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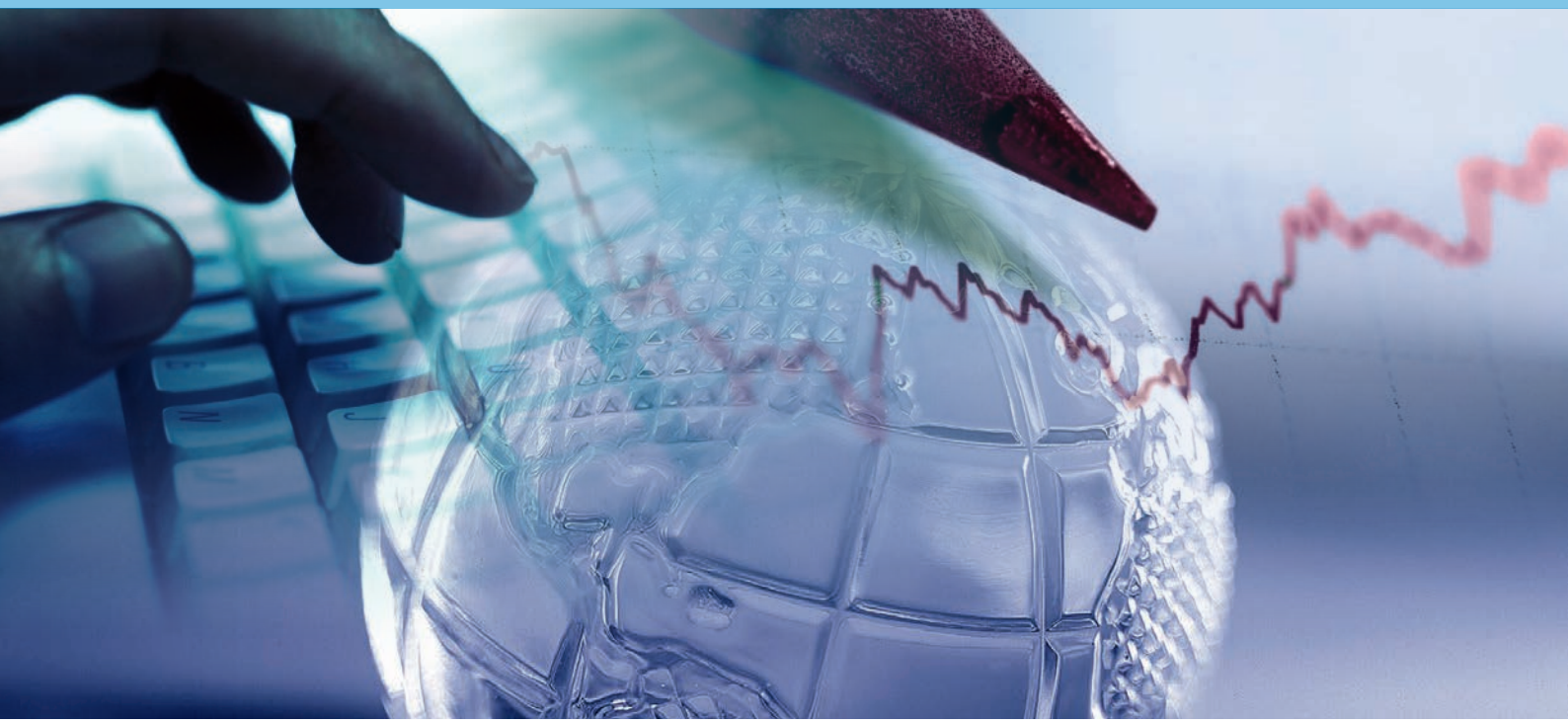

Informality in manufacturing and the economy

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Informality in manufacturing and economy

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Abstract

The informal sector in developing economies has been the subject of controversy for years. Is it a source of growth and employment or a drain on the fiscus that undermines social safety nets? This paper surveys the informal sector, with emphasis on manufacturing, both theoretically and in some empirical detail. A theoretically grounded distinction between “functional” and “juridical” informality is drawn and applied to manufacturing subcontracting. Various methodologies are employed in the paper ranging from case studies to econometrics to mathematical modelling of the relationship between productivity and employment in the formal and informal sectors. The broad conclusion is that economic theory does not support public intervention to formalize the informal sector, but rather suggests that tolerating the informal sector, especially in manufacturing, will improve overall macroeconomic performance as measured by output and employment.

1. Introduction

On average, more than half of non-agricultural employment—approximately 900 million jobs—in the developing world is in the informal sector, with another 1.1 billion in the agricultural sector (Jütting and de Laiglesia, 2009).[1] The informal economy produces output, employs labour, generates savings, makes investments and even exports occasionally. Some 50 percent of gross national savings in India and 58 percent of non-agricultural growth in Ghana originates in the informal sector (Jütting and de Laiglesia, 2009). Data limitations prevent precise estimates of the size of the informal sector by whatever definition, but the problem is not only data. There is little agreement on precisely what constitutes informality. Definitions range from the purely juridical "informal sector participants pay no taxes" to the more theoretical "the informal sector operates processes of production that do not return the average rate of profit when factors are paid their marginal products." (Gibson and Kelley, 1994). In between there are definitions that range from the nature of the product, the conditions of work–good jobs, bad jobs–to the more political: the role the informal sector plays in the conflict over the distribution of income, 'the reserve army of unemployed' that allows capital to more ruthlessly exploit labour. From a global value chain perspective, informal sectors may participate through many different linkages.

There is general agreement that the informal sector was first recognized explicitly as such by Hart (1971). Building on Gibson and Kelley (1994), this paper decomposes the definition of the informal sector into two parts: one in which informality is defined by the legal structure of the economy, *juridical* informality, and a second in which informal activity is related to the dynamics of capital accumulation and the demand for labour. The latter is referred to as *functional inequality*. This approach follows that of Ray (1998), who carefully distinguishes functional from moral problems associated with poverty and income inequality. In this paper, functional informality denotes the shortage of physical and human capital. Juridical informality, on the other hand, refers to *de jure* informality, that is firms that break or infringe the rule of law by failing to comply with legal regulations governing their trade. These include, but are not limited to, failure to register as a profit making organization, failure to obey labour and environmental regulations and a general opting out of the primary institutions governing society. The key to understanding this difference is that the latter is largely a matter of *choice* while the former has much less to do with rational choice and more about survival[2].

[1] These authors use a broad definition of the informal sector as one in which "work [is] performed outside the formal structures of the economy" by self-employed persons or very small enterprises.

[2] Despite the clarity of the definitions, in practice identifying any one firm as functionally or juridically informal may present problems. Indeed, any given firm may have elements of both functional and juridical informality, depending on jurisdiction and circumstances.

No matter how defined, the share of gross domestic product (GDP) generated by the informal sector is correlated with poverty, a distorted distribution of income and precarious forms of work. In the past, the informal sector was seen as arising from the failure of government to act as an employer of last resort. As recent as 2007, the World Bank proclaimed that informality is itself "a blunt societal indictment of the quality of the state's service provision and its enforcement capability."(Perry et al., 2007, p. 2) However, one can sense a turning of the tide towards a more benign stance against informality, abandoning what has been called 'formal sector bias' in policymaking circles. Biau (2011) notes that many

> "...international organizations [stress] the urgency of formalizing economies. At a January 2011 panel event hosted by the Organization of American States (OAS), for example, participants discussed the 'problem of the informal sector' and presented various 'roadmaps to formalization' as proposed policy responses".

Whether the turning is linked to real or imagined failures on the part of the public sector or recognition of the inherent limitations in poorly nourished and poorly educated economies, the current view calls for more inclusive institutions, both political and economic, as the foundation for sustained growth and prosperity (Acemoglu and Robinson, 2012).

The paper is organized as follows. Section two reviews profiles of the informal sector. Section three presents the analysis and the fourth section discusses policy recommendations. A fifth section concludes.

2. Profiles

Due to data limitation, the profiles of informal manufacturing enterprises are not as well-known as other informal activities or those of formal manufacturing enterprises. This section discusses the size and structure in terms of value added and employment, activities, growth, productivity, working conditions and income level of informal sector employees for different country groups and for different manufacturing sub-sectors to the extent that the data allow.

In many developing economies, the informal sector is a 'second economy' accounting for as many as 80 percent of non-agricultural jobs in sub-Saharan Africa and South Asia.[3] Traditional

[3] Estimates based on OECD (2009). The definition of informality used in this study is "…jobs or activities in the production and commercialization of legal goods and services not registered or protected by the state. Informal workers are excluded from social security benefits and the protection afforded by formal labour contracts. The majority cannot opt for better jobs which are scarce in the formal sector. Others voluntarily opt out of the formal system. For them, the savings from being fully or partly informal – no social security contributions, no tax payments, no binding labour regulations and more freedom for business activities – outweigh the benefits accrued through registration and compliance."
This is an expansive definition, including both juridical and functional aspects.

economic theory, of course, holds that job creation cannot be a goal in itself except insofar as it adds to the productive capacity of the economy. 'Jobs' is precisely what the informal sector offers. Economists are thus instinctively wary about promoting the informal sector to the extent that informality is a synonym for 'low productivity'. The second economy operating alongside the primary one is simply inferior in its contribution to human welfare. To say that the world would be better off without informality is to say nothing about the sector's contribution to public sector revenues or the rule of law or any other feature of the economy with which the presence of a large informal sector is correlated. The world would be better off if all informal workers were transformed into formal workers, only because productivity would be higher

Who they are

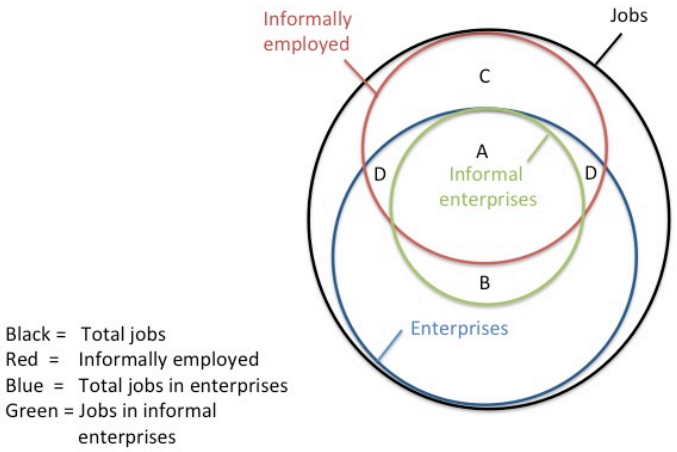
One need only look across the sea of humanity from the central overpass in Lagos to understand that the informal economy is thriving in the developing world. From street vendors and domestic workers to construction labourers, sub-contractors and curb financiers, the informal sector, always thought to have loomed large in the past, seems to have accelerated with the onset of globalization. There are many ways to characterize who the informals are. As noted, output per head employed in the informal sector is low which is primarily due to the small scale at which most informals operate. They are disorganized, unregulated and mostly self-financed. They pay sales taxes for their inputs but not on their own sales and virtually no direct tax. They neither support the public sector in any important measure nor do they attempt its capture.

Only a limited sketch of demographics of the informal sector is available. The International Labour Organization (ILO) has collected data on employment by sex in the non-agricultural sector for 47 countries. The ILO distinguishes informal jobs from informal enterprises. The latter are defined by their legal status, whether they are registered by the state (both enterprises and employees), their bookkeeping practices and the like (ILO, 2012). Data are available for informal employment, a "job-based" concept that counts employees whose main jobs lack basic social or legal protection or employment benefits such as provision for retirement, grievance and notice of termination, including severance pay, paid maternity and sick leave, educational benefits and health care coverage.

Conversely, some workers may be formally employed by the informal sector, but their numbers are vanishingly small; the overwhelming majority of workers in informal establishments are themselves informal employees (ILO, 2012). Finally, ILO data counts self-proprietors as informal workers who are not employed by informal sector enterprises. These include own-account workers (and employers) employed in their own informal sector enterprises,

contributing family workers, members of informal producers' cooperatives, paid domestic workers employed by households and own-account workers engaged in the production of goods exclusively for own final use by their household.[4]

Figure 1 Informal sector employment



Source: Author's compilation based on ILO (2012)

Figure 1 is a Venn diagram of the forms informal employment, shown by the red ring, can take following the typology developed in ILO (2012). All workers, by definition, have jobs, depicted in the figure as the black set. The set of all enterprises is illustrated by the blue ring with informal enterprises, shown in green, as a proper subset. Not all those with a job are employed by a firm: some are self-employed, shown by the black complement to the blue set. These distinctions give rise to six intersecting regions in the diagram, each of which corresponds to a type of employment. We do not discuss two of these regions since they refer to types of formal sector employment.

In region A, the intersection of the red and green sets, informal workers hold jobs with informal firms. The intersection of the green and the black complement of red, empirically very small, includes workers who hold formal jobs with informal sector firms. An example of this, based on the juridical definition of informality, starts with an unregistered firm not paying taxes and/or legally mandated wages and benefits to all workers. However, some informal firms do pay these obligations to select categories of workers, despite the firm itself being informal. These workers

[4] This definition may include workers who are not counted in total value added in the national income and product accounts. This is not necessarily the case, however, since own-use production is often imputed to GDP statistics. See the discussion on the social accounting matrix below.

then occupy region B. The opposite holds for region D, the blue complement of green, in which a formal sector firm employs informal workers. A clothing factory operating some permanent sewing lines with formal employees, but also temporary lines employing temporary workers, who may or may not receive legal wages and benefits describes this case of informal employment. The remaining region, C, the intersection of the black complement of blue and red, comprises those who are self-employed in an informal activity. Examples are informal street traders, independent construction workers, homeworkers and those who run small businesses like garment sewing, food preparation or metalworking. These people lack either human or physical capital in quantities sufficient for employment either in a formal establishment or on their own accord. This correspondence is complete, because some individuals may be mixed in with the ILO concept, who operate processes that return an adequate rate of profit, even when market wages are paid and would therefore not be considered functionally informal by the economic definition adopted in this paper.

Regions A, B and C are uncontroversial and fit most definitions of the informal sector. Region D, however, is another matter. Consider a developing country with a legal structure that specifically provides a loophole enabling employers to pay exploitative wages and no benefits to some category, possibly even racial, of workers. This example highlights the weakness of tying informality to some legal structure, which is ultimately arbitrary. These workers are juridically formal, but the ILO and other observers bend over backward to count them as informal, given their lack of coverage by the standard suite of labour legislation. "A job is informal" they write, "when it lacks basic social or legal protections or employment benefits and may be found in the formal sector, informal sector or households." (ILO 12, no page number). Uncovered temporary workers, whether by time or location, are all informal by definition. These workers may well be employed in the formal sector and specifically excluded from benefits by labour legislation. If no labour legislation exists that covers temporary workers, they cannot be juridically informal. Workers who accept such jobs are nonetheless defined by the ILO as informal. It is unclear why. Perhaps workers want such jobs or not; we do not know. This definition seems to disregard the distinction between functional and moral based analysis introduced by Ray (1998), as noted above. These workers are, however, most decidedly functionally informal *if* the production process they operate would fall into disuse if the employer had to pay proper wages and benefits. This is a strength of the distinction between juridical and functional informality, with the latter tied explicitly to economic theory.[5]

[5] The sceptical reader is referred to an example in South Africa in which the very *same company* paid different wages in two different locations, one urban and the other rural in a former homeland, with the explicit blessing of the legal authority. See Flaherty (1995) for details.

Table 1 presents the breakdown of informal employment by sex according to the most recent data from the ILO (2012). To a first approximation one can simply ignore all other countries in the developing world, besides India and China, since they account for 37 percent of the world's population and just under half the population of all developing economies. China's informal sector is small and India's is very large at 84 percent non-agricultural employment. The higher income, transitionary economies, including Russia and Serbia, confirm the inverse relationship between the relative size of the informal sector and income per capita as illustrated by the paths of China and India.

The table indicates that informal sector enterprises are the principal source of employment opportunities for low income, uneducated workers. This table slightly contradicts the idea that formal sector employers hire workers informally or outside the protected sphere. These transactions certainly exist, but in no region is the share of labour in formal enterprises higher than in their informal counterpart.

The table shows that the number of informal women in each region is greater than the number of men. The stylized fact is that men are more prominent in informal sector enterprises while women seem more willing to sequester themselves to formal firms that underpay and under-benefit them. Women seem to crowd into the informal sector with greater intensity than men. The ILO reports "in 30 of the 41 countries for which data disaggregated by sex are available, the share of women in informal employment in non-agricultural activities outnumbered that of men." (ILO, 2012, p. 2). Simple *t*-tests, however, show that the differences are insignificant, neither for the sample as a whole (t = -0.5724), nor for any of the 5 regional sub-samples (Latin America t = -1.1042, Africa, t = -1.3812, Asia, t = 0.2257, Middle East, t = 0.8483 and Transition t = 0.8215). The ILO claim is misleading as well, since population weights are not applied as they are in the regional aggregates in Table 1. Observe that women in Asia, the Middle East and transition countries are less likely to work in the informal sector than men, but this is probably due to the small sample for Asia and the transition countries and cultural bias against women working in the Middle East and transition countries.

The data is consistent, however, with the view that women are more willing to supply labour to textile, clothing and other manufacturing firms, while men are more entrepreneurial, setting up their own informal enterprises, working on their own account as independent proprietors, regions A and C in the Venn diagram above, or simply graduating to a fully formal job, while women crowd into region D. The ILO finds that 48.6 percent of women have an informal job in the manufacturing sector as compared to 31.7 percent of men and, somewhat less believable: "in

India, the share of women with an informal job in the manufacturing sector even reaches 94%." (ILO, 2012, p. 2)

Cross-country analyses using the ILO database suggest that regions A and C are highly correlated (correlation coefficient = 0.91). In addition to informal employment and informal enterprises, the published database includes unemployment rate, GDP per capita in USD (2010), the labour force participation rate as a percentage of the working age population, and percentage of the population below the national poverty line. Table 2 shows the results of some regressions on the data. The most important driver of informal sector participation is unemployment. Note, however, that when unemployment rises, informal sector participation *falls*. This suggests that informals consider their jobs to be actual jobs and not simply stand-ins for formal employment. Poverty seems to drive informal sector participation, but informal sector participation is just as powerful a driver of poverty. This simultaneity, of course, casts doubt on the interval validity of the regressions for the identification of a causal mechanism, at least in our cross-sectional data. The conclusion to be drawn from the table is that, based on the ILO data, there really is no meaningful explanation available for what causes the informal sector share to be any particular number, at least with respect to published behavioural variables.

Table 3 focuses more narrowly on the manufacturing sector and shows the breakdown of informal employment by sex according to the same ILO data. Countries without information on the breakdown by sex were dropped from the dataset. The table shares the architecture of Table 1 above for the whole economy, keeping in mind that none of the gender differences are statistically significant. Overall, informal women are well represented in manufacturing. Women are a smaller share of total informal activity in Latin American manufacturing (43 percent) than they are in the non-agricultural economy as a whole (47 percent), but their share is about the same in China and India. In Asia their share (49 percent) is even higher than in the non-agricultural economy as a whole. With respect to the percentage of total employment, women in manufacturing are underrepresented in Latin America and Africa and overrepresented in China and Asia, although the sample size is smaller than for the non-agricultural economy as whole.

Table 1 The demography of the informal sector

Region	Total		Informal Enterprise		Formal Enterprise		
	Informal Employ-ment[1,2]	Percent of Non-Ag	Informal Employ-ment[1]	Percent of Non-Ag	Informal Employ-ment[1]	Percent of Non-Ag	Total Employ-ment[1]
Latin America	94,087	51	61,366	33	32,721	18	184,024
Female	44,124	54	25,072	31	19,052	23	81,206
Male	49,963	49	36,294	35	13,669	13	102,818
	0		0		0		0
China[3]	38,073	33	24,212	21	13,861	12	116,978
Female	18,250	36	11,150	23	7,100	14	51,120
Male	19,823	30	13,062	21	6,761	10	65,857
	0		0		0		0
India	187,522	84	150,114	67	37,408	17	224,417
Female	35,268	85	24,475	59	10,793	26	41,639
Male	152,254	83	125,639	69	26,615	15	182,778
	0		0		0		0
Africa	18,878	54	14,484	41	4,394	12	35,264
Female	9,194	60	6,872	45	2,322	15	15,396
Male	9,684	49	7,612	38	2,072	10	19,868
	0		0		0		0
Asia	41,958	53	32,038	41	9,920	13	79,092
Female	18,301	51	13,458	38	4,843	14	35,609
Male	23,657	54	18,580	43	5,077	12	43,483
	0		0		0		0
Middle East	23,110	38	20,556	34	2,554	4	60,721
Female	2,240	26	1,993	23	247	3	8,746
Male	20,870	40	18,563	36	2,307	4	51,975
	0		0		0		0
Transition	10,656	12	10,432	12	224	0	86,007
Female	4,516	11	4,423	10	93	0	42,909
Male	6,140	14	6,009	14	131	0	43,099

Source: Author's calculations based on ILO (2012). Regional aggregates are: **Latin America**: Argentina (2009), Bolivia (2006), Brazil (2009), Colombia (2020), Costa Rica (2009), Dominican Rep (2009), Ecuador (2009), El Salvador (2009), Honduras (2009), Mexico (2009), Nicaragua (2009), Panama (2009), Paraguay (2009), Uruguay (2009), Venezuela (2009); **Africa**: Cote d'Ivoire (2008), Ethiopia (2004), Lesotho (2008), Liberia (2010), Madagascar (2005), Mali (2004), Mauritius (2009), Namibia (2008), South Africa (2010), Tanzania (2005/06), Uganda (2010), Zambia (2008), Zimbabwe (2004); **Asia**: Sri Lanka (2009), Indonesia (2009), Philippines (2008), Thailand (2010), Viet Nam (2009); Middle East: Egypt (2009), Pakistan (2009), Turkey (2009),West Bank & Gaza (2010); **Transition**: Armenia(2009), Kyrgyzstan (2009), Former Yugoslav Republic of Macedonia (2010), Moldova (2009), Russian Federation (2010), Serbia (2010), Ukraine (2009). Notes: 1. Thousands. 2. Sums ignore the possible existence of some formal wage employment in the informal sector. 3. Six principal cities

Table 2 Regression results

	Employment	Employment	Poverty	Poverty
Poverty	3.256e-01*	3.490e-01*		
	-1.54E-01	-1.57E-01		
GDP per capita	-1.452e-03*	-1.780e-03*	-1.36E-03	-1.39E-03
	-5.56E-04	-6.99E-04	-9.11E-04	-8.66E-04
LF participation	-1.15E-01	-3.78E-01	2.37E-01	3.30E-01
	-1.82E-01	-2.31E-01	-2.38E-01	-2.77E-01
Unemployment	-1.545e+00***	-9.259e-01**	7.85E-01	3.71E-01
	-2.43E-01	-3.04E-01	-4.64E-01	-3.58E-01
Informal employ			3.990e-01*	
			-1.64E-01	
Employ informal				3.621e-01*
				-1.50E-01
Constant	6.883e+01***	6.674e+01***	-2.35E+00	2.24E+00
	-1.41E+01	-1.58E+01	-1.68E+01	-1.83E+01
R^2-adjusted	0.457	0.367	0.18	0.19
R^2	0.516	0.434	0.269	0.275
Observations	38	39	38	39
F-stat	13.192	10.817	4.141	4.208

Source: Author's computations based on ILO (2012). Standard errors in parentheses. *** p $<$ 0.01, ** p$<$ 0.05, * p$<$ 0.1 Notes: 1. Percent of non-ag employment, 2.USD (2010)

Table 3 Informality in the manufacturing sector

Region	Employ-ment[1,2]	Percent of Non-Ag	Employ-ment[1]	Percent of Non-Ag	Employ-ment[1]	Percent of Non-Ag	Total Employ-ment[1]
Latin America	14,819	8.1	8,631	4.7	6,188	3.4	184,024
Female	6,307	7.8	3,494	4.3	2,813	3.5	81,206
Male	8,512	8.3	5,137	5.0	3,375	3.3	102,818
China[3]	4,834	4.4	2,930	2.6	1,905	1.7	110,702
Female	2,332	4.8	1,806	3.7	525	1.1	48,263
Male	2,503	4.0	1,123	1.8	1,379	2.2	62,439
India	39,231	17.6	29,949	13.5	9,282	4.2	222,448
Female	7,280	17.7	3,204	7.8	4,076	9.9	41,229
Male	31,950	17.6	26,745	14.8	5,206	2.9	181,218
Africa	1,730	7.0	1,177	4.8	554	2.2	24,630
Female	598	5.6	347	3.3	250	2.3	10,689
Male	1,132	8.1	829	5.9	303	2.2	13,941
Asia	9,790	17.4	7,131	12.7	2,659	4.7	56,296
Female	4,765	19.3	3,632	14.7	1,132	4.6	24,735
Male	5,026	15.9	3,499	11.1	1,527	4.8	31,561
Middle East	10,964	38.3	10,775	37.7	189	0.7	28,604
Female	566	19.9	510	17.9	57	2.0	2,846
Male	10,398	40.4	10,265	39.9	132	0.5	25,758
	0						
Transition	77	2.0	31	0.8	47	1.2	3,914
Female	23	1.3	7	0.4	15	0.9	1,741
Male	55	2.5	23	1.1	31	1.4	2,173

Source: Author's calculations based on ILO (2012). Countries without information on the breakdown by sex were dropped from the dataset of Table 1. Regional aggregates are: **Latin America**: Argentina (2009), Bolivia (2006), Brazil (2009), Nicaragua (2009), Panama (2009), Paraguay (2009), Uruguay (2009), Venezuela (2009); **Africa**: Liberia (2010), Mauritius (2009), South Africa (2010), Tanzania (2005/06), Uganda (2010), Zambia (2008), Zimbabwe (2004); Asia: Sri Lanka (2009), Indonesia (2009), Philippines (2008), Viet Nam (2009); **Middle East**: Pakistan (2009), West Bank & Gaza (2010); **Transition**: Armenia (2009), Former Yugoslav Republic of Macedonia (2010), Moldova (2009), Serbia (2010). Notes: 1. Thousands. 2. Sums ignore the possible existence of some formal wage employment in the informal sector. 3. Six principal cities.

The most remarkable finding in this table is that the informals share in *formal enterprises*, the last column on the right, is *larger* than the share of employment in informal enterprises. This is shown more clearly in Table 4 below. This table is simply a ratio of the data for the number of persons employed in Tables 1 and 3 above, expressed in percentage terms. In Latin America, for

example, there are 44,124 thousand females employed informally with 6,307 working in manufacturing. This is a ratio of about 14 percent as shown in the first entry of Table 4. Observe that in some cases the percentage of informal workers in manufacturing is *higher* for formal enterprises than for their informal counterparts. Table 1 shows that just under half (49 percent) of the male, non-agricultural workforce in Latin America is informal. Of that half, most work in informal establishments (35 percent of the non-agricultural workforce) while only 13 percent of the non-agricultural workforce is subsumed to the formal sector. Table 4 shows, however, that the 25 percent of those subsumed to formal sector enterprises are in manufacturing, while only 14 percent of the informal sector, running its own shop, is in manufacturing. These data show that if a Latin American male is working informally for a formal sector firm, it is more likely to be in manufacturing than in other sectors of the economy. Table 4 shows that the effect is less pronounced for women in Latin America. The same pattern can be observed throughout the rest of Table 4 although to varying degrees. The most glaring imbalance is in India, where a woman is more than three times more likely to be found working below standards in manufacturing than in the rest of the economy. This explains, in part, India's export prowess, especially in textiles, garments and related endeavours.

This striking fact is likely attributable to the high barriers to entry in manufacturing relative to the rest of the economy, trade and construction, for example. With credit rationing, informal workers have a difficult time starting up their own manufacturing concerns even if they are equipped with the appropriate human capital. Their only option for capturing some return on their investment in human capital is to offer themselves as informal workers for established formal firms. They are willing to accept reduced benefits and labour protection for a chance to work at all.

In a competitive economy, the bidding down of benefits would be recognized as a market adjustment leading to more efficient allocation of resources. Some might object, however, that the process of efficient resource allocation should avoid violation of established labour law, but strictly speaking, this scenario is fully in keeping with standard economic theory. It can then be concluded that informals in manufacturing make a more robust contribution to efficiency than their counterparts in the rest of the economy. Before they are singled out for special praise, however, it must be remembered that this repair made to the labour market distortion was caused by another distortion, viz., the one in the credit market. No one is arguing that an economy is better off with informals subsumed to formal sector capitalists; but if the financial system is insufficiently flexible to allow entrepreneurial capital to flow to qualified informals, it is perhaps a second best.

Table 4 Percentage of informal labour in manufacturing

Region	Total[1,2]	Informal Enter[1]	Formal Enter[1]
Latin America	16	14	19
Female	14	14	15
Male	17	14	25
China[3]	13	12	14
Female	13	16	7
Male	13	9	20
India	21	20	25
Female	21	13	38
Male	21	21	20
Africa	9	8	12
Female	6	5	10
Male	12	11	14
Asia	23	22	27
Female	26	27	23
Male	21	19	30
Middle East	47	52	7
Female	25	26	23
Male	50	55	6
Transition	1	0	21
Female	1	0	17
Male	1	0	24

Source: Author's computations based on Tables 1 and 3

The definitions of the informal sector advanced here operate at a very high level of abstraction. Box 1 shows that in the real world, the informal sector means many things to many people. While messy, these features can still be organized along the functional/juridical informality axis.

In thinking about the theoretical distinction, it is important to see that the laws enacted around informality are not products of economic analysis but of arbitrary and sometimes conflicting legal requirements. Indeed, firms may be juridically formal at one governmental level (city vs. state, for example), but informal at another. Legal authorities do not and indeed cannot usually determine whether a firm is permanently unprofitable or only temporarily so as it begins its metamorphosis to formality. Recall that Facebook, Amazon and Google were highly successful

in equity markets long before they earned any profit. None of these firms were in business because the owners were incapable of earning a living any other way, yet each could at some point in their history be classified as juridically informal. The legal establishment has only blunt instruments and does not even try to distinguish infant industries from their survivalist counterparts. In treating them all the same, however, government policy can block the transition of juridically informal firms to formal status.

Box 1 Salient characteristics

Kabra (1995) states that some 30 terms have been used to characterize the informal sector. Its main features are:

- Low productivity due to low human and physical capital inputs
- No significant barriers to entry leading to highly competitive markets
- Strong decreasing returns to scale (non-scalable) production technologies with limited attention to best-practice methods
- Individual proprietorship
- Self-financed or limited reliance on external finance
- Low tax burden (non-zero including bribes)
- Unregulated labour contracts, with no health or social security
- Low level of organizational modularity
- Limited adherence to labour and environmental standards
- High transaction costs
- Limited civil liability (judgement proof)
- Uninsured against natural or catastrophic loss

The education gap

Verick (2006) notes that 37 percent of workers in South Africa's informal economy had not completed primary school compared to only 16 percent in the formal sector. This will, of course, change as more and more educated workers find their way into the informal sector. In the urban informal sector in Bolivia, the odds ratio for informal salaried work compared to formal sector college graduates is more than 14 to 1 for incomplete primary education, 7 to 1 for primary complete and secondary incomplete education, dropping to some 5 to 1 for secondary complete education (Perry et al., 2007). In Bangladesh in 2010, 96.1 percent of total employment of those with no education was informally employed. For primary education, the percentage fell to 93.1 percent, for secondary education, 87.5 percent and for a secondary certificate (a higher degree), 65 percent (ADB, 2010). Even of medical and engineering degree holders, some 27.5 percent are informals[6].

[6] Banerjee and Duflo (2012) provide interesting accounts of how some of these individuals secured their degrees and

Table 5 Odds ratio compared to formal salaried college graduates

Country and employment type	Primary incomplete	Primary complete	Secondary incomplete	Secondary complete	College incomplete
Informal Self-employment					
Dominican Republic[1]	1.9	1.7	1.8	1	1
Argentina[2]	2.2	1.6	1.6	0.8	1.4
Bolivia[1]	8.5	5.6	5.5	2.6	2.5
Informal Salaried employment					
Dominican Republic[1]	2.5	2.4	2.5	1.8	1.5
Argentina[2]	6	3.2	2.8	1.4	1.3
Bolivia[1]	15.2	7	7.2	4.8	3.9

Source: Author's calculations based on Perry et al., 2007, p. 82. Notes. 1. Urban. 2. Greater Buenos Aires

One way of thinking about the informal sector is to compute the probability that one will land a job in the formal salaried sector. This probability *should* increase with education if the market is efficient at sorting. The winners take formal salaried positions and the losers retreat to the informal sector to work on their own account or for some other unfortunate who has also lost the lottery. The keys to understanding Table 5 are (1) the market will not generally perfectly sort on education, and (2) there may be excess supply of college graduates, the highest educational level in the table. The first point injects randomness into the search for formal jobs. The second maintains that even if sorting is perfect, some college graduates will remain without formal jobs if there is a shortage of formal jobs relative to the number of college graduates who want them.

Note that if the labour market were incapable of sorting on education, say a version of the children's game of musical chairs with the luckiest seated and the less fortunate left to informality, the odds ratio in the table would all be one. More educated individuals would not get priority so that their chance of a formal sector job is the same as for those with less education. If the labour market is at all efficient and some sorting does take place, then some college graduates will still lose out to some less well educated, but luckier individuals since firms cannot always find and hire the most educated workers. The college graduate could find herself in the informal sector and the odds ratio would rise above one.

Table 5 shows how these probabilities change with various levels of education. A self-employed Bolivian, for example, with some high school but no degree, is 5.5 times more likely to have lost out in the formal job lottery than her college educated colleague. The table suggests that the Dominican Republic and Argentina have less efficient labour markets, so that for a given

the efficiency with which they treat minor aliments of the local populations. Major aliments, they note, are usually left to witchdoctors, shamans, spiritualists and herbalists, for obvious reasons.

individual, some high school will only be 1.8 and 1.6 times more likely to be an informal relative to a college graduate. Even if labour markets were equally efficient at sorting on education, a large excess supply of college graduates would increase the probability that one would turn up in the informal sector and thus reduce the odds ratio. This factor is probably at work in the Dominican Republic and Argentina and less so in Bolivia.

The decreasing odds ratios from left to right in Table 5 show that even in developing countries with significant asymmetric information, the labour market is a reasonably good sorting mechanism, at least on education if not on other more latent variables. It is impossible to conclude anything other than that more education increases the likelihood of formal employment, even in imperfectly functioning markets in disequilibrium causing excess supply of labour at all education levels.

Table 6 presents informal sector participation by age. The data suggest that informal sector participation declines with age and is somewhat higher for men than women in the three countries surveyed. Duration in the informal sector also declines with age but rises with education, suggesting that human capital plays an important role in the longevity of informal enterprises.

To summarize this section, demographic data suggest that informal sector participation largely follows economic theory in that those with more human and physical capital sort themselves into formal sector activity. Younger, less educated, less experienced workers are more likely to be informal and women are favoured in their ranks. Without the distinction between juridical and functional informality, little more can be said. Informal workers who manage to find jobs in formal sector activities, however, are typically juridically informal. These workers shift out the supply curve for labour and cause real wage to fall as they subsume themselves to formal firms. Juridical informality thus contributes to the global competitiveness of the sector. Gibson (2005), however, shows that when informality crowds out educational opportunities for the young, long-term competitiveness will likely suffer since the supply of skilled labour will be reduced.

Table 6 Ratio of informal to formal sector employment shares by age

Country	All		14 - 24		24 - 40		40 - 60	
	Male	Female	Male	Female	Male	Female	Male	Female
Argentina	37	47	94	67	28	42	24	50
Brazil	33	50	43	46	22	48	32	69
Mexico	24	29	45	33	15	19	15	29

Source: Author's calculations from Bosch and Maloney, 2005

The fact that informal sector activity goes unaccounted for in GDP does not mean that informals fail to contribute to aggregate demand. They do, and this can lead to an underestimate of the savings rate in the economy since more consumption is registered than income. Methodologies to study the informal sector cannot depend heavily on recorded history in the national income and product accounts. Informals present an indirect image of themselves through their impact on the demand side. Their contribution on the supply side must be estimated rather than measured and counterfactual methods, simulation or econometrics are often employed to gauge an implied presence.

The existence of the informal sector is primarily a problem for the public sector. Indeed the informal sector is often defined in terms of unwillingness to participate in the fiscal system, pay taxes, obey labour and environmental laws and other restrictions on their ability to earn profits[7]. There is nothing in economic theory that suggests that these units *should* pay taxes or *must* participate in the formal economy. On the other hand, informal production processes are usually defective in the following way: when evaluated at the market prices for labour and raw materials, the informal process does not return the going rate of profit. The processes operated by informals are defective in the sense that they would not be observed in a competitive, full employment economy (Gibson and Kelley, 1994). The only reason these production technologies are used at all is because their operators are forced to use them by the necessity to survive. One of the main implications of the distinction between functional and juridical informality drawn here is that the former is a legitimate problem for economic theory while the latter is a problem for public sector incomes.

Whether functional or juridical, the informal sector directly and indirectly improves the functioning of the economy as follows. First and foremost, informals contribute directly to the GDP, despite their latency (Schneider and Ernst, 2000). Second, they directly assist the efficient

[7] Environmental concerns slow growth according to standard models, but this may be desirable from a public goods perspective.

allocation of scarce resources in two broad dimensions. First, they help adjust wages to their shadow values by enabling employers to use labour more intensively than if all were paid the formal wage. Capital intensities come to better reflect factor endowments. This is despite the effort of global capital to impose a mismatch as they combine high technology with low wages. The informal sector may well have grown with the rise in global trade and investment, but it is clear that it has also allowed globalization to proceed apace by providing a safety net for those who did not directly share its bounty. McMillan and Rodrik (2011) argue, for example, that many post-globalization economies show large inter-sectoral productivity gaps and persistently high unemployment. As seen in the regressions above, high unemployment is negatively correlated with informal sector activity in the ILO data. This suggests a time sequence: globalization causes a rise in unemployment and a drop in wages, and formal processes become slightly more labour intensive; the balance of the labour force must then find work to survive and turns to the informal sector as their best alternative. A bifurcation arises in working conditions, with the few enjoying modern production facilities while the many are displaced to the informal service sector. Table 7 shows the productivity and value added differences for Bangladesh as illustrative of the general trend.

Table 7 Jobs and value added in Bangladesh

	Number of jobs[1]		Gross value added[2]	
	Formal	Informal	Formal	Informal
Agriculture, hunting, forestry and fishery	5016	21453	39.1	49
Manufacturing	1323	5170	562.1	88.5
Wholesale and retail trade	2225	4935	149.7	135.7
Construction	363	2243	1028.6	81.6
Community and personal services	643	2926	821.7	53.3

Source: ADB (2010, p. 30)
1. Thousands. 2. Thousands of BDT per job.

The informal economy may or may not scale with the formal economy. Many of the characteristics featured in Box 1 above prevent informal processes from scaling in any meaningful way. Yet, informal subcontracting provides a powerful example of informal processes that do scale to the formal economy. They can remain juridically informal, but like other start-ups, are not economically tied to the small scale with which they begin. They have access to labour and capital to flexibly expand production when formal producers subcontract out excess demand. At any given moment, the firms may well operate informally, disregarding labour and environmental laws even while earning large profits. The role these firms play is one of backstopping demand that their formal counterparts cannot satisfy, however, and so while profitability might be high in one period, it can quickly plunge to zero or negative when demand

is slack. These firms are in no position to be taxed as formal entities, even though from time to time, they might appear quite profitable. Whether they eventually transition to full formality depends on the overall macroeconomic and trade environment in which the country operates. McMillan and Rodrik (2011) note that the role of the real exchange rate is crucial here and that juridically informal firms may matriculate with good policies, not with bad ones.

This all suggests a relatively simple conceptual matrix, illustrated in Table 8, involving both functional and juridical informality and scalable and non-scalable technologies. Non-scalability is usually due to transaction costs, informational constraints and lack of basic scientific knowledge about how the world actually works, discussed in more detail below. One of the key questions addressed in this paper is whether formal and informal activity is positively or negatively correlated. The answer is not self-evident and the analytical framework shows how both outcomes are possible.

Table 8 Correlation between formal and informal output/formal employment following a rise in formal sector demand

	Scalable[1]	Non-scalable
Functional	⊕/⊕	⊖/⊕
Juridical	⊕/0	⊖/⊕

Source: Author's compilation.
Note: 1. Sign of the correlation coefficient

As the first quadrant of Table 8 shows, a rise in demand for formal output will cause a rise in scalable informal output and an increase in formal sector employment. The informal sector is better off because (1) some of its workforce has abandoned its processes and taken a job in the formal sector; (2) scalable processes produce higher returns. In the second column of the first row, the increase in formal sector employment is also positive and the output of non-scalable processes therefore declines. In juridical informality (second row), the rise in formal sector output increases demand and scalable processes respond. In the last element (second row and second column), skilled workers in juridical processes cannot increase their output and some take formal jobs.

Poverty and informality are not coterminous. Poverty arises from the absence of economic growth, as does the functional informal sector. From the perspective of economic theory, it makes little sense to distinguish informal entrepreneurs from other entrepreneurs. Indeed, evading the limitations imposed by formality may itself be an aspect of entrepreneurship (see Box 2).

The admonition that the poor just need opportunities and to then get out of the way, is a common attitude among those who support the emergence of more inclusive political and economic institutions. Yunus and other promoters of microfinance take a bottom-up approach to economic development (Yunus, 2003).

Banerjee and Duflo (2012) argue that it is not necessary for all to escape poverty in the same way; the only requirement is that those who have good ideas and high marginal rates of return should be given an opportunity to succeed. A biological constraint binds, reducing savings rates as family income brushes up against it. Banerjee and Duflo (2012) emphasize multiple equilibria, or poverty traps, that force the poor to turn to informality. Focusing on their S-shaped geometry that relates effort to return is a significant contribution to the discussion of informality. Many of the technologies employed by the informal poor cannot be scaled (see Box 2). Micro-entrepreneurs residing in a low-level local equilibrium have little incentive to increase savings and often turn down offers of finance since technological indivisibilities imply a much larger investment to escape the local region of the technology. These indivisibilities essentially deprive them of the investment opportunities others, including government, might imagine they have.

Box 2 Reluctant entrepreneurs

A businessman sitting next to us on a plane many years ago described how, when he returned to India in the mid-1970s after completing his MBA in the United States, his uncle had taken him out for a lesson in true entrepreneurship. It was early one morning when he and his uncle headed from the Bombay (as Mumbai was then called) Stock Exchange. But instead of going into the modern tower that houses the exchange, his uncle wanted him to observe four women who were sitting on the sidewalk, facing the road in front of the exchange. The aspiring businessman and his uncle stood for a few moments watching them. The women mostly did nothing. But occasionally when the traffic stopped, they would get up, scrape something off the road, and put it in plastic carrier bags next to them...the uncle asked him if he understood their business model...Every morning before dawn the women went to the beach and collected wet sea sand. They then laid it evenly on the street before the real traffic began. When the cars started driving over the sand, the heat from the wheels dried it. [The women then brought the sand back] to the slum to sell in small packets made from discarded newspapers. The local women used the dried sand to scrub their dishes... This, the uncle reckoned, was true entrepreneurship: if you have very little, use your ingenuity to create something out of nothing.

Taken together, [the] evidence makes us seriously doubt the idea that the average small business owner is a natural "entrepreneur" in the way we generally understand the term, meaning someone whose business has the potential to grow and who is able to take risks, works hard and keeps trying to make it happen in the face of multiple hardships. We are, of course, not saying that there are no genuine entrepreneurs among the poor–we have met many such people. But there are also many of them who run a business that is doomed to remain small and unprofitable.

Acemoglu and Robinson (2012) contend that "inclusive economic and political institutions" are based on the government having a monopoly on force in order to promote cooperation over coercion. Institutions that define and protect property rights would seem to be central. deSoto (1989), however, effectively argues that in defining 'legitimate' commercial conduct and adjudicating property disputes in ways consistent with the formal legal system, political and thus economic institutions become less, rather than more, inclusive. The informal sector largely operates outside of this formal institutional fortress; it often cannot participate for reasons of legacy, illiteracy or other insurmountable transaction costs. Not only do informal entrepreneurs lack access to the benefits conferred by formal institutions, they are at the same time sometimes defined as enemies of the state, outlaws, in effect (Acemoglu and Robinson, 2012). The wide berth of informality implies that enforcement activities of necessity are probabilistic. deSoto's (1989) work has been a landmark in the field since it has changed the thinking about the nature of informality. Reforms that reduced the repression of informal activity are, by definition, market friendly.

Adverse possession, the legal doctrine that awards ownership after years of use or occupancy, is an orderly approach to property redistribution in developing economies in the housing sector. Protecting antiquated property rights rooted in ancient or pre-capitalist traditions cannot be defended as 'inclusive' in the sense of Acemoglu and Robinson (2012). While governments can hardly be blamed for their widespread inability to solve housing crises, neither should they stand in the way when alternative institutions emerge that can and do address these needs. Market friendly reforms, such as institutionalization of property rights and microfinance initiatives and micro-pension schemes for informal workers, have "cast informality as a force for inclusive economic development in poor countries." (Biau, 2011)

Informal workers who are unconstrained by either poverty traps or proximity to the subsistence minima are not economically different from other agents in the system. They are not forced to operate defective production processes. Even if they cannot cover fixed costs, they can and should stay in business if they cover variable costs. Each incremental deviation from the equilibrium rate of profit can then be considered a further investment in the capital base of their firm. While these firms may be unregistered, fail to pay taxes or obey labour laws, they are still not economically informal since they can be seen as investing in a transition to full formality. To refer to them as informal is equivalent to describing a medical, law or finance student as poor simply because they subject to the subsistence constraint while in school, residency or even awaiting their first pay check. What is needed is something akin to Friedman's Permanent Income hypothesis, which suggests that discounted future earnings play a role in the

determination of informality. The poor women described in Box 2 do not pretend to have calculated any such discounted sum and are properly considered economically and functionally informal.

Informal jobs are often anything but modern. Dangerous, dirty, risky and demeaning, they are sometimes "purchased" with years of family savings augmented by debt, contracted at usurious interest rates (Banerjee and Duflo, 2012). According to Banerjee and Duflo (2012), informal workers are not true entrepreneurs but rather have used their small savings to obtain a job for themselves. They describe Pak Awan, from Circa Das, a slum in Bangdun, Indonesia, who in 2008 needed to supplement the irregular income he earned as a construction worker. His wife wanted a factory job, but was unable to pass the qualifying exams. "Starting a small business", they write, "was the only option they had." She started by baking snacks and selling them in the city, but in order to be able to be at home with the children, Pak Awan secured a loan from a cooperative to open a small shop "...even though there were already two shops within 50 yards."

Women's empowerment and informality

Perhaps the most direct effect of informality in developing countries is on women's fertility decisions. This, in turn, leads to changes in human capital investment per child and is thus closely associated with growth in income per capita. Kabeer (2013) notes that apart from public sector employment, women in Egypt who took up informal self-employment consistently reported positive and significant responses on empowerment indicators ranging from (1) who decides the use of income to (2) health decisions to (3) women's contribution valued by their families, and (4) control over their own lives. Women who worked in the informal sector were more likely to have access to and use formal savings and credit facilities than their formal counterparts. This link to the capital market by informals relates to microfinance and also allows women to save, since they are less likely to squander any small surplus on consumption (e.g. alcohol) by family and extended family members (Boudreaux and Cowen, 2008).

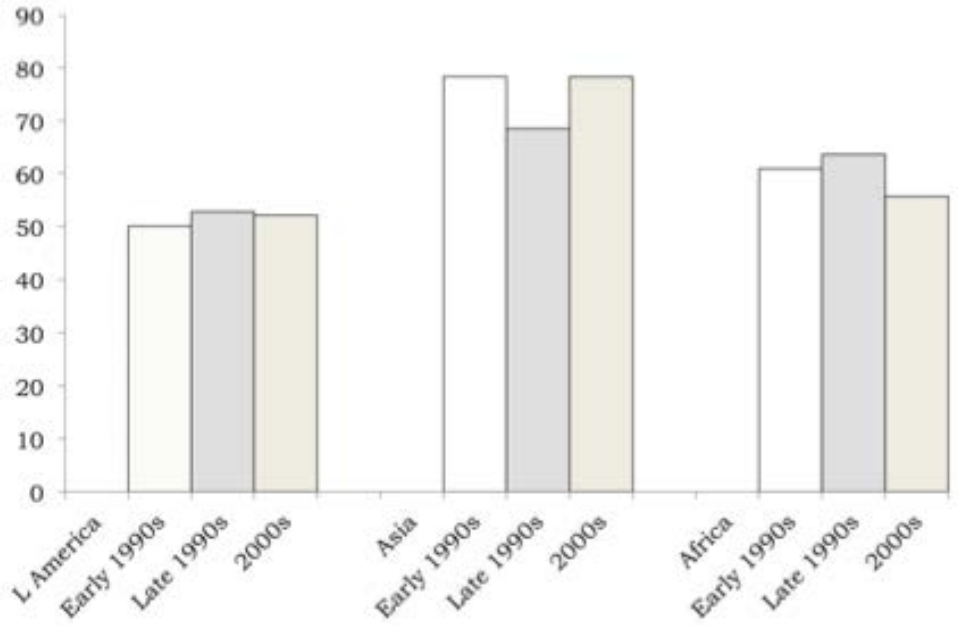
Evolution of the informal sector

The regressions above certainly suggest that as income per capita grows, the informal sector tends to disappear on its own. If the production processes operated by informals are in fact defective, they will be replaced by more productive technologies as capital accumulation proceeds. Functional informality should decline but what of juridical informality? To the extent that this is a choice, there is no *a priori* reason to think that its presence should diminish as countries grow richer. The trend towards hiring consultants and more reliance on job-shoppers and temporary workers is a salient feature of 21st century capitalism. Moreover, self-

employment might be an economic response to the increasing share of GDP in services as countries develop. These are structural changes: the transition from an agricultural to an industrial economy is often accompanied by a drop in female labour because subsistence jobs are lost. Economies of scale are weaker in services than in manufacturing, perhaps reducing optimal firm size. Could these factors, the appeal of skirting labour laws, and the rise of the service sector produce a *u*-shaped curve for self-employment?

The data suggest that the presence of the informal sector fits the common stereotype that it is more prevalent in poorer countries, the largest being in sub-Saharan Africa. There it accounts for some 60 percent to 80 percent of total non-agricultural employment (Charmes, 1998). Next is South and Southeast Asia. Estimates range from 73.7 percent of non-agricultural employment for India, 77.9 percent for Indonesia and somewhat smaller 67.1 percent for Pakistan, 66.9 percent for the Philippines and 51.4 percent for Thailand. Informality for Latin America and North Africa is less, estimated to range from 30 percent to 60 percent of non-agricultural employment (Charmes, 1998, 2000). The informal sector in Eastern Europe is considerably smaller and depends on how it is conceptualized. Top estimates are in the 20 percent range, but much of this informality is less authentically related to physical and human capital limitations, and will diminish as the institutional transformation becomes more complete.

Figure 2 Informal sector by region



Source: IILS (2009), Sinha (2011)

Figure 2 shows the recent evolution of the informality in three regions of the world in a period of very rapid growth for the world economy as a whole. These aggregates fail to show any statistically discernable trend. The McMillan and Rodrik's (2011) explanation seems to be evident here: if informality does disappear in the long-run, the processes by which economies grow and develop may well create more informality in traverse. At a minimum, the figure suggests that there is no smooth monotonic relationship between growth income per capita and the share of informal employment in total employment as the process of development unfolds.

Evolution of self-employment

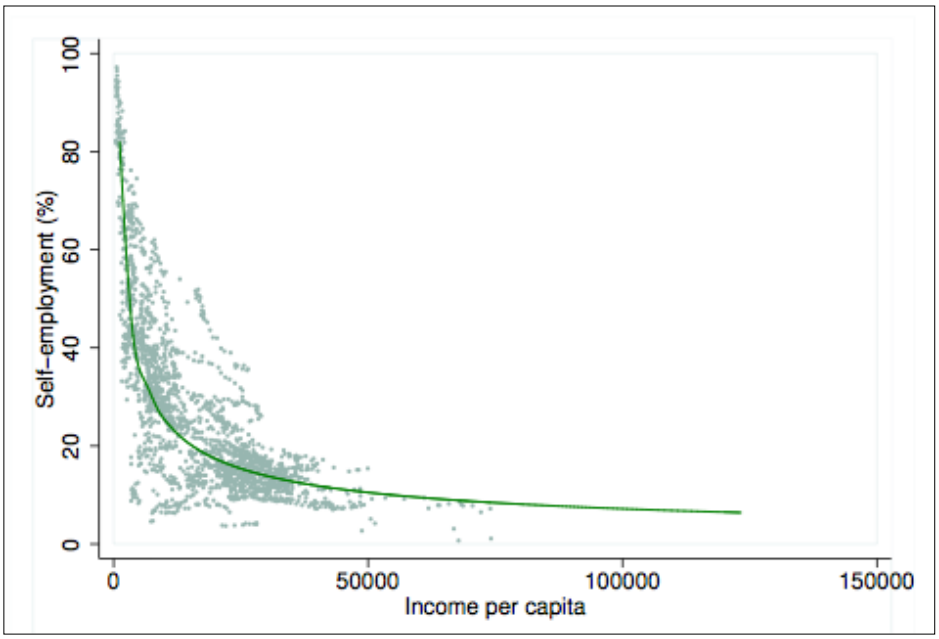
Figure 3 shows the relationship between the level of self-employment and income per capita for 246 countries in the World Bank database over the period 1986-2011. Although there are many data points, the diagram clearly indicates a downward relationship between self-employment and income per capita. In fact, the relationship is best described as a 'power law', with a critical exponent of 0.549.[8] The power law indicates an 80-20 percent relationship or Pareto distribution in which most countries (80 percent) have a very small percentage of self-employed workers for most years, while a few (20 percent) have a very large percentage of self-employed workers. Interestingly, the dataset suggests that over time, the amount of self-employment increases at every level of income per capita. Two-way fixed effects regressions indicate that the coefficients on time dummies were consistently negative from 1980 to 2000. Thereafter, the coefficients turned positive and remained so until 2008. None were significant, but the sign pattern is nonetheless consistent with the view that independent contractors, consultants and self-proprietors have become increasingly common across all countries during this period of time. This, of course, has very little to do with informality in the functional sense of the term.

Biau (2011) asserts an inverted *U* relationship, suggesting that in the early stages of development, informals meaningfully contribute to aggregate investment and thus capital accumulation and growth. The effect is not, however, cleanly identified in that investment might initially increase for reasons entirely unrelated to informality. The alternative hypothesis, just discussed, is that low wages in surplus labour economies offset other disadvantages, such as poor infrastructure, limited human capital, public sector corruption and crime that would limit

[8] A power law distribution is a distribution characterized by *scale invariance.* The distribution is written $f(x) = ax^k$, where *x* is the scaling of the argument and *k* is the critical exponent. Taking natural logs of both sides of this expression, we obtain *ln(f)=ln(a)+ k ln(x),* a linear function in log-log space. A simple regression can easily recover the critical exponent from the dataset. Power law distributions signal the presence of some underlying intention in the modeled population. Human height, for example, is better described by the normal or Gaussian distribution. Were it power law instead, most (80 percent) of people would be short, say, one metre, but it would not be unusual to see people who were 5 metres tall. Power laws describe the distribution of firm sizes in modern economies. The law applies because firm size reflects some underlying intension of their owners, in this case, perhaps, to gain market share. They are also known as "at tailed" distributions or Zipf's law. See Laherrère and Sornette (1998).

foreign investment. A burst of growth in output unaccompanied by a rise in labour demand would then be correlated with, but not caused by, a rise in informality. Biau (2011) realizes that a direct measure of informality is not possible within the confines of ordinary national income and product account analysis. The identification of informal activity in the macro economy is taken up in more detail below, but it is important to flag this problem at the outset. Biau (2011) hypothesizes an "informal Kuznets curve," an inverted *U* with growth on the y-axis and some measure of informality on the *x*-axis. As the latter increases, so, too, does the contribution to per capita income growth. At some point, however, further increments in informal activity dampen growth. The curve reaches its extreme value and turns down thereafter. Here, the contribution of the informal sector is in raising the ratio of total investment or savings to GDP. This innovative methodology partially circumvents the problem of measuring the level of informal *production* since informality is measured on the *demand* rather than on the supply side. To the extent that the informal sector demands investment goods from informal suppliers, mostly construction, the effect of informality is still underestimated. Investment in the national income and product account (NIPA) data does indeed incorporate investment by origin undertaken by all agents in the system, firms, households, governments and foreign governments, independent of their formal/informal status. Investment by *destination* is much more problematic and is ignored in the NIPA accounts.

Figure 3 Self-employment



Source: Author's calculations based on World Bank (2012)

The informal sector and growth

Since Mankiw et al. (1992), many observers have come to believe that growth depends on a small number of variables only. Still, the growth path of an economy with an informal sector is more complex than the simple Solow model, with or without technological change and human capital (Gibson, 2005). So long as the wage-rental ratio is constant, so, too, will be the optimal capital-labour ratio in the cost-minimization problem. In this case, there is a simple relationship governing the correlation between formal and informal employment opportunities. As long as the rate of output growth in the formal sector is greater than the rate of productivity growth, employment in the formal sector will rise.

The next step is population growth: so long as the ratio of the labour force to population has no trend, and it certainly could not in the long run, the average rate of growth of the latter is the same as that of the former. Similarly, if there is no trend in the rate of unemployment, the difference between the rate of output growth and the rate of productivity growth in the formal sector must exceed the population growth rate for the formal sector to shrink. This is difficult to achieve in most countries, to say the least. Population growth rates fall reliably with income per capita, but productivity growth in the formal sector can be very high, especially if it is driven by foreign, capital intensive direct investment.

Formal sector evolution is not always consistent with increasing job opportunities at higher wages, but in the long run, it must in a growing world economy. This is tautological if there is growth in terms of per capita income, but this obvious point is often ignored, suppressed, forgotten or deprecated. The formal sector need not provide any jobs for informal sector workers for the economy as a whole to grow. Even if this were to happen, the informal sector would still benefit from the extra demand workers already employed in the formal sector will add to the economy. What happens next is crucial to growth accounting. Functional informal sector workers cannot typically scale up their production processes due to lack of savings, inadequate access to capital markets, shortage of demand and decreasing returns to scale. If the barriers to growth and investment are caused by fixed transaction costs, as emphasized by Easterly (2002) and many others, then they are self-correcting, albeit slowly, and there is not a poverty trap that keeps the poor down. If demand is seen as stable over a sufficiently long time horizon, the informal sector producer will eventually realize that the non-scalable technology will have to be scrapped and a new, more productive technology adopted as a replacement. It may be the case that any given entrepreneur fails to see the emerging opportunity, but if it is there and the market is competitive, then someone will recognize that the new technology is likely to be profitable. If so, then the informal sector firm can eventually graduate to formality.

Direct linkages, workers leaving informal jobs for new formal vacancies, are not necessary for this process to unfold in this way. The market mechanism itself can convert informal jobs into formal ones by changing the structure of relative prices.

Informal employment in manufacturing: share in total employment of the activity

Table 9 shows the relative size of informal employment in each of a sample of 10 countries for the most recent data available (ILO, 2012). The data shows that manufacturing informality varies widely from a low of 17.1 percent in China to almost the entire manufacturing labour force in India. The unweighted average is about 45 percent, but as shall be seen below, this is close to meaningless.

Table 9 Informal employment: share in total employment of the activity

	Brazil[1]	*China*[2]	*Côte d'Ivoire*[3]	*India*[4]	*Indonesia*[5]
Transportation	39	35.2	66.8	84.5	91.9
Construction	67.5	21.8	73.1	97.6	77.9
Manufacturing	31.7	17.1	68	97.2	90.9
Trade	45	59.6	92.5	87.1	56.5
Services	41.5	27.6	54.3	59.9	65.8
All non-ag	42.2	32.4	69.7	83.6	72.5
GNI per capita	10,210	7,520	1,720	3,330	4,180
Population	193	1,338	19	1,225	240
GDP	1,622	5,931	23	1,684	708
GDP growth	-0.3	10	2	10	6
Life expectancy	73	73	53	65	69
	Mexico[6]	*Pakistan*[7]	*S. Africa*[8]	*Thailand*[9]	*Turkey*[10]
Transportation	57.1	84.9	34.6	49.8	35
Construction	77.8	96.7	47.8	46.4	55.2
Manufacturing	42.9	41.5	19.4	21.2	26.5
Trade	39.9	80	42.7	66.1	39.6
Services	65.8	96.1	28.7	36	17.1
All non-ag	53.7	78.4	32.7	42.3	30.1
GNI per capita	13,530	2,760	10,310	8,130	15,680
Population	112	174	50	69	73
GDP	880	176	364	319	731
GDP growth	-6.0	3.5	2.9	7.8	9.2
Life expectancy	76	65	52	74	74

Source: ILO (2012)
Notes: 1. 2009, 2. 2010, 3. 2008, 4. 2009-2010, 5. 2009, 6. 2009, 7. 2009-2010, 8. 2010, 9. 2010, 10. 2009, *11.* Other than trade or transportation, 12. PPP, 13. Millions, 14. USD, 15. Percent, 16. At birth (yrs).

The manufacturing sector share of total employment is also shown in Figure 4. Each country is shown in the figure by a data point in proportion to the population. The results of an unweighted regression are also shown on the figure with a *t*-stat of -2.58 based on robust standard errors [*p*-value = 0.032].

When the regression is population weighted, as shown in Figure 4, the coefficient doubles and the *t*-stat increases by a factor of 3. There is a similar negative relationship for trade but with less dispersion than in manufacturing: R^2 = 0.8 for trade and R^2 = 0.38 for manufacturing. The *t*-stat of -5.73 is based on robust standard errors [p-value = 0.00]. Transportation follows a very similar pattern, with virtually the same coefficient as trade and manufacturing and an R^2 = 0.54. The coefficient is again significant with a p-value of 0.01. The other sectors are not so closely linked with per capita income, however. Construction and services show no discernible relationship to per capita income: the null of no relationship between per capita income and the share of the informal sector cannot be rejected and the regression only explains 18 percent of the variance. There is a similar result for services. With frequency weights, the coefficients are significant in all the regressions. A glance at Figure 4 reveals why this may be the case: since China is more developed than India and has a much smaller informal sector, the relationships become much stronger than when Côte d'Ivoire and the rest of the small countries in the sample are given equal weights. It cannot be said that China and India *bias* the results, however, since the weights are needed to see the effect of an individual's per capita income on informality.

Table 10 Weighted regression results[1]

	1 Transportation	2 Construction	3 Manufacturing	4 Trade
Income *per capita*	-0.004**	-0.002	-0.004*	-0.004***
	-0.001	-0.001	-0.001	-0.001
Constant	85.278***	82.818***	75.248**	89.906***
	-9.486	-11.661	-16.29	-6.754
R^2-adjusted	0.486	0.083	0.298	0.771
R^2	0.54	0.19	0.38	0.80
Observations	10	10	10	10
F-stat	12.60	3.46	6.67	32.80

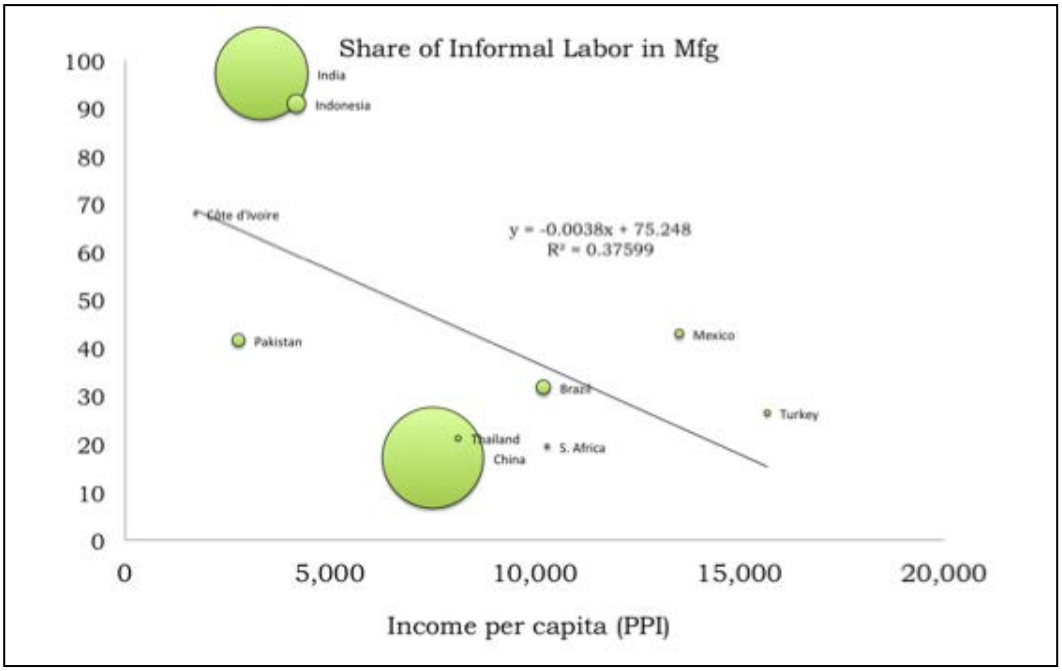
Source: Author's computations based on ILO (2012). Standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1

Note: 1. The dependent variable is the share of informals

All countries seem to exhibit structural change in GDP shares from a dominant agricultural sector to a dominant manufacturing sector later to ultimately a dominant service sector. Hence, the decline in informal manufacturing or manufacturing in general may be due to longer-term structural change. The main point is that since these features are causally linked to growth in income per capita, any correlate with the informal sector is unlikely to be causal. In other words, the profound structural change that takes place as the economy develops from a mainly agrarian to a manufacturing and finally to a service dominated system reflects deep seated preferences on the part of consumers. Along the growth path, the informal sector can expand, contract, then

expand again and then finally contract. Its size relative to the rest of the economy, however, is derivative and probably does not much affect how the economy progresses along its long-term growth path.

Figure 4 Share of informal labour in total employment in manufacturing



Informality and income per capita

Schneider et al. (2010) report on a very ambitious effort to measure the size of the 'shadow economy' in 162 countries from 1999 to 2006. This well designed study examines the same broad concept of the informal economy as used by the ILO in that it includes juridical as well functional informality. The authors employ a latent variable econometric approach, known as multiple indicators multiple causes (MIMIC), to estimate the size of the shadow economy for their dataset of 162 countries from 1999 to 2006. This method is suitable because of the unobserved nature of shadow activity. The effect of unobserved variables can, however, only be measured in terms of their effect on observed variables. Hence, the data field is divided into causes and indicators. As a result, the method combines calibration and standard estimation and is thus not free of criticism. It does, however, provide consistent panel data from which some conclusions can be drawn[9].

According to Schneider et al.'s (2010) estimates, the size of the shadow economy as a percentage of published GDP in 2006 is 38.7 percent for developing countries (*n = 98*). This implies that for developing economies, just over 25 percent of total (formal plus informal) GDP

[9] An exposition of the method is beyond the scope of this paper.

is informal. The corresponding percentages for the transition economies of Eastern Europe and Central Asia are 21 percent (17 percent of the total) and 18.7 percent or 15.7 percent of the total for high-income economies in all regions.

The presence of functional informality in developed economies is limited to non-existence. Few in the developed economies would choose to work with low productivity processes because the capital stock was insufficient to hire them formally. The same is true for human capital. The theoretical framework adopted here suggests that any shortage of physical or human capital is due to the high opportunity cost in leisure and is therefore a matter of choice. Functional informality is not a matter of choice, but a constraint that agents in less developed economies face out of biological necessity. Nonetheless, Schneider et al. (2010) report a significant shadow economy in the developed world.

The shadow economy is a broader concept than functional informality, including both functional and juridical informality. This includes the underground, second, cash or parallel economies. The processes operated in the subsection of the economy are not necessarily defective in the sense that no formal firm would operate them because their productivity is too low. Their human and physical capital intensities are suited to the markets they serve and are only informal insofar as the legal structure of the society defines them as such.

The shadow economy is the result of the optimizing choices made by agents in the economy. As the authors noted, the drivers of the shadow economy are not inadequate human or physical capital accumulation, but taxation including social security, labour and environmental regulations, the quality of public goods and services available to formal sector participants and the administrative burden. There is a cyclical component in their definition, which may capture functional informality in response to a temporary decline in employment opportunities in the formal sector. The authors' findings confirm those of a significant literature on the shadow economy. The solution to juridical informality is simple: reduce the tax burden. Equivalently, more vigilant enforcement of laws governing the shadow economy would reduce its size[10].

The juridically informal focus on avoiding a paper trail left by bank checks, credit cards and the like, and tend to rely on cash transactions. Regressions explaining the currency demand have a highly significant positive effect on most measures of taxation and regulation[11]. This indirect signature of juridical informality is heavily relied upon in the literature. It follows that most informality in developing countries would not be juridical since labour and environmental

[10] See the papers cited in Schneider et al. (2010). The data do not include crime or the drug trade, household services and production or tax evasion.
[11] A decline in labour force participation can also signal a rise in the shadow economy.

regulations are either absent and unenforced, and taxation is mostly indirect and therefore more difficult (although not impossible) to avoid by using cash. Some developing country informality is unquestionably juridical, of course, and a lower bound on functional informality could be computed by subtracting the percentage of the shadow economy in developed economies. Using the data at the beginning of this section, this (rather crude) measure suggests that *at least* half the informality the authors find for developing countries must be functional, assuming that all the informality in the developed economies is juridical.

In developed economies, it is clear that taxation, including social security contributions, is the main reason workers and employers turn to informality, and incentives to join the informal sector rises with tax levels. With high marginal tax rates and social security contributions, small-scale production of services, for example, house painting, becomes almost impossible and in Europe—and in Scandinavia especially—the service sector, replete in developing economies, barely exists. Lowering marginal tax rates is therefore one way to promote demand for informal sector production. Similarly, labour regulations can lead to substantial increases in labour costs which, if shifted to employees, provide another incentive to work informally. In all economies, enforcing these regulations raises the cost of formality and thus stimulates the growth of the informal sector.

If formality does not confer any positive benefits relative to costs, it cannot be welfare enhancing to impose compliance on informals. On the other hand, if benefits are positive yet it is possible to avoid paying the costs, then informals are free riding. Whether this should be tolerated is a question of public policy. Nothing in economic theory suggests that it should or should not, given the dynamic efficiencies possible from low taxes and light regulation in the early stages of industrial development. An incontestable role of the government is to provide public goods, and if budgets are inadequate due to increasing informality, the problem is exacerbated. Lower tax rates combined with a wider base is the traditional solution in public finance, but governments planning welfare enhancing projects may well see fit to raise marginal rates as the base shrinks. Johnson et al. (1998) present a simple but well cited model of the process. Their result is straightforward: lower taxes and less onerous regulation lead to larger stocks of public infrastructure, less corruption and graft and less informality.

The identification strategy of Schneider et al. (2010) involves the specification of six variables: 1. Share of direct taxation; 2. Government expenditure as a percent of GDP; 3. An index of the top individual income tax rate, top individual corporate tax rate and total tax revenues as percent of GDP (as three tax burden variables in a wide sense); 4. Regulatory intensity for state regulation; 5. The business freedom index of time to open a business, financial costs to start a

business, minimum capital stock to start a business and costs for obtaining a license; and 6. The state of the economy measured by the unemployment rate and GDP per capita.

The results reported by the authors can be interpreted by reference to the distinction between functional and juridical informality. Juridical informality, more prominent in developed countries, should be highly sensitive to the tax burden, but functional informality in developing countries should be much less so. The authors find that a 1 percent change in the tax burden hardly affects (0.14 percent) the shadow economy in developing countries, and similarly, the effect of regulation is minuscule (0.05 percent). Even in developed economies, the effects of taxes and regulation are numerically small, although considerably larger (0.23 percent for taxation) than in developing economies. Labour force participation rates are much more significantly related to informality in developed economies, but have no effect on informality in developing economies. The effect of government is much larger in developing economies (3 times) than in developed ones, suggesting that a large public presence fosters informality. If viewed as a production process, governments are notoriously capital intensive, requiring far more resources to convert a worker from informal to formal than in the private sector.

Schneider et al. (2010) get significant but small effects from the causal variables. They do not separate juridical from functional informality and so fail to look at the causal effect of physical and human capital shortfalls. Despite its identification issues, Schneider et al.'s (2010) paper gives consistent data during a period of world economic history in which there was substantial and widespread growth in income per capita. Prior to the financial crisis, more than 100 countries were growing at faster than 4 percent per annum and some 1 million people per month were coming out of poverty. Globalization was in full swing and current and capital account liberalization were advancing to the point that some observers claimed that the benefits of globalization were near exhaustion. If functional informality were to be affected by growth in physical and human capital, there was no other time in recent economic history that it could so clearly be observed. Table 11 provides the results of regressions on Schneider et al.'s (2010) panel data.

At first glance, these regressions seem very disappointing. The first column, for example, suggests that informality does not respond to growth in income per capita, either in developed or developing countries. The null hypothesis that growth during this period of robust economic performance left the informal share of the economy intact cannot be rejected. One might expect this conclusion for developed economies for which most informal activity is juridical. If growth cannot diminish informality in developing economies, however, one wonders how growth could ever be relied upon to set aside defective production processes.

Table 11 Dependent variable is informal output[1]

	(1) Developing[2]	(2) Developed[3]	(3) Developing weighted[4]	(4) Developed weighted
Income	1.445	2.813	-132.891***	37.465***
	(6.239)	(11.402)	(1.228)	(1.661)
Year	0.346*	0.156	0.731***	0.129***
	(0.139)	(0.134)	(0.012)	(0.014)
Constant	-654.435*	-293.264	-1430.669***	-243.731***
	(279.378)	(268.694)	(24.930)	(27.478)
R^2 - adjusted	0.005	-0.001	0.139	0.021
R^2	0.007	0.004	0.139	0.021
Observations	918	396	179,618	38,707
F -stat	3.12	0.69	6,098	285

Source: Authors' computations based on data from Schneider et al. (2010). Standard errors in parentheses. *** p < 0.01, ** p< 0.05, * p< 0.1 Notes: 1. OLS. OLS. As percent of published GDP. 2. Income category 1-3. 3. Income category 4-5. 4. Population frequency weights. 5. Percent change in per capita income

The second two columns provide the answer. In most regressions run by researchers, the unit of analysis is the nation state. Most economic questions, however, are resolved at the level of individual behaviour. Since there are vastly more of such individuals in China, India and Indonesia than in small Caribbean countries, for example, a weighting scheme that effectively equates one islander to one million Asians seems misguided and, for most questions of concern to economists, misleading at best and probably just irrelevant. The second two columns do indeed reveal the expected pattern. When population weights are applied to the observations, economic growth does reduce the level of functional informality. In developed economies, by contrast, informality does not recede; it simply changes from functional to juridical[12].

Table 12 provides the results of regressions on the Schneider et al. (2010) panel data from the MIMIC results. The second set of regressions on this same data is also instructive. Maintaining the weighted/unweighted distinction, the regressions show fixed effects for both time and income category. Even the unweighted regressions show the effect of the income category with a highly significant negative coefficient[13]. Growth in income per capita still has a positive sign in the unweighted regressions, but negative and highly significant when weighted observations are employed.

[12] The regressions do not prove this but only fail to contradict the assumption of the text.

[13] Economies are divided according to 2011 GNI per capita, calculated using the World Bank Atlas method. The groups are (1) low income USD 1,025 or less; (2) lower middle income, USD 1,026 – USD 4,035; (3) upper middle income, USD 4,036 - USD 12,475; and transition and high income, (4-5) USD 12,476 or more.

Table 12 Dependent variable is informal output[1]

	(1) Developing	(2) Developed	(3) Developing weights	(4) Developed weight
Income[2]	6.596	2.587	-91.534***	43.504***
	(6.184)	(12.197)	(0.912)	(1.903)
Category[3]	-3.717***		-5.543***	
	(0.359)		(0.016)	
year 2000	0.333	0.282	-0.236*	0.482***
	(1.425)	(1.459)	(0.100)	(0.143)
year 2001	0.462	0.328	0.250*	0.295*
	(1.424)	(1.441)	(0.104)	(0.141)
year 2002	0.423	0.418	-0.393***	1.349***
	(1.425)	(1.504)	(0.102)	(0.150)
year 2003	0.823	0.571	0.028	1.383***
	(1.439)	(1.502)	(0.103)	(0.150)
year 2004	1.293	0.710	1.689***	1.362***
	(1.446)	(1.499)	(0.103)	(0.150)
year 2005	1.626	0.845	2.932***	1.056***
	(1.456)	(1.461)	(0.107)	(0.146)
year 2006	2.272	1.171	3.597***	1.423***
	(1.472)	(1.490)	(0.106)	(0.148)
year 2007	2.821	1.346	2.497***	0.943***
	(1.488)	(1.489)	(0.109)	(0.154)
Constant	46.194***	19.348***	44.413***	13.825***
	(1.236)	(1.162)	(0.095)	(0.118)
R^2-adjusted	0.072	-0.019	0.292	0.025
R^2	0.082	0.004	0.292	0.025
Observations	918	396	218,268	38,691
F -stat	11.8	0.154	12,365	66

Source: Authors' computations based on data from Schneider et al. (2010). Standard errors in parentheses. *** p < 0.01, ** p< 0.05, * p< 0.1 Notes: 1. Annual per capita growth rate, 2. Informal sector employment as a share of total, 3. Income category

The pattern of variation over time is also instructive. Note that for developed countries, the time dummy is always positive and highly significant. For developing countries, the pattern is more mixed, with two of the years negative. The year-by-year increase in informality experienced by both developed and less developed countries is obscured in the unweighted columns and their significance is uniformly washed out.

This data suggests that the informal sector rises during the period of rapid growth. This could be the result of subcontracting out to juridically informal firms. Once this is properly taken into account, functional informality is more clearly and negatively associated with income level and growth in income per capita.

Moving to the sectoral distribution of the informal sector, the regressions in Tables 13 and 14 show similar results. Again, the dataset combines large and small countries, so weighted samples are again necessary. Here the number of observations is small, so the results must be interpreted with some care.

Table 13 **Unweighted regression results[1]**

	(1) Transportation	(2) Construction	(3) Manufacturing	(4) Trade
Income per capita	-0.004**	-0.002	-0.004*	-0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
Constant	85.278***	82.818***	75.248**	89.906***
	(9.486)	(11.661)	(16.290)	(6.754)
R^2 − adjusted R2	0.486 10	0.083	0.298	0.771
Observations F-stat	0.543	0.185	0.376	0.796
R2 − adjusted R2	10	10	10	10
Observations F-stat	12.6	3.5	6.7	32.8

Source: Author's computations based on ILO (2012). Standard errors in parentheses. *** p < 0.01, ** p< 0.05, * p< 0.1
Note: 1. The dependent variable is the share of informals in sectoral employment.

Table 13 suggests that construction does not respond much to growth in income per capita. Manufacturing informality is also weakly related to income per capita. On the other hand, there is significant response in both transportation and trade, with higher p-values for the latter. Again, the results are strikingly different when the regressions are population weighted. Income per capita is highly significant for all sectors. While there is little change in transportation and trade, the coefficient for construction more than triples and more than doubles for manufacturing.

These regression results suggest that there is really nothing terribly mysterious about the informal sector once it is disaggregated into functional and juridical. Regressions cannot prove that growth will eventually erase informality, but the relatively simple analysis of this section strongly suggests that the data fails to contradict the hypothesis that it will.

Table 14 **Population weighted regression results[1]**

	(1) Transportation	(2) Construction	(3) Manufacturing	(4) Trade
Income per capita	-0.006***	-0.007***	-0.009***	-0.005***
	(0.001)	(0.001)	(0.001)	(0.000)
Constant	98.247***	102.722***	106.842***	96.520***
	(2.612)	(4.253)	(4.423)	(1.251)
R2 − adjusted R2	0.605	0.353	0.519	0.789
Observations F-stat	0.607	0.356	0.520	0.790
R2 − adjusted R2	274	274	274	274
Observations F-stat	153.	64.6	129.3	645.4

Source: Author's computations based on ILO (2012). Standard errors in parentheses. *** p < 0.01, ** p< 0.05, * p< 0.1
Note: 1. The dependent variable is the share of informals in sectoral employment

Table 14 shows, again, that weighting the observations is necessary for the regressions to capture behaviour at the individual level. The impact of income per capita on manufacturing informality has now grown from marginal significance at the 10 percent level to highly significant at the 1 percent level.

Macroeconomic linkages

The early literature on the informal sector seemed to see it as a parallel economy with few direct and indirect linkages to the rest of the formal economy (ILO, 1972). Davies and Thurlow (2010), for example, use a computable general equilibrium model to show that trade liberalization increases formal employment but hurts informal producers. At the same time, informal traders benefit. They use these results to argue that this may explain the dominance of traders over producers in economic equilibrium. Table 15 shows that the informal sector in South Africa, whether informally employed or self-employed, accounts for about 36 percent of total employment[14]. Of these informals, more than one-third of workers work in retail trade, some 805,000 workers out of the 10 million employed in 2004 (SSA, 2004). Agriculture is the second most prominent sector for informal participation and only 14.7 percent of workers work in manufacturing in this relatively industrialized developing country. Of this number, 17.6 percent are informally employed (5 percent) or in the informal manufacturing sector (12.6 percent) (more informals work in construction, 22.5 percent of total informal workers).

Lacking both physical and human capital, informals tend to congregate in specific sectors that are intensive in neither. Figure 5 shows the sectoral correlation between the share of skilled labour and the share of formal labour. This chart is based on data from SSA (2004) as presented in Davies and Thurlow (2010). It shows clearly that—at least for South Africa—as the demand for skills rises and the share of skilled labour increases, the share of formal labour increases as well. The correlation is not unexpected and the degree of fit imperfect at $R^2 = 0.36$, but it is nonetheless evident that, by sector, a 1 percentage point increase in the share of skilled labour corresponds to a 1 percentage point increase in the share of formal labour, or equivalently, a 1 percentage point reduction in the participation of informal labour.

[14] South Africa is widely regarded as having some of the most reliable data in the developing world. It also has a significant unemployment rate and is relatively open to competitive pressures from imported goods and services. These data do not necessarily agree with Table 3 above. The table above is for more recent data.

Table 15 Informal sector in South Africa

South Africa (2004)	All workers	Formal	Informally Employed	Informal Sectors	Skilled Workers	Semi-skilled Workers	Unskilled Workers
Total employment (1,000s)	10,556	6,754	1,451	2,351	2,048	4,826	3,682
Employment share (%)	100	100	100	100	100	100	100
Agriculture	10.3	6.9	9.8	20.3	2	3.9	23.3
Manufacturing	14.7	18.9	5.4	8.3	11.2	21.2	8.1
Food and beverages	2.5	3.4	1.1	0.7	1.5	3.3	2
Textiles and clothing	2.9	3	1.2	3.6	0.6	5.3	1
Other manufactures	9.3	12.4	3.1	4	9.1	12.6	5
Construction	7.3	4.7	8.9	13.6	2.5	11	5.1
Mining and utilities	4.4	6.9	0	0	2.5	7.4	1.6
Services	63.3	62.6	75.9	57.7	81.8	56.5	62
Retail trade	17.7	14.1	7.3	34.3	10.3	20.4	18.2
Restaurants	3.3	3.6	2.5	3	3	5	1.3
Transport	4.8	5	3.2	5.1	5.6	6.4	2.2
Business	9.1	13.3	1	2	16.1	10.5	3.4
Government	10.4	16.2	0	0	29.2	7.7	3.5
Other services	18.1	10.3	61.9	13.4	17.5	6.6	33.4
Average wage[1]	19,662	26,175	10,015	8,032	38,609	19,198	9,792

Source: Davies and Thurlow (2010). Note. 1. Rands per year (per worker)

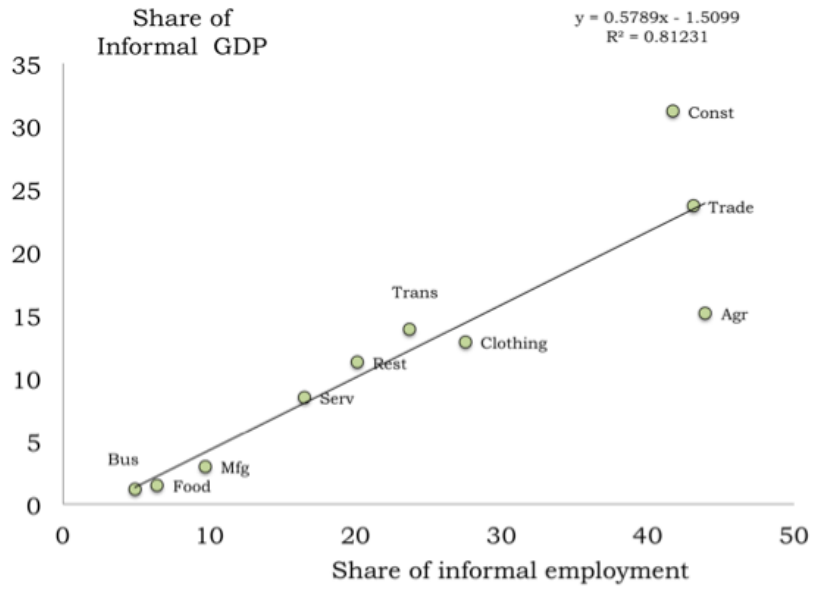
Figure 5 Skilled and formal labour in South Africa

Source: Davies and Thurner (2010)

Figure 6 confirms that the productivity of the informal sector in this country is low, and more or less uniformly so. Note the tight dispersion around the trend line. R2 is now much higher at 0.81. Most notably, a 1 percentage point increase in the share of informal labour increases the sector's share of GDP by just more than half, 57.9 percent. The relative outliers here are

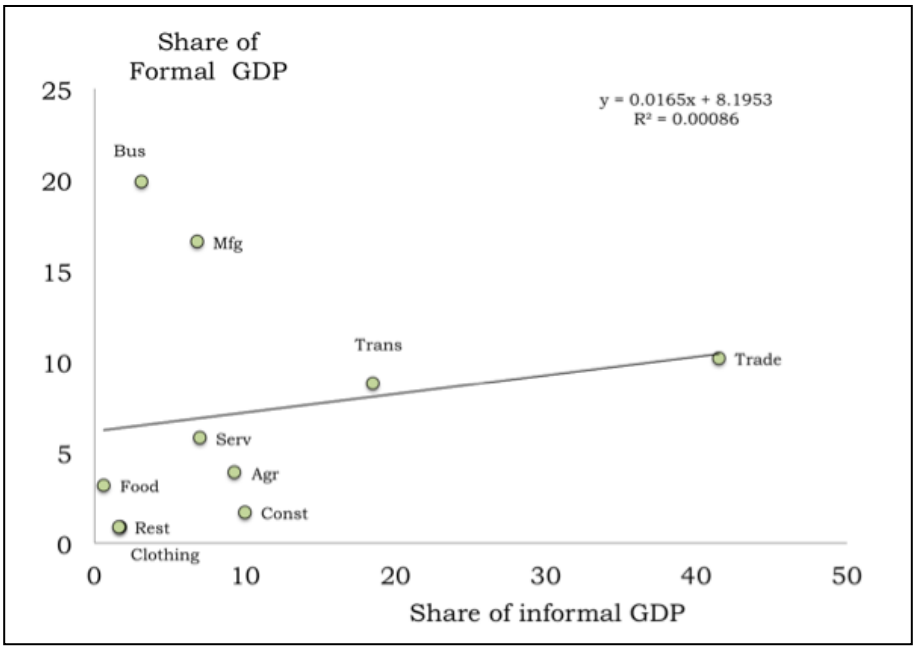
agriculture, which has 43.9 percent of informal employment, but only 15.2 percent of informal GDP.

Figure 6 Informal productivity in South Africa



Source: Davies and Thurner (2010)

Figure 7 Informal sector as a share of GDP in South Africa



Source: Davies and Thurner (2010)

Because the informal sector has so little physical and human capital, one would not expect to find the same sectoral distribution of GDP. Figure 7 illustrates the argument, again using data for South Africa.

The informal sector GDP is heavily concentrated in trade according to these data, with more than 40 percent of GDP deriving from that sector. In contrast, trade accounts for only 10 percent of GDP in the formal sector. Not surprisingly, business services are 20 percent of formal value added, but only 3.1 in the informal sector.

These data suggest that the informal sector, at least in South Africa, should not be confused with embryonic, dynamic start-ups that will eventually emerge as fully certificated formal sector enterprises. The informal sector in developing economies does not, by and large, follow the model of highly educated (even if self-educated) iconoclastic, risk-loving entrepreneurs piecing together breakthrough, disruptive technologies in settings well removed from traditional research and development laboratories. A few of these individuals may well be sprinkled among the ranks of informals, but the vast majority are nothing more than simple, uneducated people with almost no access to the capital markets to which their meagre savings contribute and little or no human capital. These individuals populate the informal sectors of the world for only one reason: they have no viable alternative. The data of this section seems to corroborate this view; informals crowd into sectors that most welcome their comparative advantage in their ability to tolerate long work hours, dangerous and insalubrious working conditions and, above all, low wages per hour worked.

The South African case is well documented but the availability of relatively reliable data on informality should not lead to inappropriate generalization to other countries. The extremely dualistic structure of South Africa imposes unusually high competitive pressure from the formal sector in what would otherwise be informal markets. The well-developed modern and formal sector easily penetrates markets typically left to informal producers and traders in other countries. For example, some large formal sector clothing firms in South Africa sell their clothing in outlying rural areas by sending trucks with merchandise to small villages, capturing by some accounts a large share of demand from informal competitors. The penetration of large-scale formal sector activities into informal markets in South Africa reduces the scope for dynamic, start-up informal businesses that have a small competitive advantage based on their informality. This may help explain the high share of functional informal activity in South Africa and the overall small share of total informal activity compared to other African countries.

Evidence from other countries with less invasive formal sectors shows a higher share of both total and entrepreneurial informal activity.[15]

Informal SAM

Legislation designed to suppress the juridical informal sector can do significant damage to the economy as a whole. It is not only those who lose their jobs who regret the intervention, but also the buyers of their goods and services in the product markets as well as employers in the factor markets. This only describes the first round; thereafter, multiplier effects compound the harm from suppressing informals. How the informal sector can be integral to the main body of the economy is often poorly understood by policymakers. This section outlines a methodology for computing the direct and indirect damage that derives from any legislative remedy to the presence of juridical informality. It is based on a social accounting matrix (SAM), a database combing, input–output information, national income and product accounts, the balance of payments and detailed government income and expenditure. SAMs are available for many countries in the world and can be employed using the methods outlined here with reasonable demands on computational capacity of whatever statistical division that might be assigned the task.

Table 16 shows a fictitious economy in which half of all employment is in the informal sector. From the value added by labour, it is evident that the wage rate is about 2.64 times higher in the formal sector than in the informal sector. The return to capital in the informal sector is small, 5, which reflects the fact that the informal sector works with only a fraction of the capital stock that the formal sector employs per unit of labour. Observe that the informal sector's contribution to employment is much less than its value added. This illustrates the idea that informal activity is first and foremost low productivity work and simply underscores the point made above that informality is essentially coterminous with low income, poverty, low levels of education and public health. There is nothing romantic about the snapshot of informality captured by this SAM.

[15] See Cohen (2012) and Reynolds, N. & van Zyl, J. (2006).

Table 16 Informal SAM[1]

	Consumption				*Investment*				
	Formal	Informal	Formal HH	Informal HH	Formal	Informal	Govt	Exports	Total
Formal	10	18	30	4	18	5	8	7	100
Informal	1	15	25	6	0	2	0	1	50
Value Added	62	15					8		85
Labour-Formal	20	1					8		29
Labour-Informal	2	9							11
Capital	40	5							45
Savings	10	0	8	6			-4	6	25
Taxes	5	0	7						12
Imports	12	2							14
Total	100	50	70	16	18	7	12	14	

Source: Authors' computations based on illustrative data

Addendum

GDP	100	Govt	16		Wages		Capital-labour ratio	
Formal	85	Exports	8		Formal	5.8	Formal	42.5
Informal	15	Imports	14		Informal	2.2	Informal	3.75
Val Added	100	Employment	10		Capital stock	231.25	Cost of capital	
Investment	25	Formal	5		Formal	212.5	Formal	18.8
Savings	25	Informal	5		Informal	18.75	Informal	26.7

Source: Authors' computations based on illustrative data

Note that the input-output relationship in the upper left-hand corner of the SAM shows how the informal sector is interlinked with the rest of the economy. Formal sector firms may well use a small amount of intermediate goods supplied by the informal sector. This 'supply chain' effect is small but noteworthy. Firms may not even realize that they are using the output of the informal sector, directly and/or indirectly, since the informal sector may enter into the supply chain at some relatively obscure point. Thus, the entry is only 1 in the prototype SAM. Similarly, in the a_{21} element, the formal sector sells intermediates to the informal sector. This is likely to be somewhat larger in magnitude and may constitute raw materials, other goods finished or otherwise to be resold. A simple example might be a soft drink, bottled by a formal firm that is then purchased on the *retail* market to be marked-up yet again and then resold. Consumption is broken down in this SAM into formal and informal households. This is somewhat unorthodox since typically, households are divided along income percentages, the richest 20 percent, followed by the next richest 20 percent and so on. Here the distribution is quasi-functional, but rather than workers and owners of capital, households are divided into formal and informal. The ratio of household in income is 81.8 percent for the formal sector and the rest for the informal sector.

The savings rate for the formal sector is only 12 percent, while it is 35.6 percent for the informal sector. Part of this disparity is due to the way in which SAMs record savings. In the formal sector, total private savings is the sum of firm and household savings. This gives an implied savings rate of 28, which is still not as high as that for the informal sector. This differential causes the distinction between formal and informal to blur a bit since the informal sector seems to be more oriented towards growth and expansion than the formal sector. This is, of course, quite possibly the case and the discussion will return to this point below. Informal households may well consume a higher proportion of informal goods, 62 percent compared to 45 percent for formal sector households. This difference can only be explained by the relative poverty of the former and should not be taken as a sign of loyalty to their colleagues or any other non-economic explanation. Informal goods are not necessarily cheaper, but the opportunity cost of search time may be significant for poor residents, lacking in information about location and prices of other competitive sources of supply.

Investment goods are similarly skewed towards formality. Informal sector participants may well contract out structures and some equipment to informal sector suppliers, but it is much less likely that formal sector firms will rely on the informal sector for any but a marginal contribution in the otherwise formal supply chain. Normally, investment is measured in the national income and product accounts, and by extension, the social accounting matrix is investment by origin rather than destination. In this case, however, demand for investment goods by informal sector participants is overwhelmingly likely to add to the capital stock they own. Hence, investment by origin is highly correlated with investment by destination. This distinguishes the formal/informal SAM from any other since it is almost never the case that investment by origin, say from the *j*th sector, is equal to investment by destination in the *j*th sector. Similarly, government is likely to be barred from purchasing goods and services *directly* from the informal sector and demand is thus zero in the second element in the government's column. Most, if not all, of government's demand is satisfied by formal firms, as is the demand for government workers, shown in the third and fourth entries in the column.

In practice, government payments to households are likely to be a mix of government wages and transfers. In this simplified presentation, transfers are not broken down and so the entry in the fourth cell of government expenditure is added to total value added and thus GDP. This is by convention only and maybe wholly indefensible despite its having been custom and practice for decades. In any event, transfer to informal sector workers and owners is undoubtedly limited, either because they are often entirely undocumented and/or may not have ever contributed to any programme, such as unemployment insurance, upon which they could draw as informals.

The SAM is nonetheless inaccurate here, since informal households unquestionably benefit from some form of government support. The assumption is one of convenience rather than fidelity to the actual pattern of disbursements.

Exports are more difficult to analyse, since some informals will likely sell to foreigners. At a minimum, those who service the tourist trade would have to be counted as exporting goods and services, while certainly, border trade is to some extent undertaken by small, undocumented firms and workers. The informality of exports is not easy to pin down, however, and the prototype SAM therefore registers some 12.5 percent of exports as supplied by the informal sector. The sum of the components of aggregate demand is the gross value of production, shown as the row total in the SAM. Similarly, the distribution of value added for formal and informal firms differs markedly in the first two columns of the SAM. Intermediates are 11 percent of GVP for formal firms and 66 percent for informal firms. The higher value of the latter is just the other side of the coin, viz. that value added is lower in informal sector activities. Similarly, the low capital intensity of informal processes is reflected in the factor remunerations. Despite the differentially high cost of capital in informal sector activities, the total payments to capital are only 33.33 percent of value added compared to 65 percent in formal establishments. This shows that informal firms are indeed much more labour intensive than their formal counterparts. Part of the difference is undoubtedly explained by the higher opportunity cost of capital in developing countries and the elevated returns they receive as a direct consequence.

Direct and indirect use of informal labour can be calculated from the SAM by way of the Leontief inverse using $L(I - A)^{-1}$, where L is the matrix of formal and informal labour coefficients per unit of gross value of production and I is the identity matrix.[16] Box 3 shows the details of the calculations.

[16] See any text (new or old) on mathematical economics, for example, Wainwright and Chiang (2005).

Box 3 Measuring informality

The SAM can be turned into a mathematical model by using some simple linear relationships to estimate the effect of suppressing juridical informality. To get started, first read some data from the SAM above.

The final demand vector is the sum of consumption, investment, government expenditure and exports, from the SAM as

$$F = \begin{bmatrix} 72 \\ 34 \end{bmatrix}$$

The gross value of production is read from the SAM as

$$X = \begin{bmatrix} 100 \\ 50 \end{bmatrix}$$

The *A*-matrix for an economy in the SAM above is intermediate purchases divided by gross value of production

$$A = \begin{bmatrix} 0.1 & 0.36 \\ 0.01 & 0.3 \end{bmatrix}$$

With the identity matrix as

$$I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

we form the Leontief inverse

$$[I - A]^{-1} = \begin{bmatrix} 1.1 & 0.6 \\ 0.0 & 1.4 \end{bmatrix}$$

Labour cost coefficients are labour costs from the SAM (both formal and informal) divided by the gross value of production

$$L = \begin{bmatrix} 0.2 & 0.02 \\ 0.02 & 0.18 \end{bmatrix}$$

Labour costs, direct plus indirect, are computed from the Leontief inverse

$$L[I - A]^{-1} = \begin{bmatrix} 0.22 & 0.14 \\ 0.03 & 0.27 \end{bmatrix}$$

Labour cost to produce final total

$$L[I - A]^{-1}F = \begin{bmatrix} 21 \\ 11 \end{bmatrix}$$

Employment depends on the wage rate here, which we obtain from the data from the SAM

$$w = \begin{bmatrix} 5.8 & 0.0 \\ 0 & 2.2 \end{bmatrix}$$

written as a diagonal matrix. Employment is labour cost divided by the wage

$$E = w^{-1}\mathrm{L} = \begin{bmatrix} 0.034 & 0.003 \\ 0.009 & 0.082 \end{bmatrix}$$

Hence, that total labour demand (omitting government) is

$$E[I - A]^{-1}F = \begin{bmatrix} 3.6 \\ 5 \end{bmatrix}$$

We verify to see whether this agrees with the SAM and it does (excluding government).

To estimate the effect of repressing the informal sector, introduce a police round up of stalls and a lockdown of ramshackle workshops, but stop short of arrests. Suppose this cuts supply of informal output by 10 percent. There is some substitution of formal for informal output, but it is imperfect and so we assume that formal output rises by only 5 percent as a result of the decline of informal output. There is no impact on investment, government or exports.

The results of the simulation are as follows:

Informal output and employment	-8.9%
Formal output and employment	-0.3%
Government deficit	+1.8%
Tax receipts	-0.6%
Private savings	+0.3%
Formal	6.1%
Informal	-5.8%f

Two important caveats apply: 1. Labour discharged from informal production does not find its way back into the informal sector, nor does it find a job in the formal sector as juridically informal. Both of these assumptions may well be false. 2. Wages and prices remain fixed. This could hold in the short run, but doubtful in the longer run. Average wages in the informal sector will probably fall in the longer term as a result of the assault on the informal sector. Some functional informality could well be converted into juridical informality.

The inescapable conclusion is that judicial repression of the functional informal sector will most likely damage the economy as a whole. Everyone will be worse off, at least for a while. Only if the functionally informal become juridically informal will the allocation of resources improve as workers accept a lower wage as they move into the formal sector. Even though the average wage will fall, all individual wages will remain constant or rise. No one need suffer a wage cut unless they were earning more in the informal sector than they are paid as informals in formal sector establishments, which is possible. (Details of the simulation are available upon request).

The model is unrealistic in many ways, but nonetheless reflects some basic adjustment mechanism in the economy. Many other combinations of assumptions could be studied. More sophisticated behavioural assumptions can be introduced into the model. The model can easily be estimated in Excel. Computable general equilibrium models or agent-based models would be the next step in realism, as well as analytical and computational complexity.

The fact that the informal sector is saving at a higher rate is key to how the dynamics of the sector unfold. Informal production processes are by definition low productivity, but, as noted above, they need not stay that way. The graduation from informality to formality is itself a cloudy process. The best economic measure is whether the firm is earning a risk-adjusted normal rate of profit. If so, then there is nothing really to distinguish a formal from an informal firm. The payment of taxes cannot serve this purpose from a strictly economic perspective, since that is an arbitrary decision by public authorities. Formal firms do not become informal, for example, when the state grants them immunity from certain forms of taxation as part of a development strategy for a region or country as a whole. On the other hand, a firm that pays market-based factor returns—the going rate of profit and wages—but can only do so if tax breaks are received, cannot be said to be legitimately formal. Were the tax breaks to be removed, the informal character of the firm would begin to reassert itself. None of this is necessarily set in stone since firms grow over time and may graduate to formality after a period of time in which they cannot pay market-based remuneration.

3. Analysis

Juridical informality v functional informality

Sinha (2011) notes that since the 1960s it was generally accepted that economic growth would eventually lead to the disappearance of the informal sector.[17] As trade is associated with more rapid growth, it follows that trade should accelerate the decline in informality (Lewis, 1954). Yet,

> "despite strong global growth that coincided with a massive increase in international trade, many jobs in developing countries remain in the informal economy. The share of employment in the informal economy has been persistent in many developing countries over recent decades and even increased in some regions. On average, 60 percent of employment in developing countries is in the informal sector...In contrast to developed countries' experiences, the formal sector in developing countries has not been able to absorb informal workers and production processes as expected. In fact, many studies suggest that globalization and trade reforms lead to competition in the formal sector, which may result in a reduction in formal employment, at least in the short run." (Sinha, 2011, p. 125).

There is no reason to suggest that the traditional theory of the informal sector as a reserve army or a residual workforce is overturned by its persistence. It is simple to conceive of a model with rapid conversion of informal to formal workers as the economy expands, but with fertility remaining stubbornly high. In that case, the rate of growth of the labour force could easily at times and even over a significant interval, exceed the rate at which formal jobs are created. The persistence of the informal sector is in no way an empirical test of the traditional theory of the informal sector. Suffice it to say that there is some rate of growth for the economy as a whole that would be consistent with the eventual disappearance of functionally informal labour.

Informality is also not the outcome of a well-defined choice theoretic framework that economics normally employs to analyse problems. There is no margin at which the benefits of formal and informal activities are equalized. Most informal participants are not in there because they feel that the formal sector is too restrictive. The outcome of informality is more closely aligned with the biological constraint since the opportunity cost is not the formal sector's activity, but rather

[17] She has in mind functional rather than juridical informality, however, since the latter would not necessarily dissolve with higher income per worker. Functional informality would disappear since with sufficient capital, there would be no reason to employ any but the most efficient techniques. The price system would then adjust to insure that the methods would be profitable to operate.

leisure. Contrary to the claim advanced by deSoto (1989) and others, informal workers have, by and large, not "chosen to operate outside such bad laws, which entail high costs and ...complex regulations." Functionally informal sector participants are informal only because their next best option fails to satisfy some minimum survival constraint. The claim here must be understood carefully because it relates to the basic distinction of the paper: informality that retains any element of economic logic cannot depend on whether workers choose to avoid taxation, and are thus informal, when they could just as well pay taxes and join the formal sector. Tax avoidance, strictly speaking, is illegal activity. In a well-functioning political system, illegal activities are irrational since the incentives to obey the law must be built into the system in order for it to quality as well functioning. Without an effective legal system, it may well be that laws are broken, but this would not apply only to informal sector operatives. Aruoba (2010) estimates cross-country differences in informal activity, government policies and institutions using data for 118 countries. This study finds that "better" institutions are associated with lower inflation, higher income tax rates and less informal activity, and higher levels of informal activity are associated with lower income tax rates and higher inflation.

Formal sector employment opportunities are quantity constrained, usually by the amount of physical or human capital required for their operation. On the other hand, when formal sector employment shrinks, as it did after the financial crisis of 2007-08, released formal sector workers do indeed compete with the informal sector, driving down incomes and presumably increasing poverty rates. This latter observation follows from price-taking behaviour in the informal sector. Informal producers have no market power and must therefore take relative prices as given[18]. Output is constrained by the scarcity factor, whether capital or labour. When a wave of newly unemployed workers turns to informality, existing informal workers have no way of blocking their new colleagues from absorbing some part of the effective demand in the economy. Since the latter is now reduced—the reason the uptick in formal unemployment occurred in the first place—the effective demand is not only smaller but will be shared across a larger number of informal sector participants.

As noted, the informal sector is often viewed as an underground, illegal, undocumented sector (ILO, 2012; Perry, 2007). This attitude is still promoted by governments who see the informal sector as "tax cheats", flying under the fiscal radar, thereby depriving governments of their lawful share of scarce resources. The view that government is "entitled" is now less common since the public sector share is endogenously determined by more primary drivers such as growth, employment and income distribution. An early articulation of this view is deSoto

[18] Some mild price discrimination is possible when informal sector traders provide services to upper income households such as taxi drivers around major airports (Davies and Thurlow, 2010).

(1989), who, among others[19], argued that in repressing the informal economy, states also effectively repress entrepreneurship. Important adjustments to changing conditions in the international market, local demand or factor supplies could not be effectively predicted by public sector bureaucrats. The flexibility of small, dynamic producers, whether paying taxes or not, could quickly adapt to the new environment. Blocking this activity through criminal or civil prosecution was counterproductive.

Juridical informality is a complex problem since it may also include tax evasion, the drug trade or other under the table transactions. These may be serious social problems but are not directly connected to the economic problem of informality. As argued above, the latter is primarily due to a shortage of capital—human or physical—required to employ those willing to work at the prevailing wage.

This is simplest to see in a world with fixed-coefficient production functions. If the capital constraint is binding, then by complementary slackness the shadow value of the labour is zero. Given the biological requirement for physical reproduction, unemployed workers have no other choice than to produce their means of subsistence informally. Schneider et al. (2010) point out that the shadow value of the "shadow" economy is, in reality, not zero, but closer to 34.5 percent of official GDP when measured for 162 countries between 1999 and 2006/2007.

The theoretically inclined might ask whether fixed-coefficient production functions do not give rise to a market failure, preventing those who are willing to work for a lower wage from prompting producers to adopt more labour intensive methods of production. The competitive mechanism ensures that events will unfold in precisely this way, but even the competitive mechanism works only up to a point. When the wage falls to a level at which the means of subsistence can be obtained informally, then the wage will adjust no further. The productivity of informal processes provides a lower bound below which the formal wage cannot fall. Transaction costs economics provides various explanations for why the wage may not fall this far, but it is certain that it cannot fall further. [20]

It is easiest to see that the world does work this way by considering fluctuations in formal sectors' activity brought on by some real shock, such as a change in the mean temperature that occurred in the Younger Dryas. When formal output falls, there is nothing to stop workers who

[19] Biau (2011) notes that the "legalist" school presents informality as a response to the presence of government-induced distortions. She notes that "a vast group of theorists now ascribes to the view that in an overly controlled environment, workers voluntarily opt out from the formal labour market to escape the burden of government regulations, cumbersome bureaucracy, and high transaction costs". See Loayza (1997), Johnson, Kaufman and Shleifer (1997), Schneider and Ernst (2000) and Loayza, Oviedo and Servén (2005) as well as Quintin and Pratap (2006).

[20] See, for example, Basu et al., (2010)

cannot find formal employment from producing the means of production on their own, "crofting" or retreating to subsistence farming (see Box 4). When population pressure relents, as it did after the "clearance" of the potato famine and forced emigration to Australia, a tradable surplus arises. Trade generalizes the reliance on potato calories and the functional informal sector—at least in Ireland—is born. It is key to see that no amount of market power in the formal sector can block the presentation of surplus potatoes–or indeed, any other good produced by the informal sector. So long as there is a demand and sufficient capital—in this case land—to allow for the surplus to exist, informal activity will take place. Historically, the "solution" to informality has always been the Malthusian one, with informal trade breaking out only when permitted by population pressure on resources (see Box 4).

It follows that trade is not essential to the notion of functional informality. Certainly, subsistence sub-economies that do not trade with the formal economy, such as the Yanomami in Brazil, are not functionally informal. The reason, however, is that their real subsistence incomes have no effect on the formal wage in Brazil since formal workers have no ability to join the tribe.

When informal trade does arise, it may be taxed or not, depending on the legal system and the degree to which laws and regulations are enforced. Note that if explicit laws do regulate trade and informal producers choose to ignore them, returns in the informal sector rise and so, too, does the lower bound on the formal wage. Schneider and Enste (2000) provide a taxonomy of modern "crofting" methods, including trade in stolen goods, drug manufacturing and dealing, prostitution, gambling, smuggling and fraud. All put upward pressure on the formal wage. The point is that there is nothing special about law breaking since the formal wage itself may be enhanced in similar ways. Consider untaxed employee fringe benefits and employee discounts, including tuition remissions, and even employer-provided health care that originally came about as a form of tax evasion. When otherwise formal firms engage in tax evasion or other illegal activities, they do not become functionally informal. They are juridically informal.

The idea that the informal sector arises from some inadequacies on the part of the public sector, such as their inability to "formalize" this sector or that one, is therefore meaningless. Even if there were no government failure, and property rights were fully secured, the informal sector would persist. The key point in the examples above is that formal market participants, no matter how much or how little market power they possess, cannot block informal producers. On the contrary, the presence of the informal sector undermines any market power formal producers might have by providing substitutes for consumers paying monopoly prices.

Box 4 Informality in history

Just as in the thirteen century, the European population boomed in the 1700s, helped by wealth generated by local and oriental trade and agricultural improvements. New crops, like the potato, although often treated with suspicion when urged on the populace by rulers (Marie-Antoinette's wearing of potato flowers put the French off eating them for decades), allowed the population of some countries such as Ireland to boom. Potatoes could be grown using a spade rather than a plow, and their fantastic productivity–more than thrice the calories per acre of wheat and rye–and high nutrient content encouraged a very dense population. An Irish acre in 1840 could yield six tonnes of potatoes, almost as much food as an acre of rice paddy in the Yangtze delta. At the time, an English worker needed 20 acres to grow his bread and cheese. The subsistence farmers of Ireland, even into the 1880s, were not only dependent mainly on their own muscle power but were "out of the market", consuming very few manufactured goods for lack of disposable income. In the Scottish Highlands, too, the population boom of the 1700s caused a retreat to subsistence, or crofting, as it was known there (Ridley, 2010, p. 199).

Formal producers can only stop informal activity through extra-market means, primarily through government capture and subsequent politico-legal pressure (Biau, 2011). The cat and mouse game has the informal producers taking steps to avoid detection since in their view, the benefits of formality do not outweigh the burden of taxation and the cost of regulations. The former include income, value added or other taxes, as well as the payment of social security contributions. The costs of compliance include meeting legal labour market standards, such as minimum wages, limits on working hours, trade and immigration barriers, safety and workplace hazardous materials as well as environmental regulations and licensing, registration and intrusive data gathering. Welfare losses from these violations are not limited to informal employers but must also include those who would not have been hired had full compliance been achieved. For the informal sector, of course, these can and often are one and the same individuals.

Equilibrium in labour markets is brought about by adjustment in the real rate of remuneration. A formal sector firm that hires an unregistered worker at a below market wage rate only facilitates adjustment to market equilibrium. In many countries, labour market subsidies have been considered a means of reducing open unemployment. If policymakers permit an unregistered worker to be hired informally by a formal employer who then avoids payroll taxes, does not pay benefits or shoulder the expense of occupational health and safety measures, then they are effectively providing a labour market subsidy. From the perspective of the employer, the cost of labour is the same in the case of the direct subsidy or the indirect subsidy arising from the ability to employ workers under informal conditions of wages and benefits. From the point of view of the state, moreover, the fiscal drain of a subsidy is eliminated by the shift of the incidence of the subsidy to informal sector workers. These workers now bear the cost of the subsidy in the form of the gap between their wages, benefits and protection relative to those of formal sector workers. Market efficiency is nonetheless enhanced.

Second, informals specialize in branches of the economy along the lines of classical comparative advantage, thereby increasing the efficiency with which resources are allocated. By doing what the informal sector does best, formal sector firms are free to concentrate on the production of goods and services that require higher levels of capital, both human and as embodied technological advance. Less of scarce capital has to be allocated to branches that more easily adapt to very high levels of labour intensity. Thereby, a larger fraction of the capital stock can be retained where it is needed most, precisely in the sectors in which the formal sector overwhelmingly dominates. This trade model approach to the informal sector is very popular and is discussed in more detail below. For the moment, it is worth bearing in mind that informality gives informal sector participants "something to do" with their time and simple Ricardian theory can thus be applied to show that informality allows everyone to have more. As the argument goes, of course, this is only relative to the autarkic state in which there is little or no trade between the sectors.

Some may find this construction artificial despite its pedigree in economic [21] theory. There are well-known downsides to specialization according to comparative advantage that mostly rely on the static nature of the problem addressed. Trade improves static allocation but may block growth if there is no opportunity for skill acquisition and climbing the ladder of comparative advantage (Gibson, 2005). There is little hope for change if informal sector participants are locked into low productivity jobs in which there is limited skill acquisition through learning by doing. Moreover, as an essentially non-traded sector, informals are not subject to productivity enhancing foreign competition to nearly the same extent as the informal sector. The dynamism of the economy as a whole relies predominantly on the dynamism of the formal sector. The question is then about the growth of demand for labour in the relevant skill categories that results from formal sector expansion. As noted above, if productivity rises faster than output, then formal employment opportunities shrink rather than expand. This does not seem to happen in the long run, but long periods of rather stagnant growth in formal employment are consistent with the trade model approach.

If growth is largely dependent on the combination of ultra-low wages with ultra-high capital intensity, comparative statics of the standard models of international trade suggest a rather perverse response to a rise in foreign demand. Rather than increase the demand for labour intensive goods as is usually the case in the Stolper-Samuelson theorem, foreign demand is likely to fall on the more capital intensive sectors. As these expand they can, to some extent, draw capital away from the other sectors, shifting the balance of domestic factor demand away

[21] See, for example, Driscoll (2007) and references cited therein.

from labour. The factor price ratio will logically reflect the change in demand, driving down the wage relative to the return on capital. In principle, foreign demand for the output of the informal sector could, and perhaps should, increase. In practice that is almost never the case for a variety of real-world reasons, including quality standards, marketing and supply chain dynamics that characterize modern international trade. It is far more likely that a burst of foreign demand will cause a decrease rather than an increase in the wage-rental ratio, as suggested by the trade theorems.

As noted above, traditional growth theory suggests that economic expansion depends on a surprisingly few variables, the overall savings (or investment) rate, the rate of population growth, technological change and capital depreciation. In this account, government and even international trade are of secondary importance to growth and only enter insofar as they affect one of the four parameters. Informality directly affects the canonical ensemble in that the savings rates must rise, at least minimally, before informal activity can begin. Despite the low levels of physical and human capital required, there are nonetheless some minimal intensity requirements that must be met before informal production is initiated. Since formal capital markets are largely outside the reach of informals, self-financing is usually necessary and this is what contributes to the overall savings rate in the economy.

The effects on the other parameters are less certain. It may well be the case that informal activity is sufficiently engaging in that fertility falls and if so, a second channel arises in which the informal sector can contribute to overall growth. On the other hand, fertility may not be affected much if the marginal contribution to family well-being of an additional potential worker is positive. In either case, low productivities and resulting low incomes prevent informal families from making significant investments in the human capital accumulation of their children. While a counterfactual in which informal sector workers only consume leisure is hard to imagine, informal production can be seen as better than nothing. With respect to their contribution to broad scale macroeconomic growth, however, it is difficult to support the conclusion that the presence of the informal sector contributes significantly to growth performance, at least when compared to any plausible counterfactual.

Finally, enumerating the functional characteristics of the informal sector must also include the effect on income distribution. Rapid productivity increases in some sectors of the economy will undermine the egalitarianism of subsistence economies and can be seen as a problem deserving of some policy response. To some degree, however, the safety net protecting the poorest elements of developing economies is provided by informal activity itself. The ILO was one of

the first to advance informality as an ameliorative to poverty and surplus labour in developing countries (Bangasser, 2000).

Juridical informality has no causal relationship to any necessarily undesirable outcome in economics. It might be said that if an informal sector were not paying taxes, then the public sector would be deprived of revenues and could not pursue its objectives of providing public goods such as the provision of infrastructure, protection of private property or the maintenance of the monopoly on the use of force. This argument critically depends, however, on the absence of government failure. It rests on the assumption that government would use the foregone revenues precisely to advance its efforts in the classical arenas of responsibility. If this is not the case, then the loss of revenue does not have particular welfare implications to speak of.

Reducing the tax and regulatory burden will lessen induced informality, that is, taking an enterprise underground to avoid taxes and regulations. Reducing the tax and regulatory burden will, on the other hand, have no effect on functional informality. It may well increase poverty measures if the formal sector lowers prices, driving down the return to informal producers with whom they compete.

If functional informality derives from the capital-limited nature of the economy, then informality must be synonymous with low productivity. A sector with low productivity is identifiable in the data and has a clear policy implication. Informality defined in this way also has a clear causal relationship to important economic variables. Human welfare is never served by reducing productivity, and improvements in productivity are broadly correlated with virtually all measures of human wellbeing[22].

If informal processes are just low productivity processes, then it would seem that there would be a clear policy mandate to simply raise productivity. Unfortunately, policymakers do not always have a clear understanding of the effects of productivity enhancing technical change. The reason is that low productivity processes create the most jobs and the political establishment is often beguiled by job creation. As noted, there is nothing in the canons of economic theory that suggests that job creation per se could be a valid or coherent policy goal. For the same level of output, more job creation simply means less leisure and this is an unambiguous decrease in human welfare. The existence of the informal sector, functional informality, clearly illustrates the point. If the formal sector could replace informal output in, say, one-tenth of the time required by the informal sector, total leisure in the system would rise, and most economists

[22] This is not to say that output per worker is the same thing as wellbeing, only that they often, in fact mostly, increase together.

would say that the economy is better off. Without some form of redistribution, it could be argued, the informals would be left without the means of subsistence. Some intervention would then be required to raise average productivity when the subsistence constraint is binding.

If all unemployment were voluntary, as in general competitive analysis, then there could be no informal activity, indeed no informal sector. That the informal sector persists suggests that unemployment is involuntary, even in the long run. As import penetration proceeds, the low level of pre-trade productivity in manufacturing insures that this sector is vulnerable to foreign competition. Skill levels in the service sector are likely to be higher than informal manufacturing, with the exception of sub-contracting of informal manufacturing and some services. These niche informal sectors might well operate at relatively high rates of productivity, but could not be reasonably expected to expand by out-competing their modern counterpart. Any remaining involuntary unemployment must be absorbed by the informal sector.

In South Africa, where the informal sector is a smaller percentage of the economy than in countries with comparable income per capita, the system of public sector transfers increases the reservation wage. This increases the per capita share of aggregate demand captured by informals. The process cannot be expected to increase the incomes of informal manufacturing or subcontracting, however, if the unit price of the commodity falls below the costs for low-productivity producers. Productivity in formal manufacturing (including subcontracting) has a lower bound that does not apply to informal services. In services, however, there are few non-labour costs and labour costs can, and quickly will, adjust to suit the competition from formal producers of close substitutes. Public expenditure on anti-crime and anti-corruption efforts has the opposite effect as do efforts to protect labour unions and collective bargaining.

Ultimately, the informal sector exists because of a shortage of physical and/or human capital. Relaxing the capital constraint would, in principle, raise productivity and cause future capital to accumulate, promoting a self-reinforcing sequence of higher per capita income and reduced informality. In the short period, however, a rise in labour productivity is not always greeted with enthusiasm, since it requires few workers to satisfy aggregate demand than in the immediate past.

An application of the theoretical framework: manufacturing subcontracting

Informal firms sell intermediate goods to formal firms as shown in the social accounting matrix in Table 16. These goods may be partially or fully elaborated, with the latter requiring little more than packaging and shipping. In this case, there is a strong positive correlation between the output of the formal firm and that of its informal subcontractors. Militating against this

positive correlation is the possibility that the subcontractors might be hired by the formal firm. Here the distinction between juridical and functional informality is relevant: while functional informals would accept a formal sector job if offered one, no such assumption is warranted in the case of juridically informals. A common example is formerly skilled workers or managers in a formal firm who start their own informal firms and now cooperate with former employers as subcontractors.

Formal and informal activities can be either positively or negatively correlated depending on the nature of the processes they operate. Functional informals are constrained by lack of access to capital markets and therefore cannot afford to upgrade the processes they control. In most developing economies, however, there is a segment, not necessarily large, of very active informal firms tied to the activities of formal sector operations. These firms find ways to expand output quickly in response to the needs of their formal sector drivers.

Indeed, subcontracting is a salient form of direct interaction between formal and informal firms. UNIDO defines subcontracting as

> "...an economic relationship where one entity the main contractor, requests another independent entity, the subcontractor or supplier, to undertake the production or carry out the processing of a material, component part subassembly or the provision of an industrial service in accordance with the main contractor's specifications." (Morcos, 2003, p. 2)

The mosaic of relationships can become quite complex. Subcontracting chains, for example, can go from large retailers to large formal sector firms to smaller formal and then even on to functional informal producers[23]. The most studied case of subcontracting relationships is the garment industry, which in the past 30 years has experienced dramatic structural change away from in-house production to subcontracting manufacturing while retaining only specialized functions such as design. Morcos (2003) finds that more than 30 percent of large US enterprises in 2001 were subcontracting more than 50 percent of production. A survey in 2003 in Bangladesh found that only 32 percent of clothing producers got their orders directly from the buyer; the rest were subcontractors (Hale, 2004).

The informal part of the subcontracting chain, by its subliminal nature, is difficult to detect and evidence is limited to case studies. A common finding is that the size of the informal activity is

[23] While most information about subcontracting and informal activity comes from manufactured goods like clothing, footwear and electronics, other sectors in which subcontracting chains extend deeply into the informal economy include non-timber forest products, such as shea butter, processed fish and fruits (Carr and Chen, 2001).

large relative to that of the formal. The Commission of the European Community in 1996 reported that of 650k workers engaged in subcontracting, 200k were home based and an additional 150k were undeclared (Commission of the European Communities, 1996). In examples from country or local case studies in the ready-made garment sector in Bangladesh, informal employment from subcontracting was estimated to be 75 percent of the level of formal employment (Rashid, 2006). One study of the city of Ahmedabad in India found that 56 percent of value added in large garment factories came from subcontracting (Unni, Bali and Vyas, 1999).

The main forms of subcontracting are full-capacity subcontracting, in which firms regularly subcontract work because of insufficient capacity and specialized subcontracting, in which the contracting firm lacks specific skills or equipment for some operations[24] (Lemma, 2001). In these cases, the subcontracting firms provide flexibility, specialized products and services and logistical support to the firms from which they get orders, causing the correlation between formal and informal output and employment mentioned above. The benefit to the subcontractor is demand.

These inter-industry flows increase direct and indirect demand throughout the input-output matrix discussed above. To the extent that the subcontracting firm finds the relationship profitable, more savings and investment can potentially result. A common complaint is that if low costs are the singular motivating factor in subcontracting, growth is likely to stagnate. This outcome, however, is not predicted by economic theory. The latter strongly suggests that all non-coerced transactions are mutually beneficial "modernizing linkages", irrespective of motive (Moreno-Monroy et al., 2012). Whether prices are high or low, it is demand that counts. That UNIDO has estimated that a full one-third of subcontracting is motivated by cost rather than these mutually beneficial modernizing linkages is, strictly speaking, irrelevant (Morcos, 2003).

In fact, cooperative interaction between the informal and formal sectors is prevalent. In Durban, South Africa, "Traders Against Crime" established a partnership between formal and informal businesses: informal traders provided surveillance and protection to their formal colleagues while the latter provided secure storage facilities for the goods of the informals (Chen et al., 2002). The informal sector does not graduate to formality as a direct result of this interaction, but lays the groundwork for an eventual transition by giving access to formal markets and infrastructural support. This is an illustration of the more general notion that the formal and the informal sector both contribute to the economy as a whole, so that aggregate demand due to

[24] Government policy in the Republic of Korea and Republic of China (Taiwan) has tended to support full capacity subcontracting with full legal authority through the Subcontract Promotion Council.

growth in informal sector output can spill over to the formal sector and vice versa. Eventually, the Durban formal sector came to sense this basic feature of the coherence of the macro economy and welcomed the informal sector rather than using their political influence to have it blocked by the state.

The more capital intensive the firm doing the subcontracting work is, the more likely it is, in turn, to encounter its own capital constraint and to then subcontract out part of its work (Morcos, 2003). The positive relationship between formal and informal activity is smaller for labour-intensive formal activity (Sundaram et al., 2012; Kongmanila and Takahashi, 2009 and Moreno-Monroy et al., 2012). The reason is self-evident in the framework of this paper. In capital-constrained developing countries, the expansion of labour-intensive processes is less likely to encounter a constraint, and thereby need to rely on subcontracting rather than on their capital-intensive counterpart. A countercurrent is when there are credence goods in the system that requires formal monitoring of labour conditions (Kucera and Roncolato, 2008 and Gunther and Launov, 2012). Here an additional constraint comes into play, such that there are now two kinds of labour, one that complies with the international labour standards and one that does not. The first behaves as a new capital constraint, causing the firm to reduce output and thus subcontracting.

Firms that only have an indirect connection to credence goods may also be affected by changes in global subcontracting chains. The interconnectedness of the economy implies that few firms, even chemicals and manufacturing, are free of this effect. The net impact is to reduce demand for scalable, juridical informal sector subcontracting. With monitoring, however, the demand for credence goods could reasonably rise, thereby increasing the demand for labour within the monitored firms. The correlation between the output of the formal and functional, non-scalable, informal sector is now reversed. Consumer preferences in developed countries can be reasonably associated with a rise of formality, increasing with the firm's human rights profile and a decline in the kind of informality most closely associated with poverty and badly distributed income (see Box 5) (Perry et al., 2007, p. 25).

Labour monitoring thus results in shorter subcontracting chains, putting indirect pressure on informal subcontractors to obey the very labour laws that juridical informal firms typically escape. Market forces thus provide an incentive for these producers to turn quasi-formal with no government involvement (Gereffi and Frederick, 2010). Since local consumers presumably do not care about or cannot afford to purchase goods embodying high labour standards, an opportunity for specialization along lines of comparative advantage arises, with local functional informals supplying local markets with unprotected goods, while the vertically integrated formal

sector concentrates on foreign markets[25]. Despite the trend in the post-dotcom period, it is difficult to imagine a more functionally informal environment than home work in a developing economy. One worker, one machine or tool, with output limited largely by the inherent productivity of the machine the worker employs. Were the worker herself to pay the market wage, there would be scant surplus to cover the rental cost of capital, most likely nothing at all. Home work can be either specialized work that falls into the category of regular subcontracting or work that is sporadic and depends solely on spikes in demand or bottlenecks in the formal sector firm. The former typically is skilled work like tailoring of high-end garments while the latter includes simple stitching or work that is considered too dangerous to be performed in factories, like stuffing down garments or stripping paint for metalworking. Here the idea is that concentrations of hazardous materials in a firm are a cost that is not borne in the decentralized environment of home work.

Box 5 Informality in history

Comparison of wages down the supply chain:

First Tier - Supply Factory RMB 700-1000 (USD 58-83) in peak season piece rate. No other form of subsidy. Minimum wage paid in low season.

Second Tier - Sub-contractor Factory RMB 500-1,000 (USD 41-83) a month for skilled workers in peak season piece rate. RMB 300 (USD 35) a month in low season piece rate. No subsidy. Wages paid 2-3 months late. No minimum wage or subsidy in low season.

Third Tier - Sub-contractor Workshop RMB 500-800 (USD 41- 66) a month for skilled workers in peak season piece rate. RMB 200-300 (USD 16-35) in low season. No subsidy. No minimum wage or subsidy in low season.

Fourth Tier - Sub-contractor Units / Homeworkers RMB 800-900 (USD 66-75) a month in peak season piece rate RMB 200-300 (USD 16-35) in low season. No subsidy. No minimum wage or subsidy in low season.

Source: (Hale, 2004, p.25)

It has been argued that home work could and sometimes is operated on a formal basis, paying taxes, obeying labour laws and achieving compliance with environmental regulations on point source emissions by the decentralized platform of production. This contributes to the overall efficiency of resource allocation and is fully compatible with an entirely formalized economy. A second equally rarified example is highly skilled garment or specialty woodworkers whose production process is entirely non-scalable. They cannot benefit from formal organization and comprise an artisan class of workers who are content to work in the isolation of their homes for

[25] Firms that resist the pressure to formalize will see competition in their own markets diminish as resources are drawn to traded goods. Examples from Ethiopia of subcontracting between informal small and micro enterprises include products such as food, small metal works and buttons to informal garment firms (Lemma, 2001). In this situation, expansion of formal activity will reduce informal activity in that sector and lead to greater concentration in the activities remaining within the reach of informal firms.

family or other reasons. Needless to say, learning by interacting with colleagues cannot be a part of this kind of production. The reality, however, is that home work is rarely efficient and largely populated by functional informals who would quickly accept an offer of formal work (Hale, 2004).

As noted, functional informals who abandon home work, piecework, their own kiosk, a storefront in their own homes and are now hired by formal firms can assist in the efficient allocation of resources if they accept a lower than going wage. This will encourage the firm to hire more of the formerly functionally informal workers as now juridically informal ones, since they are technically in violation of existing labour laws. The ILO refers to these as "disguised wage workers" [26] (ILO, 2002; Bennett, 2003).

Informal labour within formal establishments is juridical but not functional. To see this, note that workers who apply for, accept and work at a wage offered by a formal establishment in violation of labour laws is actually pushing the market wage closer to the shadow value of labour. Hence, it could be argued that they are working at a market wage, even though it is not a legally sanctioned wage. The formal process will pay the average rate of profit; otherwise it will not be operated by the formal firm. The worker is then juridical, but not functional.

It is therefore incorrect to say as many observers do, that workers who are not registered or paid legal wages with mandated benefits must be considered informal. The fact that they are not paid a full formal sector wage is not economically relevant, since the latter is determined by way of a political rather than economic criterion. A single factory, for example, may have production lines using more highly skilled workers and automated machines, and at the same time, simple machines operated by low-skill workers. A common mechanism for circumventing labour legislation is to deny workers formal contracts or the equivalent legal document to demonstrate employment, despite regular and continuing employment in the firm (Mather, 2004; Unni, Bali and Vyas, 1999). Surveys conducted by Women Working Worldwide found that in Pakistan and Bangladesh, 95 percent of workers interviewed had no appointment letter and so could not establish their rights under the labour laws of the country (Hale, 2004). It should be cold comfort to these workers that they have improved the allocative efficiency of their economies.

Conditions of work in many dimensions, wages, hours, health and safety, generally deteriorate with functional informality. It is less clear with juridical informality but since home production is rarely juridical, it is safe to conclude that home workers are at the bottom of most

[26] There is no reason to distinguish the non-wage from wage employment in the informal sector as do Blunch et al. (2001), since it is always possible to think of self-proprietors as implicitly hiring themselves as labour at the going wage rate and collecting a small or indeed negative profit.

distributions of any desirable quality of work. This is not to say that informality cannot be a choice. For example, it is true that home work can be preferred for its flexibility or for personal safety and convenience compared to a factory environment. Self-employment may also be preferred for many reasons, including increased independence and ownership of future returns if the enterprise succeeds. It is sometimes observed that self-employment in the informal economy can yield higher returns than wages to low-skilled or unskilled workers in the formal sector, but unless corrected for the difference in skills, experience, tenure and labour market attachment, the comment is mostly irrelevant (ILO, 2002).

Wage and benefit differentials between formal and informal work can be substantial due to the capital constraint. Research from Women Working Worldwide has found that the line-leaders, workers in formal sector firms who subcontract work to home workers, pay 20-30 percent of the rate they receive to the home workers. In the UK, home workers at the top of the earnings' range in 2003 earned only 73 percent of the minimum wage while those at the bottom end earned only 25 percent of the national legal minimum (Hale, 2004). These large wage differentials are evidence of the presence of functional informality. If the wage differences only compensated the additional flexibility and absence of monitoring in home work, then workers would presumably be indifferent at the margin to employment at home or on the factory floor. Since it is implausible that the benefits of home work would offset the large observed difference in wages, one would predict that if offered, the overwhelming majority of home workers would immediately accept a formal sector job. Apart and quite distinct from any offence to a sense of fairness incorporated into political slogans such as "equal pay for equal work", the large wage differentials strongly support the view that these workers are functionally rather than juridically informal. It follows that efforts to change their legal status without addressing the root cause of their functional informality, the shortage of human and physical capital, will be meaningless in terms of human welfare.

More recently in Bangladesh, formal and informal wage differentials in non-agricultural employment were strikingly different for some classes of workers. Here is some data: employees in the informal sector earn 25 USD per month or 74 percent of the wage of a formal sector employee, while informal employers earned 44 USD per month (56 percent) and informal "own account" workers earn 27 USD (43 percent) (see Box 6). (ADB, 2010).

It is sometimes argued that subcontracting itself explains the persistence and growth of informal sector activities. Since subcontracting is nothing more than a market transaction, it is unclear how it could cause informality. Certainly, there is significant inequality in pay and conditions of work across both categories of informality. It is less clear that these differences reflect anything,

but differences in the underlying skill set across informal sector participants. A consistent result in empirical studies of the nature and impact of formal-informal transactions is that these linkages are highly concentrated in the juridical part of the informal sector (Sahu, 2010; Maiti, 2010; Moreno-Monroy et al., 2012; Mukherjee, 2003). Subcontracting chains can often lead to functionally informal firms at the chain's end, and home work, the lowest link in the chain, appears to have expanded in several countries. Nonetheless, formal sector demand for informal goods and services is strongest for juridically informal firms with more capital, higher productivity and a more highly educated workforce. The reasons are straightforward. Informal firms with less capital and skill are seldom able to satisfy the quality, reliability and delivery time demands of formal enterprises. In specific tasks and circumstances, such as simple stitching of garments and basic metalworking of household objects, the chain may extend to the bottom, home work.

Box 6 Backward linkages to rural poverty in India

> In July when Asha and family stepped off the train after a 13-hour journey north to the Vidharbha region in Maharashtra, their village relatives inspected their faces finding evidence of how good life was in the Mumbai slums...To examine Asha properly, the older women had to crane their necks, since their bodies were bent from decades of agricultural labor...Asha stood mast-straight. She felt like a giantess, coming home. In the two decades since Asha and her husband left their respective villages, twenty miles apart, much had changed for the better. Some houses had grown larger and sturdier, thanks to the money those who'd left for the city sent back home. Public money had also altered the landscape: scattered among desiccated farms were new schools, colleges and handsome government offices with lawns as well tended as those of the Airport Road Hyatt. The government had built more water projects, too, but these had failed to compensate for the decline of Vidarbha's natural water systems. Poor rains and illegal siphoning depleted the water table; streams dried up and rivers reversed course. Farmer suicides had turned the region into international shorthand for the desperation of rural poverty.
>
> *Source:* Boo (2012, p. 135)

Note that the nature of the subcontracting agreement is largely outside the command and control of the state inasmuch as the Coasian theory of the firm largely determines whether there will be subcontracting in the first place or the inputs will be produced in-house. Following Coase, significant transaction costs will encourage in-firm production, even if excess capacity exists and the arrangement lacks the imprimatur of efficient resource allocation. This suggests that governments would be well advised to take a transaction costs approach to formal-informal regulation and to not stand in the way.[27]

What does Coasian theory have to offer to help better understand the scalable technology adoption problem? Subcontracting effectively transfers market risk to subcontractors who

[27] The classic references are Coase (1937, 1960).

because of their informal status, cannot afford to refuse the offer. Backward induction suggests that the only thing formal firms must do is announce a contract and informal firms will accept the risk. The variance in demand for full capacity subcontracting enters into the decision at both ends of the transaction. Formal firms are more profitable because of it and informal firms suffer higher volatility in their returns. There is nothing the state can do, however; short of aggressive exchange rate policy, since it is only the extent of market that allows the backward induction to solve the bargaining game.

The roles are somewhat reversed in full capacity subcontracting. In this arrangement, market risk is shared by formal and informal firms. A dip in demand that causes output to fall below full capacity in the formal firm does not mean demand for subcontracting falls to zero in that period. Given the complexities of the product lines, which include design and material substitution, change orders and long-tail runs, formal producers cannot easily find substitute subcontractors and quickly realize that it is in their interest to maintain a stable order flow so that the informal firm does not stray.

In developed economies, there is a significant principal-agent problem in subcontracting. The informal subcontractor, the agent, can pursue its own objective if it knows it can find other principals. In economies with a formal/informal structure, that is, developing economies, the structure itself solves the formal sector's agency problem. When the relationship between the two is irregular and uncertain, the subcontracting firm, the agent, has less of an incentive to perform as expected by the principal. Long-term relationships increase the performance risk of the subcontractor, thus reducing the burden on the contracting firm to monitor the agent. Here the main difference from fully formal economies arises: informal firms lack the breadth of market to support their bargaining position and so backward induction causes the principal-agent problem to be resolved in favour of contracting principal or formal firm. There are fewer performance breaches. Is this something public officials should try to "fix" by requiring that subcontractors register and behave as formal firms? The analysis provides its own answer. The problem is that the subcontractors actually lack options, while formal firms can always go offshore, if need be. It is a dilemma that is probably best resolved by the status quo, recognizing that further burdens imposed on the informal sector to comply with social regulation might well make the problem worse.

Evolution of informality

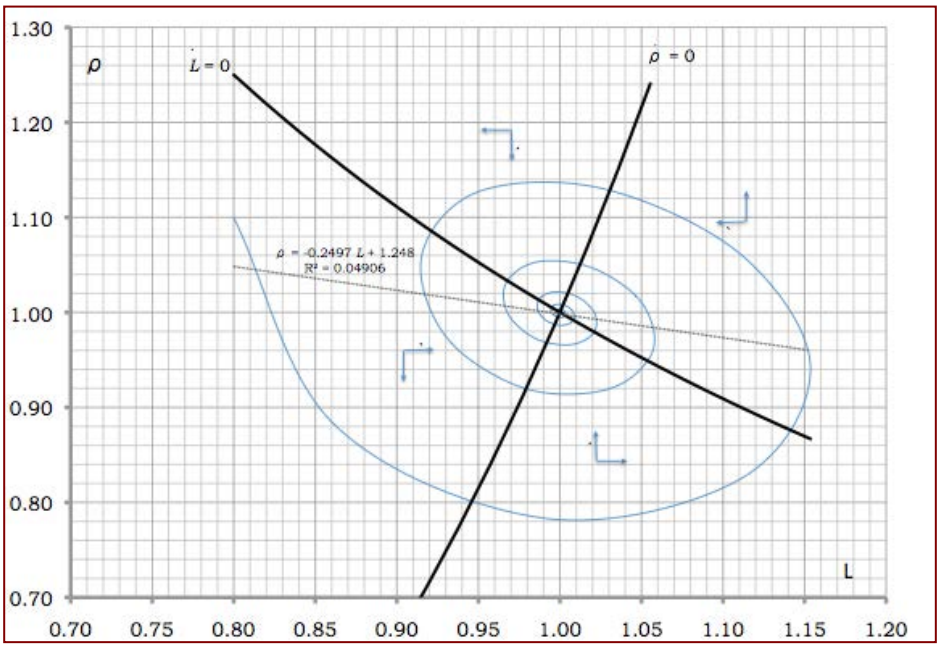
Gibson (2011) provides a simple model of the process focusing on two features of the growth of productivity: first, that for a given level of aggregate demand, a rise in productivity will reduce

employment, and second, that an increase in productivity, and thus profitability, will spur investment and capital accumulation. Profitability diminishes when labour becomes scarce and vice-versa. These two basic forces are necessary but not sufficient to construct a coherent model. Adding two more assumptions does the job. The third assumption is that a rise in employment will itself stimulate productivity increases as firms respond to increasing labour scarcity. The fourth is that employment growth must slow down as the economy reaches full employment. The downward sloping L = 0 line of Fgure 8 shows combinations of productivity and employment such that the level of employment is not changing. Any subsequent growth in the labour force would then have to be absorbed by the informal sector (Gibson, 2011).

Now consider an exogenous rise in productivity. Employment begins to fall and the economy moves to the left on the diagram. The informal sector swells and as more labour is expelled, aggregate demand falls and with it the implicit return to a unit of informal sector activity. This, in turn, drives down the opportunity cost of hiring and so profitability rises, increasing investment. The rise in investment slows job loss, returning the economy to the L = 0 locus, stabilizing aggregate demand. Note that without the presence of the informal sector, the drop in aggregate demand will be more severe. The informal sector cushions the blow of the rise in productivity and at the same time puts downward pressure on wages. Both effects are stabilizing for the economy as a whole.

The exogenous rise in productivity has released labour from formal to informal work, but as the informal sector swells, there is less need to introduce labour-saving investment. Eventually, productivity growth comes to a standstill. This is shown in Figure 8 as the $\rho = 0$ line in Figure 8. As the economy passes this line, productivity reaches its maximum and begins to decline. This helps slow job loss as well. When the economy passes the *L-dot over L* = 0 line, productivity has fallen enough to cause the informal sector to stop growing and below that line, the informal sector begins to shrink. Productivity is still falling, however, and this accelerates the decline in informality. Eventually, however, formal employers begin to run short of qualified workers and productivity stops declining. Productivity continues to fall until the economy passes the $\rho = 0$ line and then begins to rise again. This reduces the rate at which the ranks of the informal sector are depleted and eventually hiring slows to zero. Now the economy is on the L = 0 line and a new cycle begins.

Figure 8 The phase plane



How is this pattern affected by the presence of the informal sector? As long as there is sufficient reserve in the informal sector to satisfy the formal demand for labour, productivity enhancing investment will be postponed. Certainly, this generates more employment, but it is not good for growth in per capita income since the informal sector holds down productivity enhancing formal sector investment. The more the informal sector can substitute for formal labour, education, skill, language and the like, the longer it will take the economy to arrive at the $\rho = 0$ line and thus the steeper it will be.

The implications of this treatment of the informal sector are first, that it should be countercyclical, precisely like a reserve army of unemployed. Second, it should spread employment out over a larger number of workers, countering the effects of trade unions, as well as captured public sectors that would keep wages high and employment low. Third, large informal sectors that are good substitutes for formal labour should prevent investment in labour-saving technological change.

The evidence that the views of this section are correct derives from Tokman (2007) who points out that in Latin America and Africa, structural adjustment and reform actually increased the size of the informal sector. Sinha (2011), as noted above, points out that globalization has increased or at least not significantly decreased the size of the informal sector. The informal sector has exploded with globalization and economic openness (Verick, 2006). Harris-Todaro effects have caused the urban informal sector to grow as a result of structural reforms. In Kenya,

Ikiara and Ndung'u (1999) suggest that the structural adjustment programmes (SAP) caused the employment rate in the urban informal sector to increase from about 4 percent in the 1970s, when most of the labour force was in agriculture, to some 50 percent by 1994. Smaller governments, responding to directives of the Bretton Woods institutions calling for more market-oriented economies, can also contribute to urban informality since discharged workers are unlikely to return to the countryside. This includes military demobilization, as happened in Ethiopia when it released over 540,000 soldiers between 1991 and 1995 (Haltiwanger and Singh, 1999).

Nothing in the theory elaborated in the previous section suggests that the informal sector cannot disappear entirely[28]. Growth may well eradicate functional informality over time, but juridical informality is likely to survive indefinitely, if government regulation and the taxation to support it fail to confer palpable benefits. The same is true if there is significant free-ridership. The data for South East Asia seems to support the view that functional informality will disappear. In countries and regions such as the Republic of Korea, Republic of China (Taiwan) and Singapore, informal workers have been absorbed into large-scale formal enterprises. The same is true in China, although the backlog of rural functional informality is larger and more problematic.

What if the informal sector is not a perfect substitute for formal labour inasmuch as it lacks education, experience, labour market attachment measured by job tenure, in short, all the characteristics leading to successful labour market outcomes? If informal sector workers are inherently less productive than their formal counterparts, both the $\rho = 0$ and $L = 0$ are steeper and much of the time, there is an inverse relationship between employment and productivity. In Figure 3.3, the first and third quadrants defined by the isoclines occupy a relative large proportion of the phase space. In these quadrants, employment and productivity move in opposite directions (the way many policymakers believe they always do). The $\rho = 0$ isocline is steep because the lack of substitution makes formal labour effectively more scarce. This enables textile manufacturers in South Africa, for example, to argue that labour is hard to find, despite an official 40 percent unemployment rate. Similarly, the $\rho = 0$ isocline is steeper if the growth in output is likely to be slower than the growth in productivity. In an economy with more low-wage informal labour, whose qualifications prevent their earning the commodious salaries of the formal brethren, aggregate demand is more likely to lag behind, resulting in a steeper $\rho = 0$ isocline.

[28] In the same paper, Gibson (2011) provides an agent-based model that explores the conditions under which the informal sector persists or disappears.

In this case, it is best to think of the formal/informal structure as essentially a trade model (Davies and Thurlow, 2010). If informal workers are unsuitable for formal jobs, they can still contribute to GDP growth in the same way as countries with relatively low productivity contribute to the growth of world output. They do so through specialization and trade. So long as the informal sector produces what it does best, the formal sector specializes in the rest. This is the standard trade model operating within one country. Workers in the informal sector might better tolerate long, variable or non-traditional working hours or be willing to risk dangerous or unpleasant jobs while at the same time, they are unwilling or unable to acquire the human capital necessary to work in the formal sector. If these individuals self-select into the informal sector and work at jobs that no formal worker would accept, then total output will, of course, rise.

When total output rises, so, too, does total income and so the informal sector may well make a significant contribution to the level of aggregate demand. If this is the case, when the formal labour force is then near exhaustion, labour-saving technological change must still be introduced, causing a rise in productivity. If aggregate demand does not increase in steps, then some formal workers will be ejected to the informal sector. In time, their human capital might well depreciate to the point at which they become permanent members of the informal sector. Over a shorter time horizon, this is less likely, of course, and so they will probably be re-absorbed into the growing formal sector.

Something like this must occur as a country globalizes. With entry into the world economy, the country will tend to specialize along lines of comparative advantage. The transition is likely to be accompanied by a rapid inflow of foreign capital, which in turn raises productivity in the traded goods sector but does little or nothing for the productivity of the non-traded sector. McMillan and Rodrik (2011) note that productivity in the non-traded sector can decline, and this is precisely in line with the analysis developed so far. As the traded sector expands, it quickly crosses the $\rho = 0$ line as the economy experiences a productivity burst. Employment growth will slow and the political establishment will decry the empty promise of globalization as a jobs generator. It is possible, though unlikely, that globalization could be accompanied by a strong increase in productivity and reduce the unemployment rate among formally qualified workers. This would be unusual, however, and would result only when the cost advantage of the combination of advanced technology and low wages was so strong that demand for exports grew at an extraordinary rate. The advantages of current account liberalization are not conditional on this rate of expansion of demand, but the advantages are much more salient to the policy establishment if they are.

Labour market dynamics

A fairly vibrant literature does exist on the question whether agents can ever choose informality. "To first approximation," write Bosch and Maloney (2007, p. 2), "entry into the sector should be seen as a vocational choice in line with the worker's comparative advantage, to work in a more entrepreneurial sector, albeit one with irregular relations with the state." It follows that the state of play of the macro economy may well condition this choice. Maloney (1999), for example, argues against the traditional segmented labour model that is often applied to the informal sector. In this account, government or union intervention pushes wages in the formal sector above their market-clearing level. There are more qualified applicants than vacancies, so workers queue up for good jobs and, in the meantime, join the informal sector.

As noted above, some workers may in fact prefer the informal sector, given that there are a number of infelicitous barriers, such as drug testing, immigration or cultural or racial discrimination, or simply personal preferences. These and other factors may push a worker out of the formal into the informal sector, but there are also pull factors at work. Some may prefer the flexibility, hours and absence of surveillance and intrusion that the informal sector offers. Using Mexican data, Maloney (1999) shows that informal work is often more remunerative than formal. The segmented labour market approach suggests a one-way pattern of mobility from informal to formal sector employment. The data for Mexico shows that this is not necessarily true.

Gunther and Launov (2012) argue that the heterogeneity of the informal sector in that some workers are clearly rationed out of the formal sector while the informal sector is a strategy of last resort. Using data from Côte d'Ivoire, they show that the informal sector is composed of two segments of approximately equal size, with a distinct wage equation in each segment. One segment of the informal sector is "superior" and the authors base this finding on the "comparative advantage" of these individuals. In clear contradiction with the theoretical approach in this paper, however, they claim that this group has "higher average earnings as well as higher returns to education and experience." (Gunther and Launov, 2012, p. 8). This is the notion of "upper tier" informality, which according to the analysis presented here, has no clear theoretical foundation. Indeed, higher remuneration for more skills, education and experience is attributable to nothing more than market forces and cannot delineate informality in any important way (except perhaps ex-post.) Perhaps the upper tier is juridical informality. The authors do not say. What they do offer is a test of the unlimited sector mobility and find a considerable number of informal workers that would be better off in another segment of the labour market. Then, to make matters worse (assuming the reader accepts functional/juridical

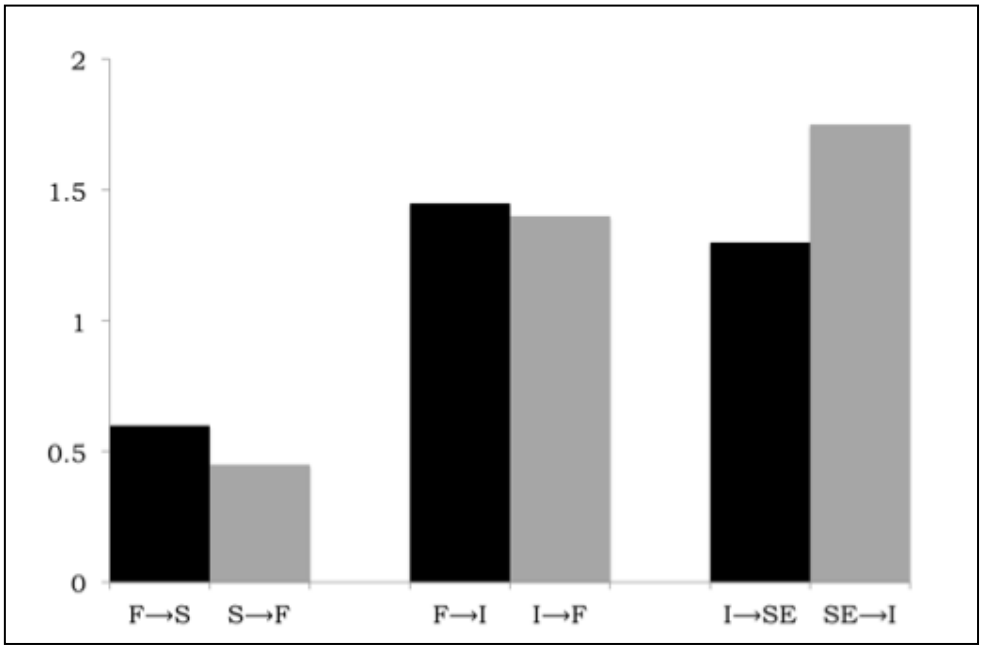
distinction), they parenthetically note "(most, but not all, of them found in the lower-paid informal segment)." They then erroneously conclude that the "higher-paid informal segment seem to have a comparative advantage in the informal sector" (emphasis added) when a comparative advantage can only be claimed in case labour mobility is incomplete [29]. Comparative advantage, as in the trade model approach discussed above, applies here mostly to the lower, immobile tier and therefore cannot explain the bifurcation the authors so expertly uncover in their data.

Bosch and Maloney (2007) develop continuous-time Markov transition processes and employ them to study and compare labour market dynamics in three developing countries, Argentina, Brazil and Mexico, all of which are very similar in terms of the structure of their labour markets. The authors distinguish formal sector salaried jobs, informal sector salaried jobs, self-employment, out of labour force and the unemployed. Workers in informal sector salaried jobs are more likely to be juridical than functional and vice versa for the self-employed. Figures 9, 10 and 11 show indices of labour flows in and out of the three sectors. What is notable is the lack of direct interaction between the formal and the informal sector. In these three countries, the juridical informal sector seems to be a buffer between the functional and formal sectors. On balance, the number of workers moving from the formal to juridical sectors is larger than the reverse flow. This data is consistent with the idea that productivity in the formal sector, at least in Argentina and Brazil, rises faster than output. In Mexico, productivity and output grow at approximately the same rate. A larger flow of workers seems to move from the self-employed or functionally informal to the juridically informal sector, who are likely to have subcontracting work from formal firms than the reverse. These juridically informals then queue for jobs in the formal sector.

Labour migration into the juridical informal sector may well be pro-cyclical but for functional informality, it is clearly countercyclical. Juridically informal workers may take up self-employment knowing that if their fledgling business fails, they can always retreat to the formal sector, and more easily so when the economy is robust. Indeed, these individuals might well wait for an upturn in the economy before venturing out on their own, abandoning the security of a formal sector post. Evidence from Mexico suggests that juridical informality is pro-cyclical and the same seems to be true for Argentina. Bosch and Maloney (2007) find that the share of self-employed in Argentina increases as economic conditions improve, while Fiess et al. (2000) show similar results for Colombia, Brazil and Chile during periods of expansion.

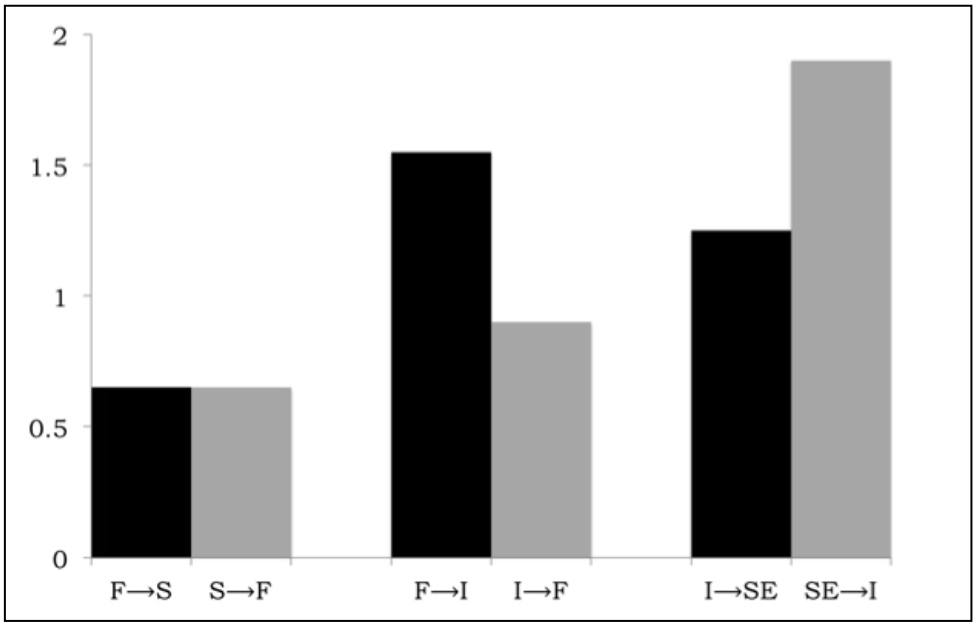
[29] Consistent with the back-of-the-envelope estimates offered above, the authors conclude that the estimated size of involuntary informal employment is about 45 percent of the entire informal sector.

Figure 9 Informal sector crowds into trade



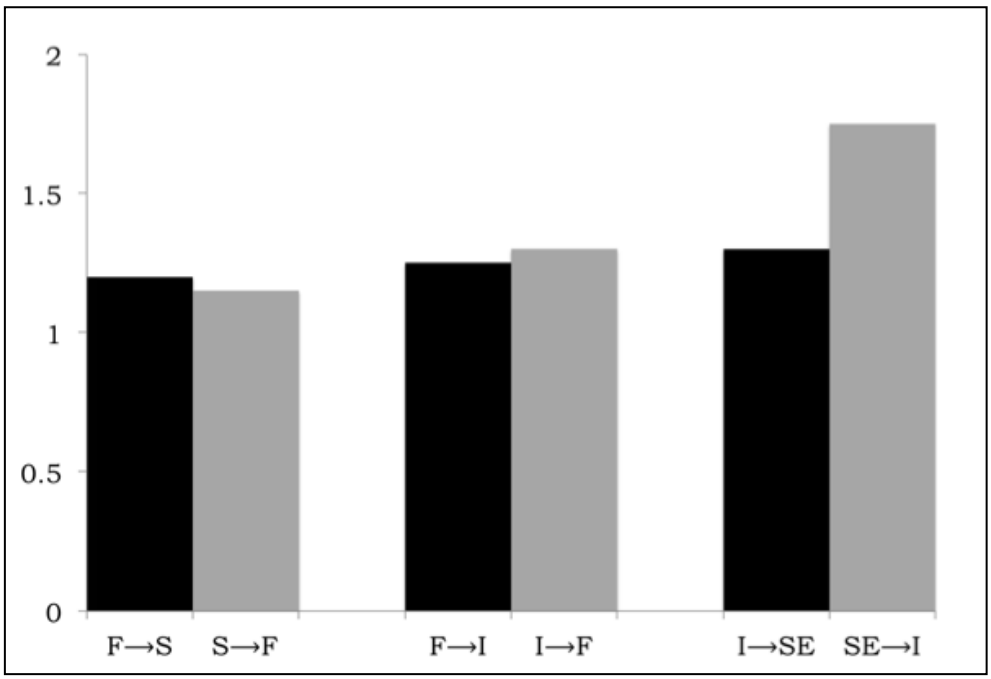
Source: Bosch and Maloney (2007)

Figure 10 Informal sector crowds into trade



Source: Bosch and Maloney (2007)

Figure 11 Informal sector crowds into trade



Source: Bosch and Maloney (2007)

4. Policy conclusions

Policy recommendations related to the following issues are addressed in this section (see Box 7 for some questionable recommendations proposed in the literature). First, while structural change from largely informal to more formal manufacturing industries is in principle desirable, it must be done through processes that ensure the development of inclusive (non-extractive) economic and political institutions.

(1) Fundamental to the idea of the informal sector is that the state cannot block participation. No reasonable government would try to do this, so the question is how best to assist the evolution of informality so that informals contribute as much as they can to the growth process.

(2) Were government under some political pressure to "do something about the informal sector" and perceived that it had a choice of whether to repress either functional or juridical informality, it should choose the former. This is supported by the computational results shown above. Any effort to discourage functional informality should be accompanied by a more relaxed proscription of juridical informality. Displaced informals would then be freer to bid down the average wage rate (without necessarily reducing individual wage) thereby enhancing competitiveness in export markets. This strategy is not recommended. Legislative repression does not lead to

economically efficient outcomes and can even increase the public sector borrowing requirement as seen in the simulation.

(3) Outward orientation has a positive but weak association with economic development. It has a stronger association with the manufacturing informal sector. The reason is clear: export oriented manufacturing sectors often require flexible, cheap sources of inputs that can be provided by sub-contracting, which can involve the manufacturing informal sector. Any attempt to formalize these linkages runs the risk of the loss of competitiveness for the country. Tolerating informality is equivalent to an export subsidy that protects both formal and informal sector profits and jobs.

(4) A country with a dense input-output matrix will have a larger manufacturing informal sector than a country that specializes in one crop, one product or a particular natural resource. This does not imply a regular relationship between industrial structure and the manufacturing informal sector, since the latter can either be a complement to a range of domestic manufacturing sectors or a substitute for the imports that a more specialized economy earns with its exports. No general policy recommendations are forthcoming from this analysis.

(5) Were the Lewis model correct, the flow from informality would always be unidirectional. Since benefits of formality are usually significant from the employee's perspective, there would never be a reason to return to informality. This provides another economic way of distinguishing the informal sector as a reserve army of unemployed, operating processes that are defective and likely to remain that way, from production processes that may promise to scale into highly profitable, capital intensive (physical or human) drivers of economic growth (Williams and Tumusiime-Mutebile, 1978 and Gibson and Kelley, 1994).

(6) There is no binding resource constraint in the latter case that enforces informality. It is an economic choice made by rational agents seeking to start new concerns. These individuals are more likely to strike off and become independent proprietors when the economy is strong and unemployment is low, and can provide a backstop in case the new venture fails. Government has no role in this process other than that justified by standard economic theory, attention to public goods and externalities.

(7) The implication for public policy of informality of this sort is virtually nil since there is nothing government can or should do about individuals who having identified a

market for some good or service they then try, often at great personal risk and sacrifice, to satisfy demand. If anything, policies that are designed to repress functional informality, arising out of static or dynamic market failure, should be restrained or tempered so that the policy establishment runs no risk of collateral damage to entrepreneurs who are undertaking the essential tasks of the economic system.

(8) The central difficultly in carrying out this advice is simply that the most dynamic, entrepreneurial firms and those mired in the self-exploitation of functional informality have always evolved from a common ancestor. If the political structure lacks confidence in its ability to pick winners, or indeed if it chooses to support the loser through tax breaks, subsidies and the rest while in effect suppressing the winner, there is little point in the exercise. This unfavourable outcome should give pause to overly zealous policymakers.

(9) One of the biggest problems facing the informal sector is lack of access to capital markets, either because of the absence of collateral, or if present, its lack of clear title. Most of the recommendations of this paper suggest that government should take a hands-off policy towards the informal sector. The approach does not, however, imply anarchy or anything of the sort. A parallel or shadow set of informal rules, regulations and other uncodified social norms and group dynamics arise to provide order within existing informal economy. The World Bank sometimes makes the point that informal norms might be adapted to the formal sector regulations to enhance the flexibility of the latter (Perry et al., 2007).

(10) The juridical distinction between the formal and informal economies may itself pose a barrier to the implementation of the appropriate technology, if it can be identified. Consider a subcontractor whose cost advantage derives from his skirting labour laws and paying less than the minimum wage. In this case, the cost of moving to the scaled technology involved a transformation not only of the capital stock but also the institutional context in which the firm operates. Some will be willing to make the transition; others not. If the transition to formality could be made less expensive with grandfathered tax and labour laws, more appropriate technological choices could be made.

(11) It is important to remember that public policy is subject to capture by the formal sector. In Russia, for example, the formal sector was successful in blocking informal

competition through the political process. This is nothing more than formal sector rent seeking. China provides a counterexample by encouraging formal-informal sector linkages far more than most countries.

Box 7 Informal sector myths

So much is written about the informal sector that it cannot all be true. Certainly, many arguments cannot withstand the harsh light of economic logic and/or formal models. Consider the following sample of questionable uses of the concept:

- Informal sector workers choose to be informal on the basis of costs and benefits. When the benefits fall shy of costs, informals simply stop purchasing the benefits of formality. It follows that some workers are pushed and some jump into the informal sector. This is a myth since no matter who happens to populate the informal sector at a given moment, the economic structure implies that some producers will have to operate informally.
- Informal workers who compete on price are usefully distinguished from those who compete on wages, that is, those who provide labour services to formal firms. This is also incoherent since all workers in the informal sector operate or are employed by defective production processes, ones that will not be operated formally and will not return the average rate of profit when market wages are paid. Any given informal always has the choice of whether to operate one of these production processes or work for someone else who does. In either case, informals who own some capital will get a rate of return depending on risk from that capital whether invested in his/her own production processes or one operated by someone else. In theory, net income, adjusted for risk, is the same for both options.
- The low wages paid in the informal sector are bad for an economy. It is better to have high wages and high unemployment than low wages and low unemployment. The traditional argument provided by economic theory strongly suggests that this is a fallacious claim. Only if one assumes that demand is completely inelastic and that there are fixed factors of production, labour and capital are always combined in precisely the same ratio in every production process in every branch of production, would this be true. So long as production can be undertaken with variable proportions in some part of the economy, low wages will provide an incentive to use those labour-intensive techniques and for that part of the economy to expand.
- It is important to distinguish workers who produce goods not produced by the formal sector (Davies and Thurlow, 2010). An example is domestic services, since few formal sector firms produce them. Economic theory, however, suggests that there are indeed substitutes for most goods, including those only produced by the informal sector. If the prices of substitutes fall, the assumption that close substitutes will experience no reduction in demand is unwarranted.
- Informal sectors deprive the public sector of needed revenue and it is therefore in the public interest to formalize informal production. Nothing in economic theory, however, supports the idea that the public sector should be entitled to some specific quantity of resources. While it is true that the public goods game suggests that public sectors may well be deprived of sufficient revenue to maximize some welfare function, it does not follow that if revenues increased, the public sector would spend these revenues in a welfare enhancing way. They may or may not.
- Informal sector activities are not protected by legislation that would otherwise provide social security benefits, health insurance, worker's compensation for on- the-job injuries, collective bargaining or other worker's rights commonly conferred in formal sector jobs. There is nothing optimal about employee provided health care, simply because that is the way it has been done in developing countries in the decades since World War II. Blunch et al. (2001) point out, for example, that the formal sector in developed economies is in the process of shedding much of the traditional "archetypal employer-employee" relationships for more flexible, less secure but highly remunerative pay in exchange. "...this directly opposes the notion [that developing] countries 'should'", they write, "move towards greater formalization of the labor force," (Blunch et al., 2001, p. 4).

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