manchester School, XXII, I39-9I.

Loayza, Norman. 1996. "The Economics of the Informal Sector: A Simple Model and Some Empirical Evidence from Latin America." World Bank.

Loayza, Norman. 2016. "Informality in the Process of Development and Growth." *Peruvian Economic Association.* Working Paper No. 76.

McMillan, Margaret, and Dani Rodrik. 2011. "Globalization, Structural Change and Productivity Growth." In Making Globalization Socially Sustainable, 49–84. WTO.

Palma, Jose. 2011. "Homogeneous middles vs. heterogeneous tails, and the end of the 'Inverted U: It's All About the Share of the Rich." *International Institute of Social Studies,* Development and Change, 42: 87-153. doi:10.1111/j.1467-7660.2011.01694.x

Pollin, Robert. James Heintz. 2003. "Informalization, Economic Growth and the Challenge of Creating Viable Labor Standards in Developing Countries." University of Massachusetts Amherst. PERI Working Paper No. 60

Portes, Alejandro Castells, Manuel and Benton, Lauren. 1989. *The Informal Economy: Studies in Advanced and Less Developed Countries.* Johns Hopkins University Press. Baltimore, viii, 327 pp.

Rodrik, Dani. 2009. "The Real Exchange Rate and Economic Growth." Brookings Papers on Economic Activity (2): 365–412.

Schneider, Friedrich., Enste, D.H. 2000. "Shadow economies: sizes, causes and consequences." *Journal of Economic Perspectives* 38.

Schneider, Friedrich. 2005. "Shadow economies around the world: what do we really know?." *European Journal of Political Economy* 21.

Schneider, Friedrich. 2007. "Shadow economies and corruption all over the world: new estimates for 145 countries." Economics – The Open-Access, Open-Assessment E-Journal 19

Schneider, Friedrich and Buehn, A. Montenegro. 2010. "New estimates for the shadow economies all over the world." International Economic Journal 24 (4), 443–461.

Schneider, Friedrich. 2011. *Handbook on the Shadow Economy.* Edward Elgar Publishing, Massachusetts.

Schneider, Friedrich. 2014. "Shadow Economy and Shadow Labor Force: A Survey of Recent Developments." Discussion Paper No. 8278. IZA. Bonn, Germany.

Shulman, Steven. 1996. "The political economy of labor market discrimination: A classroom-friendly presentation of the theory." The Review of Black Political Economy. 24. 47-64. 10.1007/BF02690042.

Todaro, Michael. 1969. "A Model of Labor Migration and Urban Unemployment in Less Developed Countries." American Economic Review. 59. 138-48.

World Bank. 2020. *World Development Indicators (WDI).* The World Bank Group.

CHAPTER 3: EMPIRICAL ANALYSIS OF FORMAL AND INFORMAL ENTERPRISE

OUTCOMES IN GUATEMALA

1. Introduction

The following chapter studies output and productivity of labor differences between two types of firms[3] commonly observed in many Latin American urban economies: formal and informal. The focus on the case of Guatemala in 2010 is based on the depth and persistence of informalization in this economy, as well as the uniqueness and completeness of data collected by the World Bank's 2010 Enterprise Survey in this round. This data will be used to explore hypotheses informed by models of production proposed by development economics and political economy. The following chapter uses economic models of production by firms, structural explanations and Oaxaca-Blinder decompositions to study how differences between formal and informal enterprises impact their output and labor productivity.

It is possible to understand informalization using formal and informal firms as comparative subjects of study (Gutierrez Romero, 2010; Loayza, 1996; Levy, 2018). Observable differences between enterprises operating in the contexts of formality versus informality are potentially determinable and crucial in order to form a better characterization of the productive potential of developing economies such as Guatemala. The theoretical framework and empirical results presented in this chapter build a case about how structural characteristics and factors of production are associated with formal and informal enterprises' labor productivity and output in drastically different ways.

The World Bank's Enterprise Survey (2010) defines informal enterprises as those that are not registered in official recording by the "Mercantile Registrar" (Registro Mercantil). Informal enterprises also lack a relation with the "Tributary Superintendence Administration" (Superintendencia de

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[3] For the rest of this chapter, firms, enterprises, and businesses will be treated as synonyms.

Administración Tributaria, or SAT), an institution that operates as the country's main fiscal authority. These enterprises typically sell a type of good or service that, if sold in a formal market, would not be considered illegal or criminal. There are plentiful examples of the goods and services these firms sell or produce. including goods like tortillas, tamales, fruit, sunglasses, and toys; services such as construction, repairing shoes and landscaping; and many more. These economic activities and enterprises are far from underground and are often legitimated by customs and norms practiced by many Guatemalans.

Results confirm that formal and informal firms' labor productivity and output are associated with factors of production, firm size, and firms' characteristics in different ways. While output is associated with factors of production in the expected way for both types of firms, labor productivity presents important differences, especially when also accounting for firm size, which has important implications for how we consider differences between formal and informal production from a theoretical perspective. Also, formal enterprises' outcomes have a strong association with their regional location, while informal firms' outcomes tend to have a higher association with belonging to the service sector and with having a female owner. Additionally, associations between formal and informal firms' labor productivity and their respective characteristics differ greatly once we consider firm size. While the number of workers is positively associated with respect to formal firms' labor productivity, this association is negative with respect to informal firms' labor productivity.

The argument is presented as follows: in section two, I look at the case of Guatemala and the relevance of informalization in this economy. Section three covers the theoretical an empirical literature review of firms and enterprise research. Section four explores two models that have been proposed in the literature analyzing output and labor productivity in the context of informalization. Section five describes the data used in the analysis. Section six covers a characterization of summary

statistics, and section seven looks at regression results, as well as Oaxaca-Blinder decomposition results. Section eight presents concluding remarks.

2. Informalization in Guatemala

Guatemala, according to the last census in 2018, has approximately 14 million citizens. In 2017, Guatemala had a per capita GDP of $4,471 (in current US dollars), and a growth rate of approximately 2.7%. The formal unemployment rate was 2.7% in 2017; however, this measure only focuses on the formal economy. In terms of its composition, the largest sector, in terms of value added, is services and the lowest is agriculture. However, in terms of employment absorption, agriculture and services employ the majority of the population. Industry is not as important as services in terms of aggregate production, while it employs the smallest number of workers (World Bank, 2020). This suggests a lack of industrialization as part of Guatemala's development puzzle.

Guatemala is among the economies with the highest informalization rates as measured by different macroeconomic direct and indirect estimates. For example, in their most recent work, Schneider and Medina (2018) argue that Guatemala presents one of the largest Latin American shadow economies. They understand the shadow economy to be the economy that comprises economic activities that circumvent costs and are excluded from the benefits and rights incorporated in laws and administrative rules covering property relationships, commercial licensing, labor contracts, financial credit and social systems. Guatemala's shadow economy has been steadily reducing from 56% of GDP in the early 1990s to 42% in 2017, according to Guatemalan Schneider's estimates. For reference, Mexico's shadow economy was 28% by 2017, and an estimate for the U.S. has been below 10% for the past two decades.

More direct measures, like those focusing on informal employment - defined as employment with low productivity and typically excluded from social safety nets - show similarly high levels for Guatemala, with informal employment ranging from 65% of total employment in the mid-1990s to

54% of total employment in the early 2000s (Cornia, 2011). For reference, even though Latin America is a region with large informal sectors, Cornia's data set shows that Chile reports lower informal employment estimates, that never rise above 36% of total employment between 1990 and 2007. These macro statistics give us a sense of the depth and seriousness of informalization in Guatemala's development process. More than half of the economy and workers operate in informality.

The role of the informal economy in Guatemala's development has been important in different ways. It could be argued that informalization of labor has jeopardized the country's quality of jobs and enterprises by operating as a secondary, sub-par market for labor, goods, and services. Output, earnings, and labor productivity are persistently lower in the informal sector than in the formal sector. Informalization, playing a dual role, has perpetuated the country's inability to increase its labor productivity and improve working conditions, while at the same time, it has also offered an important source of work and production for much of its most precarious population. Informalization also represents limits to the extent that the state, formal institutions, and enterprises are able to effectively react to shocks and develop policies that are conducive to productivity growth and inclusive development.

Informalization represents a challenge in terms of the ability of the state to operate as a neutral party in Guatemala's economy. The informal economy plays an ambivalent role in the country's economy. It can be easily observed that the country's formal sector has historically blamed informal enterprises and workers for contributing to the economy's underfunded state, often criminalizing informal workers and supporting their legal persecution and monitoring. Much attention has been given to the role that informal enterprises play in decreasing the tax-base and jeopardize the effective and democratic application of the rule of law. On the other hand, informal workers and informal enterprises have typically suffered from several constraints and exclusion when attempting to gain voice within the formal institutions and governing bodies in the country. An anecdotal example

illustrating this dichotomy can be found in observing how policy-makers have targeted the persecution of street businesses and vendors, while at the same time campaigning in informal city markets within the country.

Not all outcomes about the informal sector are negative. Many in the literature have observed how in developing economies like Guatemala, informal sectors serve as flexible hosts to income generating activities, employment, and the provision of goods and services, with more accessible options than those existing in the formal economy. Additionally, in a culturally and historically rich economy like Guatemala's, important informal sectors have bolstered tourism and expanded the availability of services, with many relying on informal enterprises to conserve the production of culturally unique goods that modernity would undermine. From typical candies and other culinary traditions to indigenous textiles and art, the informal economy in Guatemala appeals to foreigners and locals by hosting a wide range of production techniques that conserve the country's traditional knowledge and culture.

It is difficult to assess the overall effect of the informal sector on Guatemala's economy. While it is the case that it oftentimes competes with the formal sector and generates serious challenges in policy making by way of problems of measurement, impact-value, and inclusiveness in policy, the informal sector also provides labor and enterprises a degree of flexibility and support. The informal sector provides citizens with an alternative to formal production, typically exclusive to high-skill workers and privileged groups. For this reason, this chapter adopts a skeptical view of the role of informalization in Guatemala's development, focusing on its measurable characteristics without making a judgment on its social, cultural, economic, and political roles.

3. Literature Review:

The literature on informalization from theoretical and empirical perspectives is rich. While there is a lot of research pertaining shadow economies and informal labor, which adopts a

macroeconomic perspective on informalization, research focusing on informal firms as the unit of analysis is less abundant. The choice of sources described in this literature review is based on the focus on firms. Additionally, resources first treat the general literature focusing on the theoretical implications of having a large sector of firms in informality, while then focusing more directly on work pertaining enterprise surveys, particularly in the context of developing economies in Africa and Latin America, where work has also focused on characterizing firm output, worker productivity and their relation to firm size.

Loayza (1996) proposes separate production functions to characterize formal and informal firms. Assuming that formal firms use public goods as intermediate factors of production, Loayza explains that formal firms enjoy the use of the public good in full. Informal firms, on the other hand, are typically excluded from a portion of such public good. This exclusion happens due to the assumption that enterprises in the informal sector do not pay taxes. This implies that in Loayza's modeling framework, only formal firms undertake the cost of the public good, decreasing a formal firm's productivity. In the model, informal firms are characterized as firms with low productivity that, at any point in time, risk persecution and punishment by formal institutions like public city authorities and taxing institutions. From this perspective, it is easy to observe how the main objective of the model is to portray informality as a government failure rather than as the product of structural characteristics that influence the division of labor and activities in a developing economy.

Loayza (2016) presents an analysis of formal and informal sectors in an economy, linking the process of informalization of production with overall economic development. This approach to informalization of enterprises shares many characteristics with the way in which it is typically portrayed by other classical contributions in development economics (Lewis,1954; Krugman, 1993). In Loayza's more recent contribution, informalization is not reduced to its fiscal dimension. Loayza argues that formal firms face standard Cobb-Douglas production functions while informal firms typically see a

function that is linear in labor and enjoys a proportion of the technological level that formal firms possess. This shift illustrates the need of developing research of informalization of enterprises beyond their fiscal dimension, and the necessity of understanding their structural, institutional and technological characteristics in a more complete way.

Focusing on the Mexican case, Santiago Levy (2017) argues that Latin American firms' productivity in the short and medium run can be conceptually understood in terms of three fundamental aspects. The first characteristic should be factors of production. He argues that factors of production are appropriate in the analysis of firms in Mexico, since this improves our understanding of how their productivity is determined by labor, capital and human capital of different types. Secondly, Levy argues that, beyond factors of production, it is also crucial to understand the firm's environment with respect to labor regulations, taxes, and macroeconomic conditions. Third, he argues that access to technologies and institutions, such as the rule of law or public infrastructure, is crucial in determining firm's outcomes. Levy's work can be adapted to the study of firm's characteristics and context in the case of Guatemala.

Chen (2012) has argued that social categories have an influence on firms' productivity, focusing on the formal and informal divide. She explains how structural processes are crucial in determining a particular type of firm's outcome in an economy. For Chen, the division of formal and informal activities is strongly linked with processes of structural change: processes related to class formation, sectorial divisions, race, and gender, among others. These structural explanations of informalization deserve careful and informed empirical analysis to identify if the formal and informal divide is grounded.

Turning to research done specifically with formal and informal firms as units of research, we can evaluate the work done by Krakowsky (2005), who argues that the relevant question should be studying why regional differences in informalization levels at the macro level are so large in cross

country comparisons. For Krakowsky, why enterprises and workers decide to operate informally seems to be the best way to discover policies to limit or decrease the size of the informal sector. Krakowsky, assuming rational behavior in studying the informal sector, arguing that states have to engage in labor deregulation and lowering taxes if they are to stop the operation of enterprises in the informal sector. At the macro level, he compares empirically how different aggregated institutional indicators like the World Governance Indicators are correlated with indirect estimates of perceptions about different levels of informality around the world. He argues that in Latin America, the degree of ethnic fragmentation may serve as an important determinant of informalization, highlighting how structural factors in the region are important in fostering informal economic enterprises.

Narrowing the analysis to the literature comparing different types of firms in Guatemala, Funkhouser (1996) performs descriptive empirical analysis on the differences in salaries between small and larger formal firms in Guatemala in the 90s. He finds that smaller firms - less than ten workers – tend on average to employ the youngest workers in the country, between 10-19 years of age. He also finds that small firms have lower earnings and are typically found in the service sector. Funkhouser also finds that the age of a firm is an important determinant of the salaries paid by its owners. Additionally, he finds that there is a negative association between salaries and a categorical variable capturing the gender of a worker. Women have on average lower earnings than men. Funkhouser's work, although a solid starting point for enterprise analysis in Guatemala, focuses on the characteristics of firms in the formal sector. Another important way in which this study differs from the analysis performed in the empirical section of this chapter is its focus on wages, as opposed to analyzing firms' output and labor productivity.

In terms of research developed specifically using the World Enterprise Surveys, Mohammed Amin (2010a., 2010b., 2011, 2014, 2015, 2019) has developed a lot of work in the form of brief reports for the World Bank. His work provides multiple insights showing the way in which the Enterprise

surveys can be used to gain insights and answer development economics hypotheses. Some of Amin's work has focused on Latin America with a focus in Argentina and Peru, since these are the other two countries for which we can find an informal module in the surveys. This type of research has not yet been developed for Guatemala. His work deals with development issues like gender, firm size, informalization, and productivity of enterprises and labor. Amin's work is useful in identifying how to operationalize analysis about formal and informal enterprise comparisons, and some sections that follow aim at complementing this research track.

Amin (2010.a.) presents descriptive analysis of enterprises in two cities in Argentina - Buenos Aires and Chaco - focusing on the comparison of characteristics between formal and informal firms. He argues that there are important differences between informal firms between the two cities: the capital, Buenos Aires, and Chaco, a smaller rural town. The regional analysis shows that informal firms in Buenos Aires and Chaco are not that different in terms of size and labor productivity. However, Amin suggests that challenges impact the different firms in different ways, as more informal firms in Chaco have assets and capital, compared to informal firms in Buenos Aires. His results also show that corruption and crime are reported as a problematic challenge in Chaco, but not in Buenos Aires. On the other hand, registration is more beneficial for informal businesses in Chaco. This counter-intuitive results, according to Amin, suggests that local policy with respect to informalization, as opposed to proposed overarching national policy alternatives, could more effectively improve informal enterprise outcomes. Most of the empirical work presented in Amin's paper is descriptive and not inferential.

Amin (2010.b.; 2011) argues that on average, labor productivity and firm-size of enterprises in Argentina and Peru are impacted strongly by the gender of the owner. He claims that, in terms of output, a business owned by a woman produces on average only 76% percent of the output of a male-owned business. In this report, Amin focuses in four Latin American cities: Buenos Aires, Chaco, Lima, and Rosario. Crime and finance are reported as some of the largest challenges faced by female-

owned businesses. The contributions in this report include a way of measuring firm-size, in terms of number of workers, and labor productivity by using sales per worker. This approach is then adopted for the analysis developed in Guatemala in the following sections of this chapter.

Focusing on the case of 11 African countries, Amin again uses the log of the number of workers to estimate how firm size is associated with labor productivity (Amin, 2014; Amin, 2015). Measuring labor productivity in terms of sales per worker, he finds that, in the informal sector, firms show diminishing labor productivity in a sharp way. His results show a negative association between labor productivity as informal firms employ more workers. Amin argues that, while formal firms see a positive association between size and labor productivity, due to engaging in more research and development, being more likely dedicated to exporting activities, and due to higher access to finance, their informal counterparts are known to be smaller and known to not engage in these activities. He argues that given the relatively small size of informal firms and their limited variation in firm-size, it is questionable that their size has any relevance at all to a firm's structure, conduct, and performance in the same way as seen in formal firms. Amin's work also shows that informal firms in Africa show a higher predisposition to the use of public infrastructure, finance, and registration as they grow in size. This is a puzzling outcome found in Amin's descriptive analysis of African informal enterprises, since larger firms report a higher use of electricity, water, and vehicles, contradicting the notion of informal enterprises as completely lacking assets, as proposed by Loayza's in his more recent work explained above. This illustrates how empirical work can better inform modeling of informal and formal firms.

Amin et al. (2019) develop an empirical study of the formal and informal enterprises to study the labor productivity gap. Measuring productivity as the log of sales per worker for 125 countries, this chapter presents overall stylized facts about the way in which informalization is associated with different factors of production in many countries where Enterprise Surveys have been developed. The

aggregated results show that informalization, firm size, and belonging to the manufacturing sector are all negatively associated with labor productivity. Additionally, higher managerial experience, assumed to imply higher managerial quality, is also found to be associated with higher labor productivity. In this aggregated analysis, older firms and firms in the capital cities are associated with higher productivity per worker. In addition, Amin et al. (2019) argue that more specific country analysis is always useful in developing insights about how informal firms should be characterized, as each of the economies studied has its own properties with respect to informalization.

From Amin's work, we can establish some stylized facts about informalization in developing economies. We can assess that firm size and the ownership of assets are important determinants of informal labor productivity. Additionally, we can expect to see that, in the case of Guatemala, gender, sector, and region will be important determinants of labor productivity. However, as it will be shown in results, the analysis specific to Guatemalan firms highlights that important differences exist between the formal and the informal sectors. There exists a research gap found in the case of Guatemala. as research pertaining informal and formal comparisons produced by Amin and others has not yet evaluated Guatemalan surveys. This motivates the following analysis.

4. Analytical Framework

4.1. Two Models of Formal and Informal Production

For a firm in the Guatemalan economy in 2010, following a multivariate Cobb-Douglas production function, equation (1) below specifies how firm output (Y) is associated with labor (L), physical capital (K), and years of experience of manager (H). Additionally, output is dependent on a technology level (A).

$$(1) \quad Y = AK^{\alpha}H^{\beta}L^{1-\alpha-\beta}$$

Dividing both sides by L, we get sales per worker as in equation (2).

$$(2) \quad \frac{Y}{L} = A\left(\frac{K}{L}\right)^{\alpha}\left(\frac{H}{L}\right)^{\beta} = y = Ak^{\alpha}h^{\beta}$$

Applying logarithms to both sides, we get the function in linear form, suitable for regression analysis. The goal is to integrate this production functions with the Oaxaca-Blinder empirical framework. If we assume A contains structural characteristics of firms, and we assume two types of firms (formal and informal), we can write equation (3) as,

$$(3) \quad \ln y_{\gamma} = \ln A_{\gamma} + \propto \ln k_{\gamma} + \beta \ln h_{\gamma}, \qquad \gamma \in (i, f)$$

Where informal (i). and formal (f) are the corresponding firm types (γ). Assuming that at a point in time, the level of technology (A) can be deconstructed into the structural challenges, as well as other challenges, reported by firms in the year of the survey, we can explore the differences between formal and informal firms in how these factors are associated with productivity.

$$(4) \quad lnA_{\gamma} = R_{\gamma} + G_{\gamma} + \sigma_{\gamma} + I_{\gamma}$$

For example, in equation (4), where A describes structural characteristics of the firm such as its region(R), the gender of owners (G) and, if the enterprise is in the manufacturing or service sector (σ). I represents other challenges reported by firms. These may include access to infrastructure, crime and corruption conditions and, access to long term contracts such as loans or land purchases. While access to loans and land may be considered imply access to capital 'like' assets, access is different than owning assets. Access to loans and land is assumed as a separate and different restriction in a firms' production problem.

Turning the model into an empirical form, we would have the following specifications,

$$(5) \ln Y_{\gamma} = \beta_0 + \beta_1 lnK_{\gamma} + \beta_2 lnL_{\gamma} + \beta_3 lnH_{\gamma} + \delta_1 R_{\gamma} + \delta_2 G_{\gamma} + \delta_3 \sigma_{\gamma} + \delta_n I_{\gamma} + \varepsilon$$

$$(6) \ln y_{\gamma} = \beta_0 + \beta_1 ln \frac{K_{\gamma}}{L_{\gamma}} + \beta_2 ln \frac{H_{\gamma}}{L_{\gamma}} + \delta_1 R_{\gamma} + \delta_2 G_{\gamma} + \delta_3 \sigma_{\gamma} + \delta_n I_{\gamma} + \varepsilon$$

A variant that emerges from Amin's work is the consideration of firm size as a potential factor impacting the labor productivity (Amin, 2014; Amin, 2015). It is important to highlight that this empirical test would require a different assumption about the shape of the production function to be

tested. In order to see if firm size - in terms of number of workers - is associated with respect to worker productivity, the following specification is empirically explored,

$$(7) \ \ln y_\gamma = \beta_0 + \beta_1 ln L_\gamma + \beta_2 ln \frac{K_\gamma}{L_\gamma} + \beta_3 ln \frac{H_\gamma}{L_\gamma} + \delta_1 R_\gamma + \ \delta_2 G_\gamma + \ \delta_3 \sigma_\gamma + \ \delta_n I_\gamma + \varepsilon$$

In making use of this specification, it is crucial to identify that using number of workers allows us to control for firm size as a factor that is potentially associated with labor productivity. This specification implies an output per worker function of the following form,

$$(8) \ \ y = Ak^\propto L^\gamma$$

Which would, in turn, imply a different production function than the Cobb-Douglas specified above,

$$(9) \ \ Y = AK^\propto L^{1+\gamma} = ALK^\propto L^\gamma$$

This specification suggests that small competitive firms in the formal sectors would benefit from externalities generated from the number of workers in their plants or facilities. These externalities, for informal firms, could potentially be positive or negative as informal contracts. If they exist at all, externalities as the number of workers increases may be less or more binding as firms with more workers, although enjoying higher economies of scale, may be more visible to authorities and may have restricted access to markets that formal firms may have, justifying the small size of informal sector firms.

4.2. Oaxaca Blinder Decompositions and Enterprise Outcomes

The Oaxaca-Blinder decomposition is a commonly used method in the literature comparing differences in outcomes between economic agents of different social categories (Oaxaca, 1973; Blinder,1973). [4] In the past, Oaxaca-Blinder decompositions have been proposed as an alternative to dummy-variable approaches in the study of wage inequality between men and women. According to

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[4] For instance, in the AEA meetings in 2018 in Atlanta, Darrick Hamilton mentioned them as a valid and simple methodology that can be used in the study of privilege and racism. This was a direct reply towards a discussion on the unnecessary sophistication of methods used to empirically measure these concepts.

this literature, this method provides comprehensive accounting of differences between group effects (Figart, 1997). Oaxaca-Blinder decompositions possess three useful properties in the context of this analysis. First, the analysis is generalizable to multivariate regressions, allowing the accounting of multiple continuous variables. Secondly, it allows the testing of multiple categorical variables making the use of the deviation contrast transform, allowing groups of dummies to be tested simultaneously while avoiding the dummy variable trap. Finally, in order to obtain the decomposition results, it is necessary to estimate production functions individually. Pooled regressions, and individual regressions, along with the proportion of explained differences are included as the main results in this analysis. This would be the estimated regressions estimated using the Oaxaca-Blinder approach, along with decomposition results of explained and unexplained portions of differences in sales and sales-per-worker.

The simplest way of understanding the Oaxaca-Blinder methodology is by assuming that there exists a difference between formal and informal firms' productivity. If this difference is the same at all levels of such input, then a dummy variable approach suffices[5]. However, if we assume that there exists some difference in the way inputs contribute as they become more abundant, we can expect to see that firms with higher amounts of that input will be larger due to both, having that input in larger quantities, and the way in which such input contributes to output in the context of its type, formal or informal. Then we can disaggregate this difference into the proportion in it that is attributed to differences in the relative abundance of inputs as well as the difference attributed to a firm's relative use of those inputs in the formal or the informal sector. A brief graphical summary and description of this methodology can be found in Figure 3.1.

In a more formalized form, for the twofold case, suppose we have,

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5 This approach is calculated in the two-fold decompositions as part of the estimation of the decomposition and included in the results.

$$(7) \qquad y_f = X'_f \beta_f + \varepsilon_f$$

$$y_i = X'_i \beta_i + \varepsilon_i$$

$$y_i^* = X'_f \beta_i^* + \varepsilon_i^*$$

For the formal and informal sector, assuming that the $E[\varepsilon_\gamma]=0$ for all regressions, we can write,

$$(8) \qquad E[y_f] = E[X'_f \beta_f]$$

$$E[y_i] = E[X'_i \beta_i]$$

$$E[y_i^*] = E[X'_i \beta_f^*]$$

R is the expected value of the difference in productivity between formal and informal firms ($E[y_f - y_i]$). This means that we can decompose this difference into two parts. The first is the difference between formal productivity and the productivity that an informal firm would have in the production function of a formal firm. This would be the outcome explained by group differences in predictors (Q). The unexplained part would be the rest of such a difference (U), and thus, R=Q+U. This is represented in equation (9).

$$(9) \qquad R = E[y_f - y_i] = E[y_f] - E[y_i] = E[X'_f \beta_f] - E[X'_i \beta_i]$$

By adding and subtracting $E[X'_i \beta_f^*]$, we can decompose the results into as noted in equations (10) and (11).

$$(10) \qquad Q = E[y_f - y_i^*] = E[y_f] - E[y_i^*] = E[X'_f \beta_f] - E[X'_i \beta_f^*]$$

$$(11) \qquad U = E[y_i^* - y_i] = E[y_i^*] = E[y_i] = E[X'_i \beta_f^*] - E[X'_i \beta_i]$$

Finally, adding and subtracting $X'_f \beta_f^*$ to R, and rearranging, we get the decomposition in equation (12).

$$(12) \qquad R = \left[E(X'_f) - E(X'_i)\right]\beta_f^* + E(X'_f)(\beta_f - \beta_f^*) + E(X'_i)(\beta_f^* - \beta_i)$$

The first term from left to right in the right-hand side of the equation represents the difference between a formal and informal firm in the factor quantities, presuming productivity effects that prevail

in formal firms. The last two terms represent the difference explained by differences in coefficients between formal and informal firms. Additionally, there is a threefold decomposition that expands and decomposes R into three sections: the part of the difference attributable to the coefficients, the part attributable to endowments, and the part assigned to interactions of both. For a more thorough explanation of this methodology, see the work of Jann (2008) and Bauer et al. (2008). The two-fold decomposition allows the inclusion of several dummy variables using the dummy residual method.

5. Data

      Firm output is measured by sales, and **labor productivity** is obtained by dividing sales by the number of workers of the enterprise. Previous literature analyzing these surveys also uses sales per worker as an alternative to more direct measures of labor productivity (Amin, 2014). Sales are measured yearly for formal firms but measured monthly for informal firms. To make the two measures comparable, annual sales of formal businesses are divided by twelve. This smooths out the seasonality of sales. At first sight, this assumption has particular implications for the informal sector. However, we can assume the following: on average, at some point in time, the number of firms experiencing off-season sales is equal to the firms experiencing on-season sales. Given the nature of cross-section analysis, this should suffice to account for seasonality of enterprises' sales. Sales are measured in quetzales (the local currency in Guatemala) in both sectors. It would be preferable to add the entire year of sales for informal firms, but this is not possible due to lack of data availability.

      While formal enterprises surveyed report all formal workers employed in 2009, informal enterprises report paid as well as unpaid workers. This is an important distinction since it suggests that many informal enterprises pool income by enterprise, household, or family. Labor in the informal sector, then, is calculated by adding both types of workers in this group of enterprises. This may be a limitation in the data since there are no reported measures of unpaid workers in the formal sector. It would also be desirable to have information about the hours worked to assess productivity in both

the formal and informal sector to obtain more knowledge about use of time in both sectors. The **number of workers** has been used in the past as part of a potential measure of firm size (Amin, 2015; Amin, 2019).

Assets measure the approximated amount of **capital in each firm**. In order to calculate this variable, both formal and informal firms were asked for the value of their current machines, equipment and vehicles. While the response of formal firms was an estimate of the total of the three, informal firms were asked to estimate the value of each independently, and the value used for comparison is the sum reported in these three categories. This variable imposes a limit on the number of observations, reducing the sample size by half in the empirical analysis since many firms do not report owning any type of assets. The implications for assets to be zero or for firms failing to report assets are serious in this analysis, and there is no way to know the reasons for missing data in this variable.

The survey includes data about the year that the enterprise started, as well as years of **managerial experience in that industry**. It can be argued that older enterprises and older managers will have stronger reputations, longer and higher quality of social connections, and higher levels of experience and skills in the activity performed. Hypothetically, the age of the enterprise and the managerial experience should have a positive association with productivity. Due to the high correlation between these two variables and the assumption of managerial experience as the main 'input' in production, managerial experience will be the main focus as a factor of production. The measure used is the answer to the question, "How many years of experience working in this sector does the main decision maker have?"

Region is a categorical variable that equals one if the enterprise was interviewed in Guatemala City, the capital of the country, or zero if the interview took place in Quetzaltenango, a city with a smaller population in the western part of the country. Only these two cities are covered by the survey. It is important to highlight that both cities are urban centers. Nevertheless, it should be noted that

Quetzaltenango has one-third of the population as Guatemala City and is considered to be closer to the rural sector.

Gender of owner equals one if the enterprise has at least one female owner; otherwise it is zero. It is important to highlight the fact that many formal enterprises have multiple owners. In this case, the survey asks if at least one of them is female. It would be preferable to use additional variables, along with gender of owner, in order to better characterize the role of gender in enterprises. For example, the informal module asks if the main choice maker or top manager is female. On the other hand, the formal module asks what proportion of an enterprise's labor force is female. Unfortunately, these questions are not available to both sectors. The comparative nature of this analysis relies on similar questions with complete answers in both surveys. This makes female ownership the best variable to test since it is asked in both modules in a similar manner.

Two clarifications must be made about the sectoral composition of the sample. First, the formal sector has three categories: **manufacturing**, service, and core. Enterprises in the core sector are classified also as services since they refer to wholesale distribution. These enterprises are typically large retailers. The production of manufactures is exclusive to the industrial production sector. Secondly, many informal firms present a problem of separability: they can do sales, production, or both. The survey manual indicates that if some form of production is made, the enterprise is considered a manufacturing firm. Sector is therefore coded as one if the firm is in manufacturing and zero if the firm is in services.

With respect to access to infrastructure, it would be desirable to have complete information about multiple indicators. Among the possible ones are access to electricity, water, transportation and telecommunications. However, out of all of these indicators, the only one with available data for both formal and informal enterprises is **access to electricity**. The variable is one if this was reported by the survey respondent as a challenge to output, otherwise it is zero.

The survey also includes data on whether **corruption** or **crime** is reported as having been a challenge for an enterprise's sales. Corruption refers to how much sales of an enterprise are impacted by having to bribe officials. Crime refers to enterprises reporting to be victims of a crime that decreases their sales or negatively impacts their operations. These variables reflect how effective conflict resolution and crime prevention may impact an enterprise's productivity. These variables also control for the degree of instability that firms face due to the poor management of corruption and prevention of criminality in the cities surveyed. The answers provided by respondents on these categories are dichotomous, so a variable of one indicates that in the past year, criminality and corruption represented a challenge for the productivity of the enterprise.

Two frequently mentioned problems in the literature of informalization are **access to credit**, or finance (Gutierrez Romero, 2010), and **access to land** (De Soto, 1989). In the context of finance, Gutierrez-Romero argues that the typical informal business faces a risk premium when borrowing due to a higher risk of default. In theory, informal businesses are smaller and newer, thus representing a higher risk for lenders. Informal enterprises may also be willing to engage in more default due to a lack of oversight by formal institutions. Regarding access to land, De Soto argues that an institutional process found in informal enterprises is first, then the development of spoken contracts, and finally formalization of land contracts. In the formal sector, this process of appropriation works in the opposite way. It is worth testing if accessibility to land contracts is in fact a driver of productivity for formal and informal firms. The answers provided by respondents on these categories are dichotomous, so a variable of one indicates that in the past year, access to finance and access to land represented a challenge for the productivity of the enterprise.

6. Summary Statistics

Table 3.1 shows the summary statistics for 303 informal firms and 590 formal firms in the survey, as well as the summary statistics when both groups are pooled. While the average sales in the

informal sector are around Q.3,460, the formal side average sales are around Q.5 million. The smallest sales reported by formal firms are of Q.2917. There are vast differences between the two main categories - formal and informal - when it comes to sales.

In terms of labor, while the maximum number of workers recorded in the informal sector is eight, only six firms of all informal enterprises have more than six workers. This indicates that informal enterprises surveyed represent very small firms. Typically, a small firm in the formal sector has from 6 to 19 workers. Many informal firms only have one worker. The mean of informal firms is 1.75 and the median 1. This highlights that many informal firms involve the production of a good or service by a single individual. The minimum number of workers in the formal sector is two workers. The mean is 162 workers and the median is 30, suggesting the existence of outliers in formal firms employing a large number of workers. The manual of the survey's implementation indicates that direct methods of selling labor, such as windshield washers on street corners, are excluded from the survey. This creates ambiguity in differentiating between informal enterprises with a single worker and informal independent workers. The survey's definition of an informal enterprise, described above, does imply that the informal enterprises surveyed have more than one worker, making it impossible to test hypotheses about single employee firms.

Information about assets is more difficult to analyze since almost half of the enterprises are missing an answer to this question. There are 13 formal enterprises reporting zero assets; meanwhile in the informal sector, some enterprises refuse or do not know the value of their assets. Results were calculated including and excluding the 13 formal enterprises reporting zero assets without any significant changes in final results. Informal enterprises not reporting assets either due to refusal or lack of knowledge are recorded as missing. Nevertheless, as an important variable in theory of production, the estimated value of assets is included in most regressions. Assets show great disparity between formal and informal sectors. In the formal sector, they may ascend up to an average of

approximately Q.1.7 million, with a median of Q.250,000. The maximum value of assets in the informal sector only goes up to Q.105,000 with a mean of Q.7,659 and a median of Q.2000. It is also worth highlighting that the median is below the mean in both formal and informal sectors, suggesting a right skew in the distribution of assets.

Turning to enterprise age and managerial experience, formal firms have higher means for both variables. While the mean for informal businesses for both variables is around a decade, the median experience is 6 years. For formal enterprises, the mean experience is around 22 years and the median is 20. Some outliers in the formal sector are over a century old. Very old enterprises in Guatemala include those involved in the production of cement, food, and agro-industrial products. Informal enterprises are, on average, much younger than formal enterprises. Years of experience of manager in informal enterprises by top choice makers or managers is lower than in formal ones. Years of managerial experience is the main focus of the regression analysis.

Turning to structural factors captured by categorical variables, their mean value in the summary statistics indicates the percentage of firms that answered affirmatively in each category. Around half of the informal firms are owned by women, while only a third of formal firms report at least one female owner. Two thirds of formal enterprises compared to just half of informal firms are involved in manufacturing. Guatemala City, as opposed to Quetzaltenango, boasts the majority of both formal (73%) and informal (61%) firms.

It is important to highlight that the survey of informal enterprises is not representative of the population. While the formal sector was surveyed in a stratified way, the informal sector survey was done with the goal of interviewing two informal enterprises in the manufacturing sector and two informal enterprises in the service sector per block in the city where the survey was conducted[6]. For

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[6] For more details on how the surveys were designed and developed, it is helpful to examine the implementation manuals of the formal and informal enterprise modules.

this reason, the comparative results should be taken with caution when inferring issues about the Guatemalan population of enterprises at the country and the city level. It is worth highlighting that size, region, and sector are all relevant characteristics in the survey design for the formal sector.

7. Analysis of Results

Table 3.2.a. indicates the pairwise correlation between factors of production and firm output. As it can be observed, sales are highly correlated with the number of workers per firm in a positive way as well as with assets. An association between assets and sales also exists but is much weaker as compared with the association with respect to firm size. In addition, we can observe that the association between managerial experience and sales is not high nor significant. This association is only significant but weak with respect to the firm size, or the number of workers, in the pooled model. Table 3.2.b. shows the correlation between output per worker, including assets per worker, firm size in terms of number of workers and years of experience per worker. As it can be observed, years of managerial experience per worker is negatively correlated with size of the enterprise, potentially creating issues of multicollinearity if included in the specifications using firm size. More importantly, it is crucial to observe that in the pooled and the formal correlation results, firm size in terms of the number of workers is positively correlated with respect to labor productivity, but that this is not the case for informal firms. This result will be furthered explored in the regression analysis.

Table 3.3 reports individual regression and decomposition results for both formal and informal enterprises separately and the two pooled together. This table shows that the number of workers and the level of assets both have a strong association to an enterprise's sales. While including them individually, we can observe differences in the coefficients in the results as we compare the two sectors. The first specification in Table 3.3 shows that managerial experience (*H*) is statistically significant solely for informal enterprises. The expected signs are found on assets and labor. More workers and higher levels of assets are associated with firm size. The size of coefficients is different

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for the formal and the informal sector. The informal dummy in pooled specifications is always statistically significant.

Accounting for sector, gender of owner, and region in model 2, we can see different patterns of how structural characteristics are associated with sales. Controlling for other factors, manufacturing firms are smaller than service-sector firms in both the informal sector and in the pooled specification. Although the magnitude of the coefficient is similar for formal sector firms, it lacks statistical significance. Female ownership has a statistically significant negative association with respect to sales in the informal sector, most likely because women owners may be confined to low productivity service sectors. This could potentially imply a selection problem. Regional differences are important for formal firms; for example, formal firms located in Guatemala City are significantly associated with higher sales levels. When including the rest of responses, only access to finance and crime appeared to have a negative association with sales in the informal sector. Although the sign in these coefficients is puzzling, these results are not robust and merely seem to have an association with informal sector sales. On the other hand, the results for structure remain robust and do not vary. The overall explanatory power of regression results is high for the pooled and formal sector, but not the informal sector.

Turning to decompositions of the differences in sales between formal and informal firms in Table 3.3, results make use of a two-fold decomposition to disaggregate these differences into differences in endowments and differences in coefficients. The decomposition output reports the mean predictions of sales and their differences for both formal and informal enterprises. A way of simplifying OB results is by taking a percentage of what factors have an impact in explaining the differences in sales between the two sectors. The percentages of explained difference in the three specifications ranges from approximately 75% to 78%. Differences in these factors explain approximately three-fourths of the difference between formal and informal enterprise sales.

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Differences in output tend to be mostly determined by how rewards to endowments in inputs are associated with it. At least three-fourths of differences in outcomes, when it comes to sales, can be attributed to differences in endowments. Only 25% of the difference in sales has to do with how differences in terms of rewards to them. This implies that in terms of overall output, 25% of the difference is associated with belonging to the informal sector and how that prevents assets, labor, and other factors of production from being translated into sales. The fact that this difference exists allows for a more serious defense for the improvement of informal firms to have access to this type of endowments, as their conversion to higher productivity has less to do with how they convert them into higher sales, and more to do with the fact that they may not have them.

Table 3.4 shows that assets per worker are positively associated labor productivity, or sales per worker; thus, predictably higher capital intensity is associated with higher labor productivity. This specification comes straight from equation 2 and excludes firm size. The inclusion of firm size in equation 8 will be developed in Table 3.5. Table 3.4 is included for completeness as the latter specification provides better empirical results. Exploring the role that years of experience of manager per worker have on sales per worker using the Cobb-Douglas specification in equation 2, we see that in the formal sector, years of experience per worker is negatively associated with labor productivity. This may be due to the fact that the average manager in the informal sector has six years of experience, while the formal sector typically has managers with an average of 20 years of experience. Hypothetically, older managers in the formal sector make the marginal contribution of one more year of experience per worker - much lower than in the informal sector. For example, having one more year of experience in a business where the manager goes from having 34 to 35 years of experience in the same business may translate itself into a negative outcome in terms of output, as managerial experience may reflect older managing styles and outdated practices. On the other hand, one year of experience when managers are starting in a particularly new enterprise may be of great value in terms

of developing new strategies and finding new locations for sales. It is important to highlight that, when including firm size, managerial experience becomes statistically insignificant, suggesting that firm size has a stronger association with labor productivity than years of management experience per worker. In terms of the indicators, we see for the formal sector that the regional indicator reflects that being located in Guatemala City has a positive association with sales per worker. Female ownership is negatively associated with labor productivity in the informal and pooled regressions, a relationship that is particularly strong in the informal sector. Also, being in manufacturing in the informal sector is negatively associated with sales per worker.

In terms of the Oaxaca Blinder decompositions we can see that the explained differences in sales per worker are very low when estimating equation 2, as they linger between 11% and 22%. These results are in stark contrast to the results of firm size, suggesting that differences in sales per worker between formal and informal sectors in this sample are still largely unexplained and attributed to informalization itself, at least using the Oaxaca-Blinder methodology. Decomposition results in Table 3.4 suggest that input endowments have a low explanatory power over the differences in productivity of labor between formal and informal firms, and that these differences have to do mostly with how such endowments increase impact labor productivity by sector. Considering firm size is important in the literature.

The associations in coefficients found including firm size presented in Table 3.5 are consistent with Amin's(2014) results for African economies. In considering labor productivity, it could be argued that large firms could have particular needs that differ from smaller firms. The association between the constraints faced by firms of different sizes and labor productivity can be tested by reproducing Amin's (2014) regressions done for Africa. This specification includes the number of workers as a potential factor associated with labor productivity as established in equation 7. Table 3.5 presents results for this estimation. Years of managerial experience is excluded from these results, as it is

economically and statistically insignificant for all specifications in both sectors once we include firm size.

Column 1 in Table 3.5 shows results including firm size as measured by the number of workers on labor productivity using formal, informal, and pooled results. This table shows that in the formal sector, there exists a positive association between firm size and labor productivity. However, we can see that this association is negative for the informal sector. This association is statistically significant, and labor productivity, with respect to firm size, has a large coefficient of -0.49. Results in column 2 include assets per worker and also show a medium-sized positive association with respect to labor productivity. Column 3 includes the full specification including structural factors and results show the association with the female owner dummy in the informal sector is statistically and economically significant for the informal sector and for the pooled model. On the other hand, column 3 also confirms that regional differences are associated with sales per worker in a positive manner exclusively for formal firms. The pooled regression shows the overall effects of structural factors for both sectors, with lower economic significance for region and gender, as their differences are assuaged by the formal and informal divide. Belonging to the manufacturing sector appears to be statistically significant in the pooled model, suggesting that sectorial differences impact the economy overall. Column 4 confirms the robustness of these results as it adds challenges to the regressions. The only weakly significant result on challenges is access to finance and appears to be a potentially spurious correlation, as it varies wildly with respect to specification.

Overall regression statistics show that including more variables in the specification greatly improves the coefficient of determination of all regressions, reaching up to 65% in the full specification for the pooled specification, 28% for the formal, and 24% for the informal sector. These coefficients are superior to the Cobb-Douglas specification in Table 3.4, suggesting that firm size is

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important in determining the productivity of labor. All F-statistic p-values are 0.000 indicating that all coefficients are jointly distinct from zero for all specifications.

Finally, the inclusion of firm size in comparing formal and informal firms shows that the decomposition results greatly improve the explanatory power of this specification, as the explained portion in differences in labor productivity between formal and informal firms goes from 22% in the C-D specification, to a value between 32% and 41% of explained differences in labor productivity between formal and informal firms in the O-B results. This implies that endowments that are accounted for, such as differences in size, assets, and experience, as well as structural characteristics of firms, both explain between a third and two-fifths of differences in productivity when accounting for the size of firms. This suggests that the unexplained differences in formal and informal labor productivity solely attributed to the divide between formal and informal are smaller. This is concerning, as it suggests that the condition of informality alone, found in many businesses in Guatemala, is inexplicably associated with the way in which factors of production translate into higher labor productivity within enterprises, and thus represents opportunities for informal enterprises to learn about and take advantage of how endowments are translated into higher labor productivity.

Additionally, while having more workers is associated with higher labor productivity in the formal sector, having more workers is negatively associated with labor productivity in the informal sector. Multiple hypotheses can be developed as to why this is the case. For example, informal businesses with more workers may be more visible and be exposed to more monitoring policies from the state if they are too productive and competing with formal sector businesses. Another potential issue is that enterprises in the informal sector may be more difficult to manage, as the constraints resulting from increasing asymmetric information produced by incomplete contracts between workers and capitalists in informal enterprises may reduce the productivity of workers as the number of this type of enterprises grow. A third potential cause for this sign reversal may be the problem of lack of

research and development within this sector, and the lack of use of economies of scale in production, which bases worker productivity on the average total productivity, as opposed to marginal contributions of labor in production. All these explanations are hypothetical, and their development is left for future work. Nevertheless, these results suggest, as Amin (2014) points out, that firm size is a crucial component of furthering our understanding of differences in labor productivity between formal and informal sector in developing economies.

The analysis of the case of Guatemala adds to the body of evidence of how firm size is associated differently with formal and informal labor productivity. These results also show other important correlates associated with labor productivity and output between formal and informal enterprises. First, the gender of owners, which is negatively associated more strongly with output and labor productivity in the informal sector, suggests that owning an enterprise as a woman in Guatemala represents an opportunity for better outcomes. Secondly, formal enterprise outcomes are strongly associated with enterprises being located in the capital city, reflecting the centralization of formal activity in Guatemala City. Finally, enterprise outcomes are associated negatively with respect to belonging to the manufacturing sector, reflecting stalled industrialization in the annals of Guatemala's development. While these are not causal linkages, they are relevant correlates in the context of better characterizing informalization in Guatemala.

8. Concluding Remarks

The comparison developed in this chapter between formal and informal firms shows that there are important differences between formal and informal enterprises. The differentiation between the associations found should convey the existence of strong differences in how different factors impact enterprise output and labor productivity in Guatemala between the formal and the informal sector. The associations between factors of production, sales-per-worker, size, and structural characteristics of formal and informal firms seem to matter in ways consistent with empirical results found in the

literature exploring determinants of labor productivity. Results of labor productivity become insightful as we consider firm size as a potential factor associated with this outcome. Firm size is positively associated with labor productivity in the formal sector, but the opposite is found in the informal. This implies that the duality between these two sectors -formal and informal - goes beyond a semantic or conceptual debate.

Development efforts should continue to target increases in productivity of formal and informal business with the awareness of differences in how firm size, gender of owner, sectoral characteristics, and regional heterogeneity all play a role in their outcomes. Enterprises in the informal sector may be an underused resource that may provide opportunities for growth and development if appropriately characterized and understood. Efforts aimed at integrating these types of businesses into the global economy need to account for their specific attributes in order to better identify the social, political, geographic, and economic constraints they are exposed to. The study of the ways in which informal and formal enterprises differ in terms of their size, output, and labor productivity can be conducive to the development of better policy. It may also contribute to lessening the active persecution and prejudicial criminalization of informal firms that many countries, such as Guatemala, continue to engage in.

More research on informal and formal enterprises is necessary. Resources to develop such research are limited. For example, the Guatemalan 2010 survey of formal and informal enterprise is the only one that currently exists in which there was a specific informal module elaborated for the country. More waves of this survey have been conducted throughout the country, just as it was done in other countries where it was developed at some point. However, the World Bank discontinued the informal questionnaire module. This implies that factors associated with output and labor productivity in the country will continue to be, at least in terms of surveys, understudied. In 2010, other countries that included an informal questionnaire module were Peru and Argentina. This provides the ability to

develop comparative analysis between these three Latin American economies, a promising effort that is left for future research.

If something is clear, it's that informalization is not a thing of the past. Informal enterprises continue to play a significant role in Guatemalan urban economies. Guatemala is strongly affected by multiple complex processes of informalization. The assessment of the provision of solutions to these processes should account for deeper structural drivers of development that continue to impose challenges on firms. We can and should use the analytical tools and methods developed to study other social categories to develop more rigorous analysis of the problems impacting informalization to destroy the misconceptions that have accompanied this sector in past decades. Only by embracing new perspectives and approaches will informalization's fundamental role and importance be accurately assessed and understood.

9. Tables and Figures
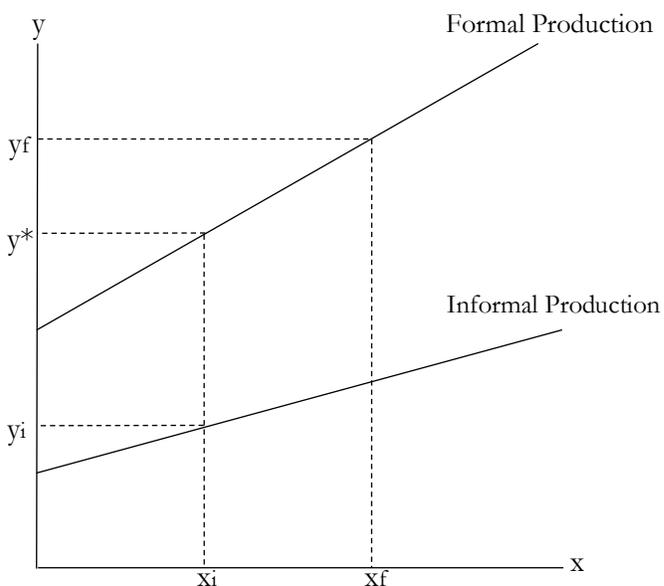
Figure 3.1. Model of Formal and Informal Production

The Oaxaca-Blinder method used in this chapter estimates coefficients for the slope and intercept of both curves, formal and informal production, given that there exists a common factor of production x. In the standard twofold decomposition, it estimates the distance, (yf-y) which accounts for differences due to a lower use of input x in informal firms. y* is estimated by using the values of the informal sector on the formal sector regression. The decomposition estimates the distance (y*-yi) which would be the part of the difference(yf-yi) that is unexplained.

Table 3.1.a Pairwise Correlations: Sales and Factors of Production, by Firm Type

Pooled	Sales	Workers	Assets	Experience
Sales	1			
	(376)			
Workers	0.76*	1		
	(375)	(427)		
Assets	0.46*	0.44*	1	
	(376)	(427)	(428)	
Experience	0.09	0.13*	0.07	1
	(372)	(420)	(421)	(421)
Formal	Sales	Workers	Assets	Experience
Sales	1			
	(219)			
Workers	0.75*	1		
	(218)	(267)		
Assets	0.43*	0.41*	1	
	(219)	(267)	(268)	
Experience	0.01	0.01	-0.03	1
	(218)	(264)	(265)	(265)
Informal	Sales	Workers	Assets	Experience
Sales	1			
	(157)			
Workers	0.47*	1		
	(157)	(160)		
Assets	0.29*	0.36*	1	
	(157)	(160)	(160)	
Experience	0.14	0.03	0.06	1
	(154)	(156)	(156)	(156)

Number of Observations in parenthesis

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Table 3.1.b. Pairwise Correlations: Labor Productivity and Factors of Production, including Firm Size, by Firm Type

Pooled	ln Sales per Worker	ln Assets per Worker	ln Labor (Firm size)	ln Man. Exp. Per Worker
ln Sales per Worker	1 (724)			
ln Assets per Worker	0.48* (375)	1 (427)		
ln Labor (Firm size)	0.67* (724)	0.27* (427)	1 (892)	
ln Man. Exp. per Worker	0.41* (711)	0.28* (420)	0.45* (875)	1 (876)

Formal	ln Sales per Worker	ln Assets per Worker	ln Labor (Firm size)	ln Man. Exp. Per Worker
ln Sales per Worker	1 (435)			
ln Assets per Worker	0.35* (218)	1 (267)		
ln Labor (Firm size)	0.37* (435)	-0.14 (267)	1 (589)	
ln Man. Exp. per Worker	0.06 (433)	-0.01 (264)	0.12* (584)	1 (585)

Informal	ln Sales per Worker	ln Assets per Worker	ln Labor (Firm size)	ln Man. Exp. Per Worker
ln Sales per Worker	1 (289)			
ln Assets per Worker	0.27* (157)	1 (160)		
ln Labor (Firm size)	-0.26* (289)	0.05 (160)	1 (303)	
ln Man. Exp. per Worker	0.04 (278)	0.1512 (156)	0.0995 (291)	1 (291)

Number of Observations in parenthesis
Stars indicate correlations significant at a 99% confidence levels

Table 3.3 Regression Results: Guatemala City and Quetzaltenango, 2010

	(1)			(2)			(3)		
	Formal	Informal	Pooled	Formal	Informal	Pooled	Formal	Informal	Pooled
ln L	0.91***	0.43***	0.96***	0.84***	0.47***	0.92***	0.84***	0.51***	0.92***
	(0.000)	(0.004)	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)	(0.001)	(0.000)
ln K	0.34***	0.15***	0.22***	0.37***	0.12***	0.23***	0.37***	0.13***	0.24***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.006)	(0.000)	(0.000)	(0.004)	(0.000)
ln H (in years)	0.12	0.12*	0.10	0.10	0.09	0.08	0.10	0.10	0.09
	(0.279)	(0.097)	(0.115)	(0.330)	(0.191)	(0.176)	(0.344)	(0.153)	(0.143)
Manufacturing				-0.21	-0.25*	-0.27**	-0.20	-0.24	-0.23**
				(0.134)	(0.094)	(0.011)	(0.165)	(0.110)	(0.026)
Fem. Owner				-0.24	-0.48***	-0.27**	-0.23	-0.48***	-0.26**
				(0.102)	(0.001)	(0.013)	(0.128)	(0.002)	(0.016)
Guatemala City				0.46***	0.15	0.26***	0.44**	0.22	0.26**
				(0.007)	(0.313)	(0.032)	(0.012)	(0.162)	(0.034)
Electricity							-0.01	-0.25	-0.26**
							(0.965)	(0.167)	(0.043)
Crime							-0.07	0.32*	0.08
							(0.789)	(0.093)	(0.590)
Corruption							-0.01	-0.32	-0.16
							(0.965)	(0.116)	(0.311)
Finance							0.09	0.33*	0.24*
							(0.563)	(0.074)	(0.052)
Land							-0.16	-0.05	-0.16
							(0.252)	(0.818)	(0.179)
Informal			-1.35***			-1.43***			-1.55***
			(0.000)			(0.000)			(0.000)
Constant	5.56***	6.27***	6.82***	5.35***	6.70***	6.96***	5.48***	6.53***	7.07***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
N	217	154	371	217	154	371	217	154	371
Prob > F	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R-squared	0.78	0.19	0.92	0.79	0.26	0.93	0.79	0.30	0.93

	OB Results	P-value	Percent	OB Results	P-value	Percent	OB Results	P-value	Percent
Formal	14.06	(0.000)		14.06	(0.000)		14.06	(0.000)	
Informal	7.81	(0.000)		7.81	(0.000)		7.81	(0.000)	
Difference	6.26	(0.000)		6.26	(0.000)		6.26	(0.000)	
Explained	4.91	(0.000)	78.48	4.82	(0.000)	77.11	4.71	(0.000)	75.24
Unexplained	1.35	(0.000)	21.52	1.43	(0.000)	22.89	1.55	(0.000)	24.76

Explained Variable: Labor Productivity-ln Sales/Worker

Robust standard errors in parentheses* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3.4. Regression Results: Guatemala City and Quetzaltenango, 2010

	(1)			(2)			(3)			(4)		
	Formal	Informal	Pooled	Formal	Informal	Pooled	Formal	Informal	Pooled	Formal	Informal	Pooled
ln K/L	0.31***	0.15***	0.22***	0.33***	0.14***	0.23***	0.36***	0.12***	0.24***	0.36***	0.13***	0.24***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)	(0.010)	(0.000)	(0.000)	(0.005)	(0.000)
ln H/L				-0.20***	0.18***	-0.09***	-0.16***	0.15**	-0.08**	-0.16***	0.14**	-0.08**
				(0.000)	(0.006)	(0.016)	(0.000)	(0.018)	(0.043)	(0.001)	(0.022)	(0.043)
Manufacturing							-0.19	-0.32**	-0.26**	-0.18	-0.28*	-0.22**
							(0.171)	(0.031)	(0.015)	(0.221)	(0.055)	(0.035)
Fem. Owner							-0.23	-0.46***	-0.29***	-0.23	-0.45****	-0.28***
							(0.116)	(0.003)	(0.007)	(0.135)	(0.004)	(0.009)
Guatemala City							0.56***	0.09	0.34***	0.54***	0.17	0.34***
							(0.001)	(0.552)	(0.004)	(0.002)	(0.260)	(0.004)
Electricity										-0.03	-0.32	-0.25
										(0.866)	(0.060)	(0.056)
Crime										-0.05	0.31	0.10
										(0.868)	(0.105)	(0.529)
Corruption										-0.01	-0.32	-0.16
										(0.957)	(0.115)	(0.307)
Finance										0.05	0.36*	0.20
										(0.767)	(0.056)	(0.102)
Land										-0.18	-0.05	-0.17
										(0.204)	(0.804)	(0.150)
Informal			-2.16***			-1.90***			-1.90***			-2.05***
			(0.000)			(0.000)			(0.000)			(0.000)
Constant	7.18	6.26	7.92	6.79	6.11	7.74	6.29	6.59	7.69	6.44	6.42	7.84
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Number of obs.	218	157	375	217	154	371	217	154	371	217	154	371
Prob > F	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R-squared	0.12	0.07	0.60	0.19	0.11	0.61	0.25	0.18	0.63	0.26	0.24	0.64

	OB Results	P-value	Percent	OB Results	P-value	Percent	OB Results	P-value	Percent	OB Results	P-value	Percent
Formal	9.78	(0.000)		9.78	(0.000)		9.78	(0.000)		9.78	(0.000)	
Informal	7.35	(0.000)		7.34	(0.000)		7.34	(0.000)		7.34	(0.000)	
Difference	2.43	(0.000)		2.44	(0.000)		2.44	(0.000)		2.44	(0.000)	
Explained	0.27	(0.000)	11%	0.54	(0.000)	22%	0.54	(0.000)	22%	0.39	(0.014)	16%
Unexplained	2.16	(0.000)	89%	1.90	(0.000)	78%	1.90	(0.000)	78%	2.05	(0.000)	84%

Explained Variable: Labor Productivity-ln Sales/Worker
Robust standard errors in parentheses* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3.5. Regression Results: Guatemala City and Quetzaltenango, 2010

	(1) Formal	(1) Informal	(1) Pooled	(2) Formal	(2) Informal	(2) Pooled	(3) Formal	(3) Informal	(3) Pooled	(4) Formal	(4) Informal	(4) Pooled
ln L	0.29***	-0.49***	0.24***	0.25***	-0.41***	0.19***	0.21***	-0.40***	0.16***	0.21***	-0.35**	0.16***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.003)	(0.000)	(0.000)	(0.004)	(0.000)	(0.000)	(0.017)	(0.000)
ln K/L				0.33***	0.16***	0.23***	0.37***	0.13***	0.24***	0.37***	0.13***	0.24***
				(0.000)	(0.000)	(0.000)	(0.000)	(0.003)	(0.000)	(0.000)	(0.003)	(0.000)
Manufacturing							-0.20	-0.24	-0.26**	-0.19	-0.23	-0.22***
							(0.145)	(0.104)	(0.012)	(0.180)	(0.122)	(0.031)
Fem. Owner							-0.23	-0.49***	-0.27**	-0.22	-0.49***	-0.26**
							(0.105)	(0.001)	(0.012)	(0.129)	(0.001)	(0.015)
Guatemala City							0.48***	0.16	0.26**	0.46***	0.22	0.27**
							(0.004)	(0.284)	(0.024)	(0.008)	(0.159)	(0.024)
Electricity										-0.01	-0.22	-0.25**
										(0.951)	(0.214)	(0.047)
Crime										-0.06	0.29	0.08
										(0.810)	(0.117)	(0.603)
Corruption										-0.03	-0.29	-0.15
										(0.908)	(0.142)	(0.314)
Finance										0.08	0.29	0.21*
										(0.602)	(0.111)	(0.071)
Land										-0.17	-0.04	-0.16
										(0.239)	(0.856)	(0.179)
Informal			-1.43***			-1.44***			-1.51***			-1.64***
			(0.000)			(0.000)			(0.000)			(0.000)
Constant	8.43***	7.49***	8.62***	5.89***	6.41***	7.06***	5.63***	6.83***	7.16***	5.77***	6.70***	7.31***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Number of obs.	435	289	724	218	157	375	218	157	375	218	157	375
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R-squared	0.14	0.07	0.53	0.23	0.12	0.62	0.27	0.20	0.64	0.28	0.24	0.65
	OB Results	P-value	Percent	OB Results	P-value	Percent	OB Results	P-value	Percent	OB Results	P-value	Percent
Formal	9.50	(0.000)		9.78	(0.000)		9.78	(0.000)		9.78	(0.000)	
Informal	7.28	(0.000)		7.35	(0.000)		7.35	(0.000)		7.35	(0.000)	
Difference	2.22	(0.000)		2.43	(0.000)		2.43	(0.000)		2.43	(0.000)	
Explained	0.78	(0.000)	35%	1.00	(0.000)	41%	0.92	(0.000)	38%	0.79	(0.000)	32%
Unexplained	1.43	(0.000)	65%	1.44	(0.000)	59%	1.51	(0.000)	62%	1.64	(0.000)	68%

Explained Variable: Labor Productivity-ln Sales/Worker

Robust standard errors in parentheses* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

REFERENCES

Amin, Mohammad. 2010.a. "Comparing informal firms in Buenos Aires and Chaco (Short Note)." Mimeograph. Available at: http://works.bepress.com/mohammad_amin/29/

Amin, Mohammad. 2010.b. "Gender and Informality in Latin America (Short Note)." Mimeograph. Available at: http://works.bepress.com/mohammad_amin/30/

Amin, Mohammad. 2011. "Labor Productivity, Firm-size and Gender: The Case of Informal Firms in Argentina and Peru." Enterprise Note No. 22. World Bank Group. Washington DC.

Amin, Mohammad. 2014. "The Relevance of Firm Size in the Informal Sector". Business and Economics Journal. Volume 5. Issue 4.

Amin, Mohammad and Islam, Asif, 2015. "Are Large Informal Firms More Productive than the Small Informal Firms? Evidence from Firm-Level Surveys in Africa." World Development, Elsevier, vol. 74(C), pages 374-385.

Amin, Mohammad; Ohnsorge, Franziska Lieselotte; Okou, Cedric Iltis Finafa. 2019. "Casting a Shadow : Productivity of Formal Firms and Informality." Policy Research working paper; No. WPS 8945. Washington, D.C. : World Bank Group.

Bauer, Thomas. Mathias Sinning. Markus Hahn. 2008. "The Blinder–Oaxaca Decomposition for Non-linear Regression Models." The Stata Journal 8:4, pp. 480–492.

Blinder, Alan S. 1974. "Wage Discrimination: Reduced Form and Structural Estimates." *The Journal of Human Resources* 8, no. 4: 436-55. 10.2307/144855.

Chen, Martha. 2012. "The Informal Economy: Definitions, Theories and Policies." WIEGO working paper No.1.

Cornia, Giovanni. Bruno Martorano. 2011. "The IDLA Dataset: a Tool to Analyze Recent Changes in Income Inequality in L.A." United Nations University. UNU-WIDER.

De Soto, Hernando. 1989. *The Other Path: The Invisible Revolution in the Third World.* New York: Harper and Row.

Figart, Deborah M. 1997. "Gender as More Than a Dummy Variable: Feminist Approaches to Discrimination." Review of Social Economy, vol. 55, no. 1, Informa UK Limited, pp. 1–32.

Funkhouser, Edward. 1996. "The urban informal sector in Central America: Household survey evidence." World Development. Volume 24, Issue 11, Pages 1737-1751.

Gollin D. Jedwab R., Vollrath D. 2013. "Urbanization with and without Industrialization." Working Papers. 2013-290-26, Department of Economics, University of Houston.

Gujarati, Damodar. 1995. *Basic Econometrics.* McGraw-Hill. New York. pp. 838.

Gutiérrez- Romero, Roxana. 2010. "The Dynamics of the Informal Economy." CSAE Economics Department, University of Oxford, Oxford, UK. CSAE WPS/2010-07, 33 pp.

Jann, Ben. 2008. "The Blinder–Oaxaca decomposition for linear regression models." Stata Journal, 8, (4), 453-479.

Krakowski, M. 2005. "Determinants of the Informal Economy: The Importance of Regional Factors" HWWA Discussion Paper No. 313.

Krugman, Paul. 1993. "The Fall and Rise of Development Economics." MIT.

Levy, Santiago. 2018. *Under-Rewarded Efforts: The Elusive Quest for Prosperity in Mexico.* IDB, Inter-American Development Bank.

Lewis, W.A. 1954. "Economic Development with Unlimited Supplies of Labor." The Manchester School, Vol. 22, No. 2, 1954, pp. 139-191.

Loayza, Norman. 1996. "The Economics of the Informal Sector: A Simple Model and Some Empirical Evidence from Latin America." Carnegie-Rochester Conference Series on Public Policy. 45. 129-162. 10.1016/S0167-2231(96)00021-8.

Loayza, Norman. 2016. "Informality in the Process of Development and Growth." The World Economy. The World Economy. 39. 1856-1916. 10.1111/twec.12480.

Oaxaca, R. 1973. "Male-Female Wage Differentials in Urban Labor Markets." *International Economic Review* 14: 693–709.

Schneider, Friedrich. Leandro Medina. 2018. "Shadow Economies Around the World: What did we Learn the last 20 years?" International Monetary Fund. WP/18/17.

World Bank, 2020. "Enterprise Surveys Indicators Data - World Bank Group." http://www.enterprisesurveys.org.

World Bank. 2020. *World Development Indicators (WDI).* The World Bank Group.

APPENDIX

Macroeconomic Model of Informal Labor Supply

Frenkel and Ros' (2006) model has the property of linking two different branches of literature of development economics formally. On one hand, they model two different sectors, and informalization is modeled as having no access to capital. On the other, they link mainstream theory with the Harris-Todaro-Fields dualist framework. It is a dualist and growth model simultaneously. This allows the exploration of production and distribution in the context of development simultaneously.

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The two production functions for each sector are:

$$\text{i.} \qquad Y_f = AK_f^\alpha L_f^{1-\alpha}$$

$$\text{ii.} \qquad Y_i = AL_i^\delta$$

Assuming that the formal producer is under competition, and in the short run, is under a monopolistically competitive market structure, then she solves the profit maximization problem:

$$\text{iii.} \qquad \text{P}= p_f AK_f^\alpha L_f^{1-\alpha} - w_f L_f - rK_f$$

From the first order conditions, we can obtain the formal demand for labor equation:

$$\text{iv.} \qquad L_f = K_f[(1-\alpha)\,\frac{p_f}{w_f}A]^{\frac{1}{\alpha}}$$

in this context, p_f is equal to ep^* where p^* is the world market price of a traded formal good and e is the nominal exchange rate, that in theory, moves accordingly to the real exchange rate.

On the other hand, let the urban labor force be:

$$\text{v.} \qquad L = L_f + L_i + U$$

We could derive employment and unemployment rates at this point in different ways. In the original model, for example, they focus on urban formal unemployment. For this reason, their unemployment rate is specified in the following way:

$$\text{vi.} \qquad u = \frac{U}{U+L_f}$$

Their model can exploit the Harris-Todaro-Fields assumption that people do not go directly from informal to formal jobs, implying,

$$\text{vii.} \qquad w_f\left(\frac{L_f}{U+L_f}\right) = w_i$$

This assumption claims that in equilibrium, the informal wage has to be equal to the formal wage times the probability of finding a job in the formal sector. This linkage allows a solution for the equilibrium formal unemployment rate in terms of the wage ratio as follows:

$$\text{viii.} \qquad u = \frac{U}{U+L_f} = h\left(\frac{w_i}{w_f}\right) = \frac{\frac{w_fL_f+w_iL_f}{w_i}}{\frac{w_fL_f+w_iL_f}{w_i}+L_f} = \frac{w_f-w_i}{w_f} = 1 - \frac{w_i}{w_f}$$

Turning our attention to informal labor shares, we can make use of this model focusing on informal labor:

$$\text{ix.} \qquad L_i = L - L_f - U$$

Expressing the formal unemployment equation in xiii.

$$\text{x.} \qquad U = (U + L_f)h\left(\frac{w_i}{w_f}\right)$$

we can rearrange x.

$$\text{xi.} \qquad U = \frac{L_f h\left(\frac{w_i}{w_f}\right)}{1-h\left(\frac{w_i}{w_f}\right)}$$

And substituting U in ix.,

$$\text{xii.} \qquad L_i = L - L_f - \frac{L_f h\left(\frac{w_i}{w_f}\right)}{1-h\left(\frac{w_i}{w_f}\right)}$$

Substituting formal employment and simplifying,

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xiii. $\quad L_i = L - \dfrac{L_f}{1-h\left(\frac{w_i}{w_f}\right)} = L - \dfrac{K_f[(1-\alpha)\frac{p_f}{w_f}A]^{\frac{1}{\alpha}}}{1-h\left(\frac{w_i}{w_f}\right)}$

Assuming Harris-Todaro-Fields condition and that viii. holds, equation xiii. can be expressed as,

xiv. $\quad L_i = L - \left(\dfrac{w_i}{w_f}\right)^{-1} K_f[(1-\alpha)\,\dfrac{ep^*}{w_f}A]^{\frac{1}{\alpha}}$

The comparative statics confirm,

$$\frac{\partial\, Li}{\partial L}, \frac{\partial\, Li}{\partial \frac{w_i}{w_f}} > 0 \qquad \frac{\partial\, Li}{\partial K}, \frac{\partial\, Li}{\partial e,} < 0$$

Informalization is negatively associated with capital and exchange rates in the formal sector. A larger labor force and higher inequality between the formal and the informal sector are associated with higher levels of informalization.