Preface

I would like to thank my supervisor, Halvor Mehlum, for providing helpful comments and advice, while allowing for a great degree of independence. I also thank the Center of Equality, Social Organization and Performance (ESOP) for granting me a student scholarship and office space. Finally, I wish to thank my office mates at ESOP, fellow students, friends and family.

Sophie Kristoffersen,
Oslo, May 2011.
Summary

Over the past two decades, the state has slowly re-emerged as a central actor in the global development discourse. The development welfare state is in fashion, but it faces several challenges, among these, the presence of a big informal sector. Recent estimates show that informal sectors in most developing countries are very big, often constituting around half of official GDP, and have been growing during the last two decades. In the literature, a growing informal sector is generally regarded a response to an increased burden of taxation, social security contributions and labor market regulations. Further increases in taxes are expected to induce informal sector growth, eroding the tax base, such that tax revenue may in fact fall with higher tax rates. I find that these assumptions are primarily based on evidence from developed countries. Furthermore, I argue that while they may describe the situation in some high-income-high-tax countries fairly well, there are obvious differences in the structure of informal sectors in developed and developing countries. This suggests that a somewhat different story may be going on in the latter.

The term informal sector suffers from great definitional confusion, possibly due to the fact that it is characterized more by what it is not, than what it is. Authors are free to more or less explicitly apply their own context specific definitions. This contributes to the term’s popularity and applicability on the one hand, but also undermines the potential for generalization of results on the other. Little can be done to solve this trade-off, and I do not believe that the answer is to abandon the term. Rather, it is crucial that the term, when used, is explicitly defined to avoid misunderstandings.

In this thesis, I follow the broad definition by Thomas (1992, 1), that the informal sector refers to all productive activities, which are not included in the national income accounts of a given country. Furthermore, I use his four sub-sector framework to describe the different types of activities which are characterizing for the informal sector. I argue, that while evasion of taxes and regulations characterizes most informal activity in developed countries, the informal sector in developing countries
largely consists of petty-traders and -producers, subsistence and home production, and is usually accepted by authorities as the only option for many people to earn an income in the absence of formal employment and social protection. This leads me to question the applicability of research on the informal sector, undertaken in developed countries, to developing country contexts.

I modify a general equilibrium model of industrialization by Murphy et al. (1989), to investigate whether the structure of the informal sector in developing countries may cause a different relationship, than what is usually perceived, between taxation and informal sector growth, to arise. After some alterations to the model, I introduce a proportional consumption tax, redistributed evenly to all individuals as a uniform lump sum subsidy, and analyze the consequent changes in the relative sizes of the formal and informal sectors in the country. I find an unambiguously positive income effect of the tax on formal sector growth, and discuss under which circumstances this effect may dominate or modify potential displacement effects such as tax evasion. I further discuss the implications of these findings for poverty reduction and gender equality, and briefly outline a few extensions of the model.

Numerical calculations for this thesis are done in Maple 14.
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1 Introduction

Over the past two decades, the state has slowly re-emerged as a central actor in the global development discourse. The development welfare state is in fashion, but it faces several challenges, among these, the presence of a big informal sector. Recent estimates show that informal sectors in most developing countries are very big, often constituting around half of official GDP, and have been growing during the last two decades. In the literature, a growing informal sector is generally regarded a response to an increased burden of taxation, social security contributions and labor market regulations. Further increases in taxes are expected to induce further informal sector growth, eroding the tax base, such that tax revenue may in fact fall with higher tax rates. I find that these assumptions are primarily based on evidence from developed countries. Furthermore, I argue that while they may describe the situation in some high-income-high-tax countries fairly well, there are obvious differences in the structure of informal sectors in developed and developing countries. This suggests that a somewhat different story may be going on in the latter.

The term informal sector suffers from great definitional confusion, possibly due to the fact that it is characterized more by what it is not, than what it is. Authors are free to more or less explicitly apply their own context specific definitions. This contributes to the term’s popularity and applicability on the one hand, but also undermines the potential for generalization of results on the other. Little can be done to solve this trade-off, and I do not believe that the answer is to abandon the term. Rather, it is crucial that the term, when used, is explicitly defined to avoid misunderstandings.

In this thesis, I follow the broad definition by Thomas (1992, 1), that the informal sector refers to all productive activities, which are not included in the national income accounts of a given country. Furthermore, I use his four sub-sector framework

\footnote{While I fully acknowledge the critique of the terms, developed and developing countries, I choose to use them here as is custom in the field of Economics. The terms refer to the countries listed as Advanced Economies, and Emerging and Developing Economies, respectively, in the World Economic Outlook Database (IMF, 2010).}
to describe the different types of activities which are characterizing for the informal sector. I argue, that while evasion of taxes and regulations characterizes most informal activity in developed countries, the informal sector in developing countries largely consists of petty-traders and -producers, subsistence and home production, and is usually accepted by authorities as the only option for many people to earn an income in the absence of formal employment and social protection. This leads me to question the applicability of research on the informal sector, undertaken in developed countries, to developing country contexts.

Several approaches have been taken to estimate the size of informal sectors around the world. Measuring the unobservable is a challenging task. Estimates are subject to great measurement error, and differ substantially for various approaches. Taken together, however, these estimates may provide an indication of the state of the world. But one should keep in mind that what is measured as informal activity in developed countries, is mostly tax evasion, while in developing countries it is largely people without formal employment, trying to make ends meet.

In this thesis, I modify a general equilibrium model of industrialization by Murphy et al. (1989), and investigate whether the structure of the informal sector in developing countries may cause a different relationship, than what is usually perceived, between taxation and informal sector growth, to arise. After some alterations to the model, I introduce a proportional consumption tax, redistributed to all individuals as a uniform lump sum subsidy, and analyze the consequent changes in the relative sizes of the formal and informal sectors in the country. I find an unambiguously positive income effect of the tax on formal sector growth, and discuss under which circumstances this effect may dominate or modify potential displacement effects such as tax evasion. I further discuss the implications of these findings for poverty reduction and gender equality, and outline a few extensions of the model.

The structure of the thesis is as follows: Section 2 briefly accounts for the re-emergence of the state on the global development arena. Section 3 provides a review of the history, definitions and size estimates of the informal sector in developed and developing countries, and its relation to development and taxation. In section
4, I first present and modify the general model. I then introduce taxation and redistribution, and analyze the changes in equilibrium. Section 5 first considers the interaction between the positive income effect of taxation in the model and potential displacement effects of taxation. Following this, is a brief discussion of the implications of my findings for poverty reduction and gender equality, and of the potential confusion in results arising from different definitions of the informal sector. In section 6, I discuss some of the assumptions made, and outline a few extensions of the model, before summarizing and concluding in section 7.

2 Revival of the development state

Since the end of the Second World War, when the concept of development was first put on the global agenda, the discourse on the role of the state has been changing in course with the more general political picture. In short, the development state was in, then out, and now it seems to be regaining some of its lost popularity.

During the first decades of the Cold War, the state was regarded a major actor in promoting national development. Theoretical work by economists such as Keynes, Rosenstein-Rodan (1943) and Rostow (1960) were major sources of inspiration, and the role of the state was thought to be strategic channeling of savings and foreign resources (aid) into industry, combined with active macroeconomic policy and, to a varying degree, some coordination and protection of new industries. The 1980s was the era of neo-liberalism. Irresponsible states were blamed for the financial crisis, and subsequent debt crisis, of the 1970s, and under the parole of structural adjustment, states were ‘rolled back’ all over the world. In the early 1990s more balanced views of the relation between state and market gained terrain, and over the past two decades, the international development discourse has slowly moved towards re-embracing the development state. This process has emerged from accepting the need for correction

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2Ideas about development have of course existed for as long as man, but the origin of intentional development as a field of study, and especially in the context of international aid, is usually ascribed to the beginning of the Cold War and American president Truman’s inaugural address in 1949 (Thomas, 2000).
of market failures, via no longer viewing the entire state as a bad in itself, but focusing on cautious notions of good governance, through endogenous growth theory including human and social capital, towards the importance of countries taking a leading role in the formulation of their own development policy (see e.g. Bardhan and Udry, 1999, cp. 17, III; Fine, 1999; Hewitt, 2000; McNeill, 2006). This discursive development has by no means been a linear and unison process. Indeed, every prevalent regime has been contested from several holds throughout. But it has been a dominant trend, especially among major donor countries and multilateral institutions.

Recent evidence on the ongoing movement towards re-embracing, and simultaneously re-defining the development state can be found in the United Nations Research Institute for Social Development (UNRISD) flagship report from 2010 (UNRISD, 2010). The seven key messages of the report are that:

- Poverty reduction requires growth and structural change that generate productive employment
- Comprehensive social policies are essential for successful poverty reduction
- High levels of inequality are an obstacle to poverty reduction
- Poverty reduction requires effective state action
- Politics matters for poverty reduction
- There are many paths to poverty reduction
- Poverty is reduced when economic and social policies, institutions and political arrangements are mutually supportive

Thus, while the report recognizes the variety of paths towards poverty reduction, the emphasis on the state and social policies can not be ignored. Even more remarkable is the focus throughout the report on universal social protection, which is illustrative of what I call a re-definition of the classic development state, towards a development welfare state, in line with the experiences of e.g. the Nordic countries.
These ideas seem, at least to some extent, to be shared also by the OECD Development Assistance Committee, the International Labor Organization (ILO), and other UN agencies, as well as some of the big donor countries (ILO, 2010, 122). Whether they will be embraced as warmly by the International Financial Institutions (IFIs) remains to be seen, but according to Norwegian State Secretary from the Ministry of Foreign Affairs, Ingrid Fiskaa, there is an increased openness towards these issues also within the IFIs \(^3\). More importantly, some of the developing country governments are themselves showing signs of cautiously embracing elements of a welfare state approach to development (see e.g. Delthier, 2007).

The existence of a sizable informal sector in a country may affect the success of the development welfare state in at least two ways. Firstly, through the ability of the state to reach its own population with social policies. Secondly, through the ability of the state to collect revenue from its own population. I will get back to this relationship in section 3.4, but first, let me try to clarify what the informal sector is.

3 The informal sector

There has been, and is still, great confusion and disagreement regarding how to define the informal sector, which activities it constitutes, and even what to call it. While a thorough literature review is beyond the scope of this section, I will briefly try to account for the origin of the concept, and clarify definitions and content.

3.1 Emergence of a theoretical concept

Though research on informal activities was undertaken long before, the origin of the term, informal sector, is usually ascribed to the anthropologist Keith Hart, in his paper, *Informal income opportunities and urban employment in Ghana* (Hart, \(^3\)This statement was made by Ingrid Fiskaa in a comment on the UNRISD report, at the seminar *Fighting Poverty with Social Pacts and Welfare. Is it possible and what can Norway do?* March 16, 2011, hosted by ESOP/Department of Economics at the University of Oslo.)
first presented at an Institute of Development Studies (IDS) conference on Urban Unemployment in Africa in 1971. The term was immediately embraced by the ILO, who was already playing a major role in stimulating debate concerning employment, poverty and the questionable applicability of the term ‘unemployed’ to the poor in many developing countries. Thus, ILO was the first organization to formally adopt and use the term, informal sector, in a report on employment in Kenya, and continued to act as a driving force behind the study and debate of the concept in the following years. By the 1980s, the term was widely used within academia and the international development community. However, while there was some common understanding of what to associate with the informal sector, focus and definitions still varied a lot among central actors (McNeill, 2004; Thomas, 1992, 51-59).

3.1.1 Definitions and content

From the many attempts to define the informal sector (Ahwireng-Obeng (1996) finds more than 50 definitions in over 75 different studies), it is clear that it has been characterized as much by what it is not, as what it is. Hart (1973, 68-69) originally focused on individual income opportunities and placed wage-earners in the formal sector and self-employed in the informal, including both legitimate and illegitimate income sources. He noted that individuals can be engaged in several activities and in both sectors simultaneously. When the ILO adopted his term, they took on what Thomas (1992, 53) refers to as a more enterprise-based approach. Their focus was on the nature of activities undertaken in the informal versus the formal sector, such as scale of operation, production methods, ownership structure and difficulty of entry. Others again, saw the informal sector as almost synonymous with small-scale enterprises, and thus questioned the added value of the term (McNeill, 2004, 47).

While most agree that there is a relationship between the formal and informal sectors, there has been great disagreement over the nature of this relationship and whether it is productive or counterproductive. Thus, while many governments early
on viewed the informal sector as a painful reminder of their country’s backwardness, the ILO took on a more positive view of the employment opportunities generated (Thomas, 1992, 55). The World Bank viewed the informal sector mainly as a result of policy generated barriers to formal market entry (Thomas, 1992, 56), while Hernando De Soto, establisher of the neoliberal Institute for Freedom and Democracy, took this viewpoint even further, referring to informal sector activity as an invisible revolution from below, against extensive and inefficient government regulations (McNeill, 2004, 48). Many scholars criticized the dualist approach evident in the examples above, highlighting a much more complex relationship between notions of ‘formal’ and ‘informal’ spheres, and this duality’s limited ability to cover all economic activity (Thomas, 1992, 57-58).

A consensus now seems to have been reached, that clearly defining the informal sector is not possible. According to McNeill (2004, 49), it can be argued, that since the central idea behind the term is that it refers to activities which fall outside the scope of official recognition and statistics, reaching agreement on a definition which makes the concept observable and measurable would also make it disappear. At the same time however, he notes how ‘[t]he lack of a clear definition opens the way both for poor quality research, and also for a policy consensus which is more apparent than real’ (McNeill, 2004, 52). This is particularly evident when one compares research from developed and developing countries respectively (Gërxbhani, 2004).

Ahwireng-Obeng (1996) claims, that the tendency to define the informal sector by what it is not, in relation to the formal sector, rather than what it is in its own value, has caused the failure of the concept. Yet, the closest economist have come to a definition of the informal sector is still that it refers to all productive activities, which are not included in the national income accounts of a given country (Thomas, 1992, 1). It is recognized though, that further clarification of what this includes, on a case to case basis, is necessary. Thomas (1992) provides a useful framework for this purpose. He divides all informal economic activity into four sub-sectors: The household sector, the informal sector (I will refer to this the small-scale sector for clarity), the irregular sector and the criminal sector.
The household sector produces goods and services in the home which are also consumed in the home. Examples of production in this sector includes subsistence agriculture and domestic work, undertaken by members of the household. The output and production is legal, and is characterized by the lack of market transactions.

The informal (small-scale) sector includes small-scale producers and distributors of goods and services in developing countries, such as street vendors, bicycle-taxis, small workshops etc. The output and production is legal (or at least not illegal), but the scale of operation is such that it is not recorded in the national income accounts of countries with limited administrative capacity.

The irregular sector produces legal outputs, but some level of illegality is involved in the production or distribution. Common examples are tax evasion or breaking legal regulations.

The criminal sector produces illegal outputs by illegal means, and includes everything from petty-theft to organized drug trafficking.

3.1.2 Naming the child

What I have been referring to as the informal sector above, in line with Hart (1973), Ahwireng-Obeng (1996), Gërxhani (2004) and others, is thus called informal economic activity by Thomas (1992), who uses the informal sector to refer to a subsection of activities. Other names which often occur in the literature include the underground economy, the second economy, the unofficial sector etc. (Schneider and Enste, 2002, 7-9).

Just from the limited selection of literature cited in this section, it should be clear that there is a lot of confusion about how to define, and even what to call, the informal sector. When using the term, it is thus important to always make clear exactly what it refers to. In this thesis, I will stick with the traditional term, informal sector, and refer to all informal activity as described by Thomas (1992).
When using his four sector-framework, I will refer to his informal sector as the small-scale sector.

3.2 Informal activity in developed and developing countries

Though the term, informal sector, had its origin in development research, it has been extended by some authors to developed countries as well (McNeill, 2004, 47). Here, the focus is mainly on the irregular sub-sector, and new names also for this, have been introduced such as the black, shadow, parallel, underground, unofficial, etc. economy (Thomas, 1992, 125). Even though the informal sector in developed countries is also characterized by lack of data, the headaches it causes for governments and bureaucrats have made it subject to great scrutiny, especially in the area of tax evasion (Gërxhani, 2004, 284). As will be discussed further in section 3.4, some of this research has inspired policy recommendations for developing countries as well. However, while there are as many different informal sectors as there are countries in the world, the most remarkable distinction is probably that between the overall structures of informal sectors in developing and developed countries respectively. In the framework of Thomas (1992), the irregular sub-sector constitutes the majority of informal activity in developed countries, while the small-scale sub-sector dominates in developing countries. The household sector is present everywhere, but is bigger in developing countries, where subsistence production is prevalent. Reviewing the literature, Gërxhani (2004, 282) makes the following observation:

Regarding developing countries, the low rate of industrialization and productivity, and the presence of surplus labor are listed as principal reasons why a dualistic system arose in the cities of the third world (Breman, 1980). In addition, it is accepted that due to the old economic mechanism (low technology and intensive use of cheap unskilled and semi-skilled labor) that these countries have, informal activities emerge and grow quite rapidly. This is basically one of the reasons why the informal sector in less developed countries is considered to be a sector for survival.
These important structural differences may limit the potential for generalization between developed and developing countries.

3.2.1 The informal sector, poverty and development

Most people working in the informal sector in developing countries are poor. This does not imply that they are poor because they work in the informal sector, but rather the opposite, that the informal sector provides an opportunity to make a living in countries where being unemployed is not an option for obvious reasons. Thus, a big informal sector should be (and is usually) regarded a symptom, rather than the disease itself.

In the short run, the informal sector offers indispensable possibilities for the people working there. It is a known fact, that the majority of informal workers are women. The informal sector is generally regarded countercyclical, indicating that it provides a safety net for formal workers who lose their job in times of crisis. Observers agree, that though it is not recorded in the national income accounts, the informal sector obviously contributes to production and growth. Also, even though average income in the informal sector is lower than that of the formal, some entrepreneurs and business owners have much higher earnings in the informal sector than average formal wages (Chen, 2001; Thomas, 1992).

However, while informal production contributes to growth, the sector is generally regarded much less productive than most formal activities, and even though some make a good living in the informal sector, wages here are lower than the formal average, and there is no protection of workers’ rights etc. A big informal sector poses major challenges in the longer run to benevolent governments struggling with misleading statistics, and the inability to reach a big part of their own population for purposes of collecting revenue and providing social protection.

Thus, when expressing a desire to reduce the size of the informal sector, what is usually meant, is to create possibilities for more workers in the formal sector, such that the need for informal employment and thus the size of the informal sector
is reduced. Also, formal employment in itself is not the goal, but the ability to register and regulate labor and production, in order to provide benefits to the entire population, is fundamental for a country that wants to follow a welfare state path to development.

3.3 Size estimates

Estimating the size of the informal sector is complicated for the same reason as defining it is difficult. The sector is constituted by the unofficial, all of that which is generally not observed. Thus, many approaches to providing estimates essentially try to isolate parts of incomes or various input demands which can not be explained by the official measures of an economy’s size, and take these parts as estimates of the size of the informal sector. This includes macro-economic or ‘indirect’ approaches, such as monetary (cash demand) methods, physical input (electricity demand) methods, labor force discrepancy, and income and expenditure discrepancy approaches. These methods are all subject to a range of problems, especially measurement error, and provide very crude estimates, which tell us nothing about the structure of the informal sector. An attempt to deal with some of these flaws, is the model, or MIMIC (multiple-indicators and multiple-causes), approach. This method identifies and utilizes several explanatory indicators simultaneously, which is a significant progress compared to the simpler approaches. However, this method still uses many of the same indicators, and is thus subject to some of the same flaws. A different class of estimates are provided by micro-economic or ‘direct’ approaches, such as surveys based on questionnaires and tax auditing reports. While these can be significantly biased (they often provide much lower estimates than the ‘indirect’ approaches), they provide much more detailed information, which can give some indication of the structure of the informal sector (Bajada and Schneider, 2005; Schneider and Enste, 2002; Thomas, 1992).

Because of such methodological problems, estimates of the size of the informal sector should be interpreted with much care. They are, however, the best we can
do, and can give us at least an indication of the state of the world. Schneider and Enste (2002) and Bajada and Schneider (2005) provide thorough overviews of point estimates, and developments over time, of informal sectors in several developed and developing countries. The estimates are based on various approaches, and include the authors’ own estimations, as well as several others in the literature.

Their overall results, based on electricity and currency demand, labor force discrepancies, and the MIMIC approach, indicate that among 21 OECD countries, Southern Europe (Italy, Greece, Spain and Portugal) along with the four Scandinavian countries and Belgium, have the biggest informal sectors relative to official GDP. From the 1970s and throughout the 1990s, the informal sector grew in all 21 countries, except USA, where it decreased marginally during the 1990s (Schneider and Enste, 2002, 35-38). With the exception of Austria, Germany and Switzerland, the size of the informal sector showed a marginal decline in all 21 countries from 1999-2003 (Bajada and Schneider, 2005, 85). In general, informal sectors in OECD countries are smaller than in Asia, Africa and Latin America.

In Asia and the Middle East, informal sectors average around 30 percent of official GDP, and in all 31 countries, for which Bajada and Schneider (2005, 87, 97) present estimates, the sector has been growing. It should be noted, that while informal sectors are very big in some of the poorest Asian countries, ranging from 30 to more than 50 percent of official GDP, they are much smaller in countries such as Singapore, Hong Kong, China, Vietnam, Indonesia and several of the Middle Eastern countries. In these countries, sizes range from 10-20 percent, similar to many OECD countries.

In both African, Latin American and a few East and Central European former Soviet countries, informal sectors are estimated to be very big, ranging around 40 percent of official GDP and growing from 1999 to 2003 (Bajada and Schneider, 2005, 91-95). But also this huge group of (mainly developing) countries show big variations. Thus, while Bolivia and Panama top the list of Latin American countries with informal sectors around 65 percent of official GDP, The corresponding numbers for Argentina, Chile and Costa Rica lie below 30 percent. Among the transition
countries, Azerbaijan and Georgia take the lead around 60-70 percent depending on approach, with the bulk of other countries ranging from 20-40 percent. Finally, in Africa, the percentage of the labor force engaged in informal activity was estimated to range from 34 percent in Zimbabwe (no labor force estimate is provided for South Africa) up to 80 percent in Gambia and DR Congo in the late 1990s. When focusing on the production share however, Zimbabwe topped the list in the early 2000s along with Nigeria and Tanzania, with informal sectors around 60 percent of official GDP. Most African countries show estimates between 30 and 50 percent of GDP, with South Africa distinguishing itself as the only country below 30 percent. It is noted by the authors, that these numbers may be underestimated for the least developed countries due to poor quality of data, relative to the more developed North African countries and South Africa (Bajada and Schneider, 2005; Schneider and Enste, 2002).

To sum up, even though these estimates should be interpreted with care, they do suggest an overall trend in the size and latest development of informal sectors around the world. While the informal sector has showed a marginal decline in most OECD countries in the early 2000s, it has been growing in the rest of the world, as it did in most OECD countries from the 1970s and throughout the 1990s. Informal sectors are relatively small (less than 20 percent of official GDP), but not negligible, in most OECD countries and some highly developed Asian and Middle Eastern countries, while most countries in Latin America and Africa, along with a few less developed Asian and former Soviet countries, have the biggest informal sectors, ranging around, and even above, 50 percent of official GDP.

### 3.4 Taxation and informal sector development

What do the numbers above imply in terms of causes and consequences of informal sector growth? Schneider and Enste (2002, 155-177) only draw implications for the OECD countries. They argue that the growth in informal sectors towards the end of the twentieth century was mainly caused by a rising tax burden and strict labor-market regulations, combined with a declining tax morality and loyalty
towards government. The consequences of growing informal sectors in the presence of taxation for allocation, distribution and stabilization are ambiguous. Erosion of the tax-base is considerable, though not as big as usually claimed by governments. The authors suggest that overall, something should be done to limit informal sector growth, and outline a two-pillar strategy to deal with the causes, focusing on ‘exit’ and ‘voice’. In short, the strategy is to decrease the attractiveness of ‘exit’ from the formal sector into the informal, while strengthening ‘voice’-options, by increasing individuals’ possibilities of influencing government decisions. To reduce the attractiveness of ‘exit’, they recommend governments to reduce tax rates, social security contributions and transfer payments considerably, to simplify the tax system, to deregulate labor markets and to fight corruption and wasteful spending of revenue. To promote ‘voice’, governments should strengthen direct democracy and limit centralization (Schneider and Enste, 2002, 178-184).

Without providing an analysis as rigorous as the above cited, Bajada and Schneider (2005) draw implications of informal sector growth also for the developing countries, and reach more or less the same conclusions as Schneider and Enste (2002). Thomas (1992, 169, 235) warns against what he sees as a tendency in the literature to draw microeconomic implications and policy recommendations from imprecise macroeconomic estimates of informal sector sizes. This concern is probably even more justified if policy recommendations for developing countries are based on macroeconomic estimates combined with microeconomic evidence from developed countries. Nevertheless, other authors also seem to accept the claim that informal sector growth in developing countries is driven (at least partly) by tax pressure. In a recent theoretical paper on tax policy and the missing middle, Dharmapala et al. (2008) discuss the optimal trade-off between minimizing administrative costs of taxing firms below a certain size (by exempting informal firms from taxation) on one hand, and avoiding too many firms reducing their size and shifting to the informal sector on the other. Even though they conclude that, under certain circumstances, accepting a sizable informal sector in developing countries may be optimal, the limitations posed by the existence of an informal sector to the tax system are taken as
a precondition. Gordon and Li (2009), in another recent paper, construct a model which explains a range of ‘puzzling’ tax policies in developing countries by the threat posed by firms’ incentives to shift production to the informal sector, trading off the efficiency costs of going informal against the gains in tax evasion.

Thus, while little evidence from developing countries exist on this issue, the risk of a growing informal sector is regarded limiting to the possible extent of taxation. While I agree that this should be of concern to developing country governments, other factors may also play a role, especially when taking into account the major structural differences between informal sectors in developing and developed countries, from where most of the evidence on this issue comes. Models focusing on the distortionary effects of taxation on informal sector growth, often do not take into account other perspectives, such as how the tax revenue is spent, even though the effects of government spending on a developing economy may be rather large.

Providing thorough empirical evidence on what drives informal sector growth, or undertaking a full incidence analysis of existing tax systems in developing countries, is an extremely interesting task, unfortunately beyond the scope of this thesis. I will instead present a theoretical model, focusing on the income effects on informal sector growth, of a simple system of taxation and redistribution. Hopefully, this model can contribute to the understanding of how one possible way of spending tax revenue potentially affects the informal sector. If redistribution can limit informal sector growth, it is my belief, that this may offset some of the distortions from taxation, leaving a bit more room for the development welfare state to collect revenue.

4 Model

4.1 Introduction

The model I present, draws on earlier ideas about the state as a central actor in the development process. But instead of promoting development in the traditional sense, through coordinating investments in industry, the state in this model has one
simple tool: Redistribution through taxation.

The model is a modified and expanded version of a general equilibrium model presented by Murphy et al. (1989), in their paper, *Income Distribution, Market Size and Industrialization*. The key message of the paper is the necessity of concentrating buying power in the hands of consumers of local manufactures, to foster industrialization in a developing country. They present a model of a closed economy with a big agricultural sector, producing food (strict necessity good) under decreasing returns to scale (DRS), and a small industrial sector, potentially producing a continuum of manufactures under increasing returns to scale (IRS). The industrial sector faces competition from the informal sector, where the same manufactures can be produced under constant returns to scale (CRS). As wages are not high enough to cover the workers’ need for food, the only demand for manufactures in the economy comes from a small elite of shareholders of different sized portfolios, containing the same mix of land rents and industrial profits. These shareholders demand a range of manufactures in the same prioritized order, each of which can be produced in two ways. Either in the informal sector, at a labor cost bigger than 1 per unit, or in the industrial sector, at a labor cost of 1 per unit after a certain fixed investment has been made. Thus, only manufactures for which the demand is high enough to cover the fixed investment will be produced with IRS technology in the industry. Other demanded manufactures are produced under CRS in the informal sector.

My model follows the structure of Murphy et al. (1989), but departs from their framework in several ways. I operate with a big informal sector, producing a basket of necessity goods under CRS (food, transportation, health services, light manufacturing etc.). Part of the informal production (say textile) can be exported. This is in line with the observation that for most developing countries, labor intensive low-skill production, such as e.g. textile, makes up the bulk of exports. Tough international competition leads many firms to subcontract production to ‘self-employed’ (mostly female) workers in the informal sector to avoid regulations such as minimum wages (Chen, 2001; Endresen and Bergene, 2006). There is also a small formal sector operating under IRS, equivalent to the industrial sector in Murphy et al. (1989). The
formal sector faces competition from imported manufactures, which are traded for textile.

Everyone, who are not able to find a formal job, work in the informal sector, either in small-scale and irregular production, or in home production (seemingly unemployed). Thus, the informal sector here covers both Thomas (1992)’ small-scale, irregular, and household sub-sectors. There is no criminal sub-sector in the model. The abundance of informal labor enables the elite to suppress wages in the small-scale and irregular sectors and extract rents. As a result, informal sector wages are too low to cover the workers’ optimal consumption of necessity goods. The rents are most easily interpreted in a sharecropping framework. In informal food production for instance, it is not unlikely that sharecropping is the prevalent contract form, and that land owners are able to keep workers at their reservation utility (in this case, the utility of working in home production), extracting the rest of the surplus as rents (see e.g. Bardhan and Udry, 1999, cp. 6, I-II). Parts of the urban informal production may show some of the same properties when space is scarce and privately owned, but one can also consider e.g. a government representative issuing ‘licenses’ to operate in an informal market⁴. Given that the workers have the option of either working in the small-scale sector, paying the license-fee to the representative, or working in home production, the representative sets the fee high enough to keep the small-scale workers exactly at their reservation utility, and extracts the surplus as rents. These examples also illustrate how, even though the average income in the informal sector is lower than that of the formal, some individuals are able to earn a more than decent income in the informal sector (Thomas, 1992, 69).

Workers in the formal sector receive a higher wage (e.g. a national minimum wage), which is still very low, but exactly enough to buy them the optimal amount of necessity goods. The elite share manufacturing profits, rents from the informal sector, and some exogenous income (e.g. inheritance), holding different sized portfolios containing the same mix. The elite consume the optimal amount of necessity

⁴These licenses should not be regarded official, given that the market in question is informal. Rather, they are some kind of protection fee, to avoid harassment by police or gangs working for the ruling elite.
goods and spend the rest of their income on locally produced and imported manufactures.

Thus, I change the original (and more conventional) agriculture-industry duality of Murphy et al. (1989) to one of formal and informal sectors. I do this, firstly because this is the duality of interest for the present discussion, secondly because I believe this is a more meaningful way of categorizing production and consumption in developing countries. Consider agriculture as an example. While agro-industry constitutes part of the agricultural sector, utilizing technologies more similar to those of industrial production than traditional farming, the rest of agricultural production falls within the small-scale or household subsistence sector. Also, according to Schneider and Enste (2002, 44), the irregular sector is at least as big in agriculture as in urban production.

While I acknowledge the general critique of simplifying dual approaches, the model is intended to be simple. After presenting the general model, I introduce an exogenous ad valorem tax on all formal consumption including imports. Total tax revenue is redistributed as a uniform lump sum subsidy to all individuals. I have chosen this tax-regime on the basis of its simplicity in terms of the model, but also because I believe it is practically feasible. I will get back to this in section 6.1.

4.2 Consumption and preferences

All consumers have the same preferences over a basket of necessity goods, \( G \), and a continuum of manufactures \( q \in (0, \infty) \). Individual utility is such that a consumer with a given budget demands only necessity goods until a certain threshold, \( z \), is reached, and no necessity goods above \( z \). The demand for \( G \) is thus completely inelastic. After obtaining the optimal amount of necessity goods, the consumer spends the rest of his or her budget on manufactures. Each manufacturing good comes in discrete units that ensure satiation, such that increased consumption of manufactures is an expansion of the range of goods consumed, not the amount of each good. The marginal utility of manufactures is decreasing in \( q \), making low
index goods more desirable than high index goods. This means that a richer person
always consumes the same as a poorer person does, plus some higher index goods.

Each individual supplies one discrete unit of labor, such that total labor supply
equals population size, $L$. Shareholders spend their entire labor supply managing
their wealth. Workers supply their labor either to the formal or the informal sector.
Utility from leisure is disregarded in the model.

4.3 Informal sector

The informal sector absorbs all labor which is not utilized by the formal sector. We
can divide the informal workers into two groups. One group, $I_H$, are ‘unemployed’.
They work in the household sub-sector, operating outside the market. They pro-
duce and consume a small amount of necessity goods, $w_I$, which is lower than $z$,
and gives them individual utility $w_I$. Another group, $I_G$, are ‘employed’ in the CRS
production of necessity goods, $G$ (numeraire). They are more productive than the
home-workers, but because of high unemployment, the elite in control of these in-
formal firms are able to suppress wages down to $w_I$, keeping the informal workers
indifferent between working in these firms and the household sector. The rest of
the product is extracted as rents. Thus, informal workers are indifferent between
belonging to $I_G$ or $I_H$, and the relative sizes of the two groups are determined by
the overall demand for necessity goods.

The informal sector is linked to the formal sector in three ways. Firstly, part of
the $G$-production is exported to finance import of manufactures. Secondly, part of
the rents extracted from $G$-production are spent by the shareholders in the formal
sector. Thirdly, all formal workers and the elite demand an amount, $z$, of informally
produced necessity goods. The total demand for $G$ consists of the demand from
$I_G$ informal workers, $M$ formal workers, $N$ shareholders, and exports, $X$. Recall
that the $I_H$ informal workers in the household sector consume their own produc-
tion, and do not demand anything in the market. Total rents are thus given by:
$$R = G - w_I I_G = z(M + N) + X.$$
4.4 Manufacturing

There are two ways, in which the country can cater local demand for manufactures. One is to import them, the other is to produce them in the formal sector.

Imported manufactures are traded for some of the informally produced necessity goods at exogenous world market prices, \( p_X \) and \( p_Y \). For simplicity, I assume that the price of all manufactures is the same. Trade is in balance, such that the total demand for imports, \( Y \), determines the demand for exports: \( X = \frac{p_X}{p_Y}Y = p_Y Y \), since the informal product is numeraire.

Alternatively, manufactures can be produced locally in the formal sector. I assume that for each \( q \), a potential firm exists, with access to IRS technology and monopoly in its own product. This firm will decide whether to enter the market or leave it to imports, based on the size of the market. If there are enough local consumers whose menu includes \( q \), to cover the fixed cost associated with entering the market, the firm will do so.

I assume for now that manufactures can not be exported. A brief discussion of this is provided in section 6.5.

4.5 Income distribution

The elite consists of \( N \) shareholders of different sized portfolios, containing the same mix of manufacturing profits, \( \pi \), rents, \( R \), and exogenous income, \( V \). This assumption about uniform portfolio composition is rather unrealistic (I will discuss this briefly in section 6.4), but it follows from Murphy et al. (1989). It enables me to order all individuals by income, focusing on the distribution rather than the source of income. Minimum share-ownership in the country is \( \gamma \), and the distribution of shares is given by \( G(\gamma) \). Thus, \( N = L(1 - G(\gamma)) \), and individual shareholder income is \( y = \gamma(R + \pi + V) \), \( \gamma \in \{0, [\gamma, 1)\} \).

Most people do not hold shares, but work either in the informal or formal sector. The lower middle-class consists of \( M \) formal sector workers earning the minimum wage, \( z \). They consume \( z \) necessity goods but no manufactures. Lastly, the
\[ L - (M + N) = I_G + I_H \] poor, informal workers earn and consume \( w_I < z \) necessity goods, and no manufactures.

I impose the following ‘inequality’ assumption: \( w_I < z < \gamma(R + \pi + V) \), which should be rather plausible given the discussion in section 3.

### 4.6 Industrialization

Assume that the world market price of manufactures, \( p_Y \), in terms of necessity goods is \( \alpha \). After a certain fixed cost of \( C \) labor units is covered, local industrial firms are able to produce the same manufactures, using one unit of labor per unit of the good, at the formal labor cost \( z \), where \( z < \alpha \). Each industrialized firm can then sell its product locally at the monopoly price \( \alpha \) and earn profits:

\[
\pi_q = (\alpha - z) \frac{N_q}{\text{sales}} - \frac{Cz}{\text{fixed costs}}
\]  

(1)

Sectors 0 through \( Q \) industrialize and replace imports. Sector \( Q \) will be the sector that, given demand, just breaks even and earn zero profits after covering the fixed cost:

\[
\pi_Q = 0 \Rightarrow (\alpha - z)N^* = Cz
\]  

(2)

This equation gives us the necessary demand for sector \( Q \) to industrialize:

\[
N^* = \frac{Cz}{\alpha - z}
\]  

(3)

Assuming that \( N^* < N \) such that some industrialization can take place, the share held by the \( N^* \)th richest individual is such that \( N^* = L(1 - G(\gamma^*)) \). This individual consumes all manufactures produced in the formal sector, but no imports, and has the following budget constraint:

\[
Q\alpha = \gamma^*(R + \pi + V) - z
\]  

(4)
Figure 1: Income distribution and informal production

This implicitly defines the extent of industrialization in the country as:

$$Q = \frac{\gamma^*(R + \pi + V) - z}{\alpha}$$  \hspace{1cm} (5)

The demand for manufactures by shareholders holding a smaller share than $\gamma^*$ is:

$$q(\gamma) = \frac{\gamma(R + \pi + V) - z}{\alpha}, \gamma \in \left[\frac{\gamma}{\gamma^*}\right]$$  \hspace{1cm} (6)

Thus, we can divide the elite into two groups; the rich, holding shares of $\gamma^*$ or more, and the upper middle-class, holding shares smaller than $\gamma^*$. The number of rich people in the country is $N^*$. They consume $z$ of necessity goods, all local manufactures, $Q$, and some imports. The upper middle-class consists of $N - N^*$ individuals, consuming $z$ necessity goods, and some local manufactures, $q \in (0, Q)$.
Figure 1 illustrates the income and demand of the income groups, along with informal production and rents. Because the number of rich people is determined by the size of the fixed cost, their expenditure on formal manufactures exactly cover the fixed costs in sectors \((0, Q]\) such that that the infra-marginal sectors \((0, Q]\) earn positive profits from sales to the upper middle-class.

### 4.6.1 Trade

The manufactures demanded by the rich, which are not produced locally, are imported at the world market price \(\alpha\). The share of national income spent on imports is \((1 - K - N^*\gamma^*)\), where \(K = \int_2^{\gamma^*} \gamma dG(\gamma)\) is the total share held by the upper middle-class. Thus, total imports equal:

\[
Y = \frac{(1 - K - N^*\gamma^*)(R + \pi + V)}{\alpha} \quad (7)
\]

Trade is balanced such that the value of exports equals that of imports. The external demand for informal necessity goods is then:

\[
X = \alpha Y = (1 - K - N^*\gamma^*)(R + \pi + V) \quad (8)
\]

### 4.6.2 Informal sector rents

Using equation (8), we can now recalculate total rents from the informal sector:

\[
R = z(M + N) + X = \frac{z(M + N) + (1 - K - N^*\gamma^*)(\pi + V)}{K + N^*\gamma^*} \quad (9)
\]
4.7 Equilibrium

4.7.1 Equilibrium profits: The $\pi(M)$ equation

Using equation (1), we get an expression for aggregate profits in all industrialized sectors:

$$\pi = (\alpha - z) \left[ N^*Q + \int_{\gamma}^\gamma q(\gamma)dG(\gamma) \right] - CzQ \quad (10)$$

Insert for $C$ and $q(\gamma)$ from equations (3) and (6) to get:

$$\pi = \frac{\alpha - z}{\alpha} \left[ (R + \pi + V)K - (N - N^*)z \right] \quad (11)$$

Note that revenue from sales to the rich and fixed costs exactly cancel out, and we are left with the profit rate $\frac{\alpha - z}{\alpha}$ times total spending by the upper middle-class on manufactures. Inserting for $R$ from equation (9) and collecting terms gives us the $\pi(M)$ equation:

$$\pi(M) = \frac{\alpha - z}{\alpha - (\alpha - z)\frac{K}{K + N^*\gamma}} \left[ \frac{K}{K + N^*\gamma}(V + z(M + N)) - (N - N^*)z \right] \quad (12)$$

The positive relationship between $M$ and $\pi$ in equation (12) is not surprising. It tells us that aggregate industrial profits are increasing in the size of the formal sector defined as number of formal sector workers. When workers shift from the informal to the formal sector, their wage, and thus their demand for necessity goods increase. This leads to higher rents which are distributed to all shareholders. The share of rents which accrues to the upper middle-class generates increased profits in the infra-marginal sectors. These profits are again distributed and spent by the elite, generating a multiplier effect.
4.7.2 Equilibrium formal employment: The $M(\pi)$ equation

Formal sector employment equals the demand for locally produced manufactures, $D_F$:

$$M = D_F = \frac{(R + \pi + V)(K + N^*\gamma^*) - zN}{\alpha}$$  \hfill (13)

Inserting for $R$ from equation (9) and collecting terms gives us the $M(\pi)$ equation:

$$M(\pi) = \frac{\pi + V}{\alpha - z}$$  \hfill (14)

This relationship between $M$ and $\pi$ is also positive, illustrating how employment in the formal sector increases with profits through increased demand from the shareholders. This happens directly as an effect of profits being spent on local manufactures, and indirectly, as the resulting increase in formal employment increases rents which are distributed to shareholders and thus again increase formal demand.
For given parameter values, \( M \) and \( \pi \) are endogenously determined in a general equilibrium, illustrated by the intersection of the \( \pi(M) \) and \( M(\pi) \) curves in Figure 2. But will an equilibrium always exist? The curves intersect as long as the slope of one and the inverse slope of the other are not exactly equal. Let us call the slopes \( \sigma_{\pi(M)} \) and \( \sigma_{M(\pi)} \). Then the curves intersect if \( \sigma_{\pi(M)} \neq \frac{1}{\sigma_{M(\pi)}} \). It is easily shown that \( \sigma_{\pi(M)} < \frac{1}{\sigma_{M(\pi)}} \). But do we always get a meaningful equilibrium (i.e. for positive values of \( M \) and \( \pi \))? A meaningful equilibrium, in which some industrialization takes place, will occur as long as \( VK > \frac{\alpha z}{\alpha} N^*(N\gamma^* - K - N^*\gamma^*) \geq 0 \). Thus, in addition to the assumptions already made, we see that a certain level of exogenous income held by the upper middle-class is necessary for any industrialization to occur. This necessary level is increasing in the profit rate, individual spending on necessity goods, the number of rich people necessary to cover the fixed costs of industrialization, and decreasing in the density of the distribution of shares among the upper middle-class. Because \( \sigma_{\pi(M)} < \frac{1}{\sigma_{M(\pi)}} \), the equilibrium, when it exists, is stable.

### 4.7.3 Comparative statics

Industrialization in this model is interpreted as increasing \( Q \), the range of manufactures produced in the formal sector. However, we are mainly interested in effects on \( M \), the number of formal workers, as this determines the total size of the formal and informal sectors. I will refer to increases in \( M \) in the model as formalization, implying that labor shifts from informal to formal employment. Since workers have higher incomes and productivity in formal than home production in the model, formalization can be interpreted as development.

Some brief comparative statics are: \( \frac{dM}{d\alpha} < 0 \), higher world market prices limits formalization. Even though a higher price increases the prospects of formal firms to generate profits, it reduces real incomes and thus demand; \( \frac{dM}{dL} = 0 \), population size does not affect the absolute size of the formal sector, but it does of course affect the relative size; \( \frac{dM}{dV} > 0 \), formalization is increasing in exogenous income; \( \frac{dM}{dz} > 0 \) and \( \frac{dM}{dw} I = 0 \), formalization is increasing in the minimum wage, and not affected by the
informal wage. Remember here that $z$ is also the optimal consumption of necessity goods, and that $w_f < z < \alpha$; $\frac{dM}{dK} > 0$, formalization is increasing in the fraction of income shared by the upper middle-class; $\frac{dM}{dN} < 0$, formalization is decreasing in the number of people holding shares. As long as $K$ does not change, dividing it between more individuals, who have to cover their demand for necessity goods before spending on manufactures, lowers $M$; $\frac{dM}{dN^*} < 0$ and $\frac{dM}{d\gamma^*} < 0$, as both $N^*$ and $\gamma^*$ are determined by the fixed costs in manufacturing.

It should be clear from the above, that for very poor or highly unequal countries, it is more difficult develop through industrialization, leading to only few formal jobs and many poor workers in the informal sector. This prediction, though drawn from a very simple model, is not surprising, given the observation that many developing countries have big informal sectors, high inequality and low official GDP growth.

### 4.8 Introducing taxation and redistribution

In this section, I expand the model, introducing an exogenous ad valorem tax, $t$, on all formal consumption including imports. Total tax revenue, $T(t)$, is redistributed as a uniform lump sum subsidy of $\frac{T(t)}{L}$ to all individuals.

#### 4.8.1 Modeling taxation

In addition to wages and shares, all individuals now receive an exogenous income of $\frac{T}{L}$. $T$ will be derived below. Introducing an ad valorem tax, $t$, on manufactures (locally produced and imported), raises the consumer price to $\alpha(1+t)$, while leaving the producer price unchanged. Following my discussion of the informal sector in section 3, it is natural to assume that this can not be taxed. Also, in line with the Diamond-Mirrlees efficiency lemma, I assume that intermediate goods (the fixed costs in manufacturing) are not taxed. Thus, the tax resembles a value added or sales tax.

The introduction of this new parameter complicates the model somewhat. Firstly, it matters for the demand for manufactures whether $t$ is big enough, or too small,
to lift the informal workers above $z$. Secondly, increasing the income of the poor increases their demand for informal goods up to $z$. This again affects total rents, $R$, from the informal sector. Informal production is now:

$$G = \begin{cases} 
    z(M + N) + w_I I_G + (z - w_I)(L - (M + N)) + X & \text{for } w_I + \frac{T}{L} \geq z \\
    z(M + N) + w_I I_G + \frac{T}{L}(L - (M + N)) + X & \text{for } w_I + \frac{T}{L} < z 
\end{cases} \quad (15)$$

which gives us total rents:

$$R = G - w_I I_G = z(M + N) + X + \min(\frac{T}{L}, z - w_I)(L - (M + N)) \quad (16)$$

### 4.8.2 Changes in local demand

Imposing a tax on formal consumption affects the elite’s demand for locally produced manufactures, such that:

$$Q = \frac{\gamma^*(R + \pi + V) + \frac{T}{L} - z}{\alpha(1 + t)} \quad (17)$$

$$q(\gamma) = \frac{\gamma(R + \pi + V) + \frac{T}{L} - z}{\alpha(1 + t)}, \gamma \in [\gamma, \gamma^*) \quad (18)$$

But now the workers also demand some manufactures. Formal workers demand:

$$q_F(0) = \frac{T}{L\alpha(1 + t)} \quad (19)$$

while informal (including household) workers demand:

$$q_I(0) = \begin{cases} 
    \frac{w_I + \frac{T}{L} - z}{\alpha(1 + t)} & \text{for } w_I + \frac{T}{L} \geq z \\
    0 & \text{for } w_I + \frac{T}{L} < z 
\end{cases} \quad (20)$$
This gives us the total demand for formally produced manufactures:

\[ D_F = \frac{1}{\alpha(1+t)} \left[ (K + N^*\gamma^*)(R + \pi + V) - zN + \frac{T}{L}(M + N) \\
+ \max(w_I + \frac{T}{L} - z, 0)(L - (M + N)) \right] \] (21)

### 4.8.3 Trade

The rich’ demand for imports changes slightly due to the price-increase, affecting exports:

\[ Y = \frac{(1 - K - N^*\gamma^*)(R + \pi + V)}{\alpha(1+t)} \] (22)

\[ X = \frac{1}{1+t} (1 - K - N^*\gamma^*)(R + \pi + V) \] (23)

### 4.8.4 Tax revenue

Tax revenue depends on the total demand for taxed goods:

\[ T = t\alpha(Y + D_F) \] (24)

Inserting for \( D_F \) and \( Y \) from equations (21) and (22) gives us the following expression for total tax revenue:

\[ T = \frac{t}{1+t} \left[ (R + \pi + V) - zN + \frac{T}{L}(M + N) + \max(w_I + \frac{T}{L} - z, 0)(L - (M + N)) \right] \] (25)

### 4.9 New equilibrium

The new expression we get for aggregate profits in all industrialized sectors is:

\[ \pi = \frac{\alpha - z}{\alpha(1+t)} \left[ K(R + \pi + V) + \left( \frac{T}{L} - z \right)(N - N^*) + \frac{T}{L}M \\
+ \max(w_I + \frac{T}{L} - z, 0)(L - (M + N)) \right] \] (26)
while formal sector employment equals:

\[
M = D_F = \frac{1}{\alpha(1+t)} \left[ (K + N^*\gamma^*)(R + \pi + V) - zN + \frac{T}{L}(M + N) \\
+ \max(w_I + \frac{T}{L} - z, 0)(L - (M + N)) \right]
\]

Equations (26) and (27), along with (16), (23) and (25), make up a system of five equations to determine the five unknowns, \(R, X, T, \pi\) and \(M\). When \(t = 0\), i.e. when there is no taxation, this system of equations reproduces the linear \(\pi(M)\) and \(M(\pi)\) relationships from equations (12) and (14) of the general model. For values of \(t > 0\), the max- and min-functions in the equation system causes local discontinuities to arise, such that it is no longer possible to arrive at simple linear relationships between \(\pi\) and \(M\). However, separate analysis of the two cases where \(t\) is big enough, or too small, respectively, to lift the informal workers above \(z\), combined with thorough numerical analysis, provides the following insights: For all parameter values which do not break my assumptions, and for which a meaningful equilibrium exists without taxation (i.e. for \(V\) big enough), the \(M(\pi)\) function from equation (14) of the general model is independent of the tax and does not change. The \(\pi(M)\) equation changes, and behaves differently for low and high values of \(t\) respectively.

For small values of \(t\) (satisfying \(w_I + \frac{T}{L} < z\) in equilibrium), compared to the case with no tax, the \(\pi(M)\) function has practically the same intercept\(^5\) as in the general model, but is now slightly convex. As illustrated in Figure 3, the equilibrium unambiguously shifts upwards (higher \(M\) and \(\pi\)) compared to the case with no tax, and it is still stable. Further increases in \(t\), still satisfying \(w_I + \frac{T}{L} < z\), slightly increase the growth rate of \(\pi(M)\) without affecting the intercept. Thus, for small values of \(t\), \(M\) is increasing in \(t\).

For high values of \(t\) (satisfying \(w_I + \frac{T}{L} > z\) in equilibrium), the \(\pi(M)\) equation

\(^5\)The intercept is unchanged by four decimals, meaning that there is an effect of the tax, but it is marginal and can be disregarded. The intercept in itself is not interesting, as it is obviously not possible to make positive profits with no employees in the formal sector.
initially follows the same pattern as above (i.e. same intercept, slightly convex curve). However, from the point where \( w_I + \frac{T}{L} = z \), the function is linear, with a much steeper slope, as illustrated in Figure 4. For high enough values of \( t \), this kink occurs before the equilibrium, such that equilibrium \( M \) and \( \pi \) seems to be growing faster in \( t \), for higher values of \( t \). Plotting \( M \) as a function of \( t \) for given values of the other parameters, Figure 5 illustrates how \( M \) is an overall increasing function of \( t \), but with a much higher growth rate after \( t \) reaches the \( \frac{T}{L} + w_I = z \) threshold.

This result is not very surprising if we consider the multiple effects of first introducing a small tax, and then increasing it, in the model. Starting out with no taxation and a small but existing formal sector, we introduce a small tax, redistributing the revenue as lump sum grants to all individuals. This redistributive scheme increases the after tax real income of informal and formal workers. The after tax real income of the elite as a group is reduced. It is possible, for very
unequal distributions within the elite, that some of the least wealthy individuals are affected positively, but let us here for simplicity assume that the net contribution of all members of the elite, to this tax scheme, is positive. The reduction in real income reduces the elite’s demand for both locally manufactured and imported goods. The consumption of higher index local manufactures decreases first, and the range of manufactures, $Q$, is reduced. In isolation, this should reduce the demand for formal labor, $M$. The consumption of imports also decreases, reducing exports and informal rents.

The poor informal workers in both home-, and necessity good production receive a subsidy, which they spend on necessity goods in the informal sector. This increases informal demand, production and rents, as some of the ‘unemployed’ in the household sector get employment in necessity good production. This positive effect on informal production and rents more than offset the negative effect from
reduced exports, leading to increased rents, which are distributed among the elite and counteracts the initial reduction in their real income.

The formal workers also receive a subsidy, which they spend on lower index manufactures in the formal sector. This increases the demand for manufactures, and thus the labor demand and profits in the formal sector. The increased demand for formal labor has a direct effect on formal employment, as well as an indirect through the increased demand by the new formal workers. Because of the IRS technology, the returns to increased demand for lower index goods is higher than the returns to higher index goods. This is because the low index goods are already produced at a large scale, while the higher index goods are produced at a smaller scale, with lower average returns. Increased $M$ also increases informal production and rents, which along with the increased profits are distributed among the elite. The distributed profits and rents are spent on import and higher index manufactures, offsetting part
of the initial reduction in the elite’s demand.

In sum, we get a small decrease in imports and exports. The final effect on the range of locally produced manufactures is ambiguous but marginal, while informal and formal production and employment, rents and profits increase. Formal worker spending of the subsidy on lower index goods has the most direct positive effect on formalization, but is small, because the number of formal workers is small. Total efficiency in the country increases, since production in informal sector increases, demand is shifted from higher to lower index goods with higher returns, and some resources are withdrawn from the imports-exports-rents spiral, and directed towards the more productive (from a national point of view) local formal sector. It should be noted, that even in the case where shares are distributed evenly among the rich such that nothing is imported in the country, the effect of redistribution is positive, due to increased informal productivity and demand for lower index manufactures.

Let us then consider increasing the tax to a level high enough for the subsidy to lift all the poor above \( z \). First of all, the effects outlined above take place, but are stronger in this case, since the tax and subsidy are higher. In addition, the informal workers start demanding formal manufactures once they obtain the optimal amount of necessity goods. In the model, this has two effects. The first effect is that rents now increase at a much slower pace. Workers shifting from informal to formal sector still increase their net demand for necessity goods, but those staying in the informal sector no longer increase their demand. This reduces the growth-rate of \( R \) significantly. The other effect works through the informal workers demand for formal manufactures. This effect is similar to that of the spending of formal workers, and as seen above, it is more direct than the rent channel, as nothing ‘leaks’ out to imports and fixed costs in high index manufacturing. Thus, the total effect is now stronger than before, such that formalization occurs at a higher pace for tax rates above the \( w_I + \frac{T}{L} = z \) threshold.
5 Discussion

5.1 How much can we tax?

According to this simple model, increasing the tax will always increase the number of formal workers, and thus improve efficiency in the country. There is no limit to how much we can tax efficiently. This is of course very unrealistic, and follows from the fact that I have excluded distortions potentially generated by the tax. All income is consumed in each period, everybody have a fixed demand for informal goods, production of manufactures can not be shifted to informal sector etc. Thus, the present model captures what can be thought of as a pure income effect of redistribution. Realistically, taxation distorts incentives in developing as well as developed countries. Demand is not completely inelastic, and different technologies possibly exist, which can produce the same products or very close substitutes. As the tax increases, consumers may shift some of their demand away from manufactures and towards more informal goods. It may also be the case that the supply of manufactures can be shifted to the informal sector, either through smuggling from abroad or as small-scale production. In addition to the direct loss of tax revenue and formal jobs, this may also have an efficiency cost if the informal technology is less efficient than the formal. I will refer to these distortions taken together as the displacement effect of the tax. There is no displacement effect in the model. While several other models focus specifically on the challenges posed by distorted incentives, leaving out how tax revenue is spent, my intention with this model is to show how under certain circumstances, income effects may modify displacement effects, leaving some room for efficient taxation.

As a thought experiment, let us assume for a moment that the displacement effect is uniform across manufactures and increases exponentially with the tax burden. Combining displacement effects with the income effect found in the model, depending on relative ‘strengths’ of the effects, we may get a result, where displacement effects dominate initially, causing very low tax-rates to increase informal sector size.
For a bit higher rates, income effects may dominate and thus reduce the size, while for very high rates, the displacement effects presumably take over, and the informal sector grows again. Graphically, the ‘average’ of income and displacement effects may look something like Figure 6.

The graphs in Figure 6 are arbitrary, and meant only as an illustration. For given growth-rates of income and displacement effects, the figure shows that increasing $t$ a little from status quo with no taxation may in sum reduce the number of formal workers, as in interval $a$. Increasing the tax a little further after this (interval $b$), may
reverse part of the negative effect, but the formal sector is still smaller compared to status quo. In interval $c$, the income effect now dominates the displacement effect, allowing the tax to increase the number of formal workers above status quo, up to the turning point where interval $d$ begins, and the informal sector again grows. In interval $e$, the tax is now so high that displacement effects dominate, and $M$ decreases at an increasing rate with $t$. This simple thought experiment suggests that it may be possible, under certain circumstances, to introduce and increase the tax within some interval $(c)$, and thus increase both the welfare of the poor and the size of the formal sector.

It is obvious, that the outcome in Figure 6 depends fully on the relative steepness of the curves, and especially where the kink on the ‘income’ effect curve occurs. Say for example that the kink occurs at a tax rate of more than fifty percent. In this case, the displacement effects are probably already too large for the income effects to ever start dominating. So how high tax rates are we talking about in the model? This depends fully on the parameters, and it is possible to manipulate the model to get the kink almost anywhere.

Thus, for some parameter values, it may be possible to efficiently increase taxes, leading to formalization and development. According to the model, the potential for taxation is higher in small, stagnant economies with a high average, but very unevenly distributed income. The tendency of poor workers, to spend their income in the formal sector, also increases the potential efficiency of taxation. In their original paper, Murphy et al. (1989, 553) suggest that countries with a bigger population industrialize more easily due to a bigger domestic market. According to this new version of the model, development through redistribution is easier to achieve in a less populous country, as less resources have to be distributed to lift a smaller poor population above $z$, for a given number of rich people with a certain income. This result is in line with the observation that the countries historically known to have undertaken ‘welfare state led’ development, are the relatively small Nordic countries.
5.2 Poverty implications

Even though most of the poor’s spending in the informal sector is extracted by the elite as rents, the subsidy financed by taxation always benefits the poor, because it increases their consumption in the first round. If, in addition, taxation increases the number of formal jobs, the chances of getting a job in the formal sector, and thus earn a higher income, increase with \( t \). It should be noted however, that this possibility is not necessarily evenly distributed among the poor workers.

What are the potential implications of following the recommendations outlined by Schneider and Enste (2002), and extended to developing countries by Bajada and Schneider (2005)? Assuming that we are in interval \( b \) or \( c \) in Figure 6, reducing taxes and transfers will harm the formal workers who lose the subsidy and may lose their job, and the informal workers who also lose the subsidy, while the chances of obtaining a formal job are reduced. In the other intervals, reducing taxes will still harm both the formal and poor informal workers who lose subsidies, but it may generate more formal jobs, outweighing this loss for some informal workers, who are able to obtain a job in the formal sector.

5.3 Gender equality

As noted by Chen (2001, 72), ‘[t]here is a significant overlap between being a woman, working in the informal sector, and being poor’. As women constitute the majority of informal workers, would a tax system like the one suggested here benefit women more? Even though this falls outside the model, a few simple insights can be made. The subsidy benefits the recipient, and we expect that a majority of net beneficiaries will be women, while the majority of the rich who are net contributors are expected to be men. But what about the benefits from increasing formal employment? As noted above, the chances of obtaining a formal job are not evenly distributed in the population, and not between the genders either. Let us assume for a moment that women constitute half of the total labor force, and that the higher proportion of women in the informal sector is an implication of formal employers’ preference
for male employees. We assume that the genders are perfect substitutes, such that this preference is only due to historic circumstances, cultural institutions, or the fact that the employers are themselves men. Then, expansion of the initially small formal sector in the model will widen the gender-gap, given that mostly men are offered formal employment at the outset. Once all men have shifted to the formal sector, we expect the formal firms to hire women, given that the genders are perfect substitutes, and the gender-gap slowly starts closing again. This is a very crude idea based on extremely simple assumptions, and it is obvious that the relationship between development, gender and formalization is much more complex and context specific. Based on a model, which has not been developed to analyze gender aspects, I will not attempt to draw any conclusions regarding formalization and gender equality. However, evidence on rising female labor force participation in twentieth century USA and Europe, on the one hand, and the effect of women’s formal employment on empowerment, on the other, suggest that there may be something to the simple story outlined above. Nevertheless, other social policies, which are often part of the ‘welfare state package’, but fall outside the present model, probably play a much more important role. These policies may be directed specifically at gender inclusion, but also investments in e.g. education, health care, parental leave and child benefits have proved beneficial for women’s welfare and participation (see e.g. Sen, 1999, 115-116; Smith and Ward, 1985; Todaro and Smith, 2003, 331-332).

5.4 Informal sector size: Product versus labor force

In the model, I have interpreted the size of the informal sector as the number of informal workers, not the size of their production. Because of the rent-structure in the model, what matters for each worker’s welfare, in addition to the size of the benefit, is whether or not he or she has a formal job. Meanwhile, the size estimates reviewed in section 3.3, are much more elaborate on production than labor force participation. Besides the fact that product estimates may be easier to obtain than those for labor market participation, this is probably a result of the authors’
preoccupation mainly with national income accounts and the irregular sub-sector. While these issues, as mentioned earlier, should be of concern to developing country governments, I believe that the number of people engaged in informal work may give a better indication of the overall welfare of the poor.

In general, labor force and production estimates in combination could give an indication of whether the informal workers in a country should actually be regarded as poor. As an example, it is interesting to note that among the Sub-Saharan African countries, Zimbabwe was estimated to have the lowest fraction of their labor force, 34 percent, engaged in informal production in 1998 (Schneider and Enste, 2002, 46), while the share of official output produced in the informal sector in 1999 was around 60 percent, and thus the highest in Africa (Bajada and Schneider, 2005, 95). In the model, a high informal product reflects the demand for necessity goods and imports from the formal sector, and whether an informal worker is engaged in household production or the more productive small-scale sector, does not affect his or her welfare as everything above $w_I$ is extracted as rents. This suggests that even though it is tempting to conclude that informal workers in Zimbabwe may not have been as bad off, we do not know whether these numbers (if even reliable) are boosted by a handful of people extracting rents.

Household production, to the extent that it is regarded as leisure pursuits, and due to its invisibility, is often excluded from estimates and definitions of the informal sector. But in developing countries, subsistence production constitutes a major part of the household sector (Thomas, 1992, 3). What would happen if we excluded household production from informal activities in the model? Increasing taxes, or any other exogenous shock that leads to expansion of the formal sector, increases the demand for necessity goods, such that informal workers shift from household to small-scale production. While the informal sector overall contracts, the small-scale sector (and thus the informal sector excluding household production) expands because of increased demand from the growing formal sector. The welfare of the informal workers, who obtain a formal job, increases, while it is unchanged for the remaining informal workers. Ambiguities such as these, caused by definitional
confusion, suggest that the size of the formal labor force, rather than the informal, should be the variable of interest, in addition, of course, to other sector-independent measures of welfare.

6 Assumptions and extensions

6.1 Choice of tax regime

In the model, I have chosen to focus on a proportional consumption tax, redistributed evenly as a uniform lump sum subsidy. There are several reasons for this choice. First of all, it is very simple, both in terms of the model, but also in reality. In their original paper, Murphy et al. (1989) briefly discuss distributive and efficiency effects of arbitrary lump sum transfers from one group in the population to another. As differentiated lump sum transfers are generally not very feasible, I find it more interesting to investigate the effects of a somewhat realistic tax system. It is noticeable, how this system, without being very well targeted at the core purpose of redistributing purchasing power towards the consumption of local manufactures, still seems to serve the purpose. This may suggest a lower bound on the potential efficiency gains from redistribution.

In terms of implementation, uniform consumption taxes are regarded transparent and very simple to administer vis a vis other taxes. A consumption tax hits spending on imports, while a tax on e.g. labor income (on top of the minimum wage) increases the local producer price, and thus the cost of manufacturing locally versus importing. Taxing imports directly might be an efficient way of collecting revenue while supporting local industry, but for international political reasons this does not seem like a very feasible option. Even though the consumption tax is proportional, it is progressive, since necessity goods are exempted. The progressiveness is further strengthened by the uniform lump sum transfer. This transfer is chosen over e.g. targeted transfers for a number of reasons. Firstly, even though displacement effects are not part of the model, I find it appropriate to consider a system of redistribution,
which does not cause unnecessarily big adverse incentives. Secondly, it follows the recommendation by UNRISD (2010), that social policies should be universal. But is a universal lump sum subsidy practically feasible? One of the initial arguments in this thesis for wanting the formal sector to grow, was the difficulties of the state to reach its own population in the informal sector with social policies. It turns out, however, that a universal lump sum subsidy may be one way of reaching them. In 2002, the Namibian Tax Consortium, commissioned by the government of Namibia, published a report evaluating the current tax system and suggesting improvements (NamTax, 2002). In addition to praising the effectiveness of the recently introduced value added tax (VAT), and making suggestions in a range of other areas, they recommended authorities to introduce a basic income grant (BIG), which is the practical parallel to a uniform lump sum subsidy. The grant, financed by an increase in the VAT, should, according to the Tax Consortium, secure efficient poverty relief and reduce inequality. This suggestion, though not subsequently implemented by the government, inspired a coalition of NGOs to initiate the BIG Pilot Project in the Otjivero-Omitara region of Namibia. For a period of two years, each resident of the community under the age of 60 (Namibians over 60 are entitled to a universal old age pension), registered at the beginning of the project period, received a monthly grant of 100 N$ (13 USD), paid out by means of an electronic identity card. In spite of big problems with in-migration to the region, the BIG proved efficient in reducing poverty and inequality, and in generating positive employment, schooling and health outcomes. The system of implementation, first administered by a private company and later by the Namibian Post Office, proved rather efficient and was not very expensive. In addition, the project showed a very positive side-effect of the BIG for national statistics, as people got registered.

The BIG Pilot Project suggests that the state has potential to effectively reach its poor population with benefits. Why should we then bother to create employment opportunities in the formal sector? This of course has to do with taxation and the ability of the poor to benefit from a range of other social policies, such as the minimum wage, social insurance etc. I will touch briefly upon some of this below.
6.2 Wages

What if we remove the minimum wage in the formal sector, in a well intentioned attempt to lower the barrier of entry into the formal sector, by deregulating the labor market as suggested by e.g. Bajada and Schneider (2005)? Due to the high levels of ‘unemployment’ in the economy and competition for formal jobs, I expect this to drive the formal wage down to $w_I$. In the model, this weakens the efficiency of redistribution. Recall that the most direct positive effect came from the formal workers’ demand for manufactures. If the formal workers now have to first meet their demand for necessity goods, just like those in the informal sector, the tax rate has to be much higher to get substantial increases in $M$. By then, it is plausible that displacement effects will dominate. In addition, there is no longer any welfare gain, for a poor worker, from obtaining a formal job.

6.2.1 Other gains from working in the formal sector

In light of the observation that for practical reasons, social security coverage, when it exists, is extended only to workers in the formal sector (ILO, 2010), maybe the gain from obtaining a formal job, is not from higher wages, but from access to these services. In the model, this does not necessarily change anything. Consider, as an example, an obligatory health insurance paid by the employer, enabling the worker to free an amount of income, he or she would otherwise have spent on informal health services. If the cost of this health insurance to the employer and the gain for the worker equals $z - w_I$, nothing has changed. A precondition for this, however, is that the benefits from working in the formal sector do not push the formal wage down below $w_I$.

6.3 Revenue spending

Instead of redistributing the tax revenue, the government may spend it on other social programs, infrastructure, administration or, if the government is corrupt, they may even pocket some of the revenue. Investments in social programs or
infrastructure, if we believe that they can be translated into a monetary benefit for certain groups, can be modeled as a transfer equivalent to the lump sum subsidy, but no longer necessarily uniform.

Administrative costs and corruption (other than rent extraction from the informal sector) can be modeled as a leakage on $T$, simply making the tax less efficient. This depends however, on how the administration budget, or the income from corruption, is spent. If it is spent in a way that generates more formal jobs, which is more plausible for the administrative costs than for corruption, this may strengthen the positive effect of taxation.

### 6.4 Shares

The assumption made in the model, about all shareholders’ portfolios containing the same mix of manufacturing profits, $\pi$, rents, $R$, and exogenous income, $V$, is rather unrealistic. However, some assumption has to be made about the distribution, and it may as well be this as any other. But let us for a moment consider what would happen if each shareholder had income either from $R, V$ or $\pi$. As long as holders of the different sources of income are distributed evenly within elite in terms of income level, nothing changes. If, for some reason, the upper middle-class collected all the rents, growth in $R$, due to initial growth in $M$, would have a stronger positive effect on $M$ than if $R$ was shared by all of the elite. This is because there is no longer a ‘leakage’ to imports. However, if the increase in $R$ is big enough for the upper middle-class to suddenly become rich, the model gets very complicated.

Knowing who has income from $R, V$ and $\pi$ could be relevant for the potential of taxing these sources directly instead of indirectly through the consumption tax. It is common knowledge, however, that taxing income and wealth is a big challenge in developing countries. Most likely, the government is not able to observe who holds which shares, and especially $R$ and $V$ may be unobservable. $\pi$ is likely to be observable, but if we are interested in taxing only profits, this can be done at the firm level.
6.5 Trade and maturing of the economy

In the model, I assume that manufactures can not be exported. I argue that there may be a skepticism among foreign consumers towards products from new industries in developing countries, and international marketing costs may be high. While I believe that the model fits trade patterns in many developing countries today, it is of course unrealistic to assume that import of high index manufactures, and export only of textile, will not change, as the country develops. Maybe it is more realistic that, after a certain period of maturing of the formal sector, some manufacturers can enter the world market?

One potential scenario is that only some higher index manufactures are demanded in the world market (because other countries are in the same situation as the one we are considering), and that learning by doing may be essential in the formal sector, such that to produce a high index good, the country has to have experience in producing lower index goods. If this is the case, a new threshold may arise in the model, at which the development process speeds up because the country starts exporting manufactures. Furthermore, this implies that $Q$, the range of manufactures produced, is no longer irrelevant for the development outcome.

Another scenario could be that exporting also shows IRS properties, such that a certain sizable investment has to be made, in e.g. marketing and transport, before the country’s products are demanded in the world market. Different possibilities in terms of financing this investment will change the predictions of the model drastically. A thorough analysis, of how changing the assumptions about trade would affect the outcome of the model, would have to be based on a reconstruction of the entire model, and is beyond the scope of this thesis. It is however, an interesting topic for further investigation.

The same is the case for one last issue, I wish to stress. In the model, there is no limit to formal sector growth. This is of course impossible in reality, as its size is limited by the number of potential formal workers available. Also, at some point, labor will become scarce in the informal sector. As I have been focusing on cases
where the formal sector is very small, this issue is not of initial concern. However, as the country develops, it will be. Investigating the effects of labor scarcity on wages, rents and further development, is a very interesting extension left for future exploration.

7 Conclusion

In this thesis, I have argued that a big informal sector poses major challenges to developing country governments pursuing welfare state led development. Based on evidence from developed countries, it is often argued that informal sectors grow in response to an increased burden of taxation, social security contributions and labor market regulations. However, while evasion of taxes and regulations characterizes most informal activity in developed countries, the informal sector in developing countries largely consists of petty-traders and -producers, subsistence and home production, and is usually accepted by authorities as the only option for the involved people to earn an income in the absence of formal employment and social protection. This has led me to question the applicability of research on the informal sector, undertaken in developed countries, to developing country contexts.

Here, I have modified a general equilibrium model of industrialization by Murphy et al. (1989), and within this model, investigated whether the structure of the informal sector in developing countries may cause a different relationship, than what is usually perceived, between taxation and informal sector growth, to arise. I introduced a proportional consumption tax redistributed to all individuals as a uniform lump sum subsidy, and analyzed the consequent changes in the relative sizes of the formal and informal sectors in the country. I found an unambiguously positive income effect of the tax, on formal sector growth. Depending on the relative growth rate of displacement effects, I found that there may be cases, where income effects dominate displacement effects, such that increased taxation is efficient.

My main conclusion is that, while tax evasion in developing countries should not be underestimated, there may be a tendency to overstate this challenge, possibly
due to the vast amount of research in this area from developed countries, coupled with a widespread definitional confusion leading to over-generalization of results. My theoretical findings, though only indicative, suggest that under certain circumstances, increasing taxes may lead to formal sector growth while reducing poverty and inequality, even in the presence of a big informal sector.

After a few months of working on this thesis, I find a great need for quantitative empirical research on the informal sector and taxation in developing countries. In addition, a few interesting cases for further exploration in the model, are issues concerning trade and labor scarcity at higher levels of development. Lastly, political economy issues of law-implementation seem particularly interesting in the context of taxation in developing countries.

References


