

Formal-informal economy linkages and unemployment in South Africa

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Summary – South Africa’s high involuntary unemployment and small informal sector is attributed to an underperforming formal sector and barriers-to-entry in the informal sector. This paper examines the economywide linkages between formal and informal economies while accounting for different types of informal activities. A multi-region empirically-calibrated general equilibrium model is developed capturing both product and labor markets. Three policy options are considered. First, results indicate that trade liberalization reduces national employment. However, it increases formal employment, hurts informal producers and favors informal traders, who benefit from lower import prices. Past liberalization may, therefore, partly explain South Africa’s small informal sector and its concentration amongst traders rather than producers. Secondly, wage subsidies on low-skilled formal workers increases national employment, but hurts informal producers by heightening competition in domestic product markets. This suggests that it is insufficient to examine unemployment policies by focusing only on labor markets. Thirdly, unconditional cash transfers stimulate demand for informally-produced products, thereby raising informal employment without undermining formal producers. The transfer does, however, place a large fiscal burden on the state and is less effective at reducing national unemployment than a wage subsidy. Overall, these findings underline the importance of distinguishing between the formal and informal sector implications of socioeconomic policies.

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1. Introduction

Unemployment is one of South Africa's most pressing socioeconomic challenges, affecting a quarter of the workforce. Rodrik (2008) identifies manufacturing's poor performance relative to skill-intensive services as the main cause behind rising unemployment amongst lower-skilled job-seekers. Moreover, most of manufacturing's decline since the end of Apartheid is attributed to low profitability caused by rising import competition. As a result, formal sector job creation has failed to keep pace with expanding labor force participation. It is expected then that the unemployed would turn to the informal sector. Indeed, informal employment has accounted for most of the job creation over the last decade (Casale et al., 2004). However, despite this expansion, South Africa has a small informal sector compared to other countries at similar income levels (Maloney, 2004; Schneider, 2002). Supporting this observation, Kingdon and Knight (2004) show that unemployment in South Africa is involuntary and that informal work is preferred. This suggests that there exist significant barriers-to-entry in the informal sector, such as poor access to credit, high levels of crime, and a reservation wage inflated by social transfers (Ranchhod, 2006).

High unemployment in South Africa is thus attributed to an underperforming formal sector and to the inability of the unemployed to enter informal labor markets. However, few studies have examined the linkages between South Africa's formal and informal sectors. In other words, how the structure and size of the formal sector influences employment incentives and opportunities in the informal sector. Moreover, studies that do consider formal-informal sector linkages typically focus on tax policies, such as expanding the tax base, or on labor market interactions, such as trade unions' protection of formal employment (see, for example, Schultz and Mwabu, 1998; Lucas and Hofmeyr, 2001). Such studies do not address formal-informal sector competition in product markets, which may also influence the size and composition of the informal sector, and hence indirectly the high level of unemployment.

In this paper we examine how South Africa's formal sector affects informal production and employment. Given the diversity of the informal sector, Section 2 uses recent household and labor force surveys to develop a typology of informal activities based on their different interactions with the formal sector. Drawing on this typology, Section 3 constructs an empirically-calibrated economywide model that captures formal-informal sector linkages in both

product and labor markets. This model is used in Section 4 to examine three policies that feature prominently in South Africa's current unemployment debate: trade liberalization; formal sector wage subsidies; and unconditional cash transfers. Model results indicate that policies can produce diverging outcomes for formal and informal economies. More specifically, policies favoring formal sector job creation may in fact lower informal employment, while also having differential impacts on different types of informal activities. This suggests that formal/informal linkages can explain some of the small size of South Africa's informal sector, as well as its concentration amongst traders rather than producers. These results also caution against adopting formal sector policies without considering informal sector impacts. The final section discusses these findings and their implications for future research.

2. A typology of informal activities and employment

Contrasting views of the informal economy

In contrast to typical dual economy models, the informal economy is quite diverse and has complex interactions with the formal sector. To begin with, there are conflicting views over the role of informal activities in stimulating broader economic development (Devey et al., 2003). For some the informal sector is viewed as a dynamic sector with the ability to create jobs and actively contribute to economywide growth. Informal activities are viewed as 'small enterprises' which may eventually generate tax revenues through a gradual process of formalization. By contrast, others view informal activities as low productivity employment or as 'survivalist' strategies for poor households. From this perspective, the informal sector plays a passive role in development and acts as a temporary substitute for social protection during the formal-sector-led growth process. Evidence from recent surveys in South Africa reveal the heterogeneity of informal activities and suggest that there is room for both perspectives (Berry et al., 2002). Indeed, the informal economy comprises a continuum of survivalist and enterprise activities. This more nuanced view of the role of informal activities highlights the complexity of designing policies that account for differential impacts on formal and informal economies.

There are also differences in the definition of the ‘informal’ sector (Devey et al., 2003). Here we draw the distinction between ‘informal activities’ and ‘informal employment’. Some view informal workers as those who own or are employed by informal or unregistered firms. Indeed, this is the view held by official statistics in South Africa. By contrast, others take a broader view and include workers *informally employed* within the formal sector (Husmanns, 2001). For example, the former (narrower) definition includes informal producers and traders, while the latter (broader) definition includes day laborers and seasonal farm workers working for formal firms/farms but without contracts or benefits. This distinction is important. For example, under the narrower definition, South Africa has a disproportionately small informal sector (i.e., 2.35 million informal workers or one fifth of total employment). Under the broader definition, an additional 1.45 million workers are classified as informally employed (excluding domestic workers and subsistence agriculturalists).¹ This raises the share of broadly-defined informal employment to more than one third of total employment. While this redefined informal sector measurement is not directly comparable across countries, it is more consistent with other countries at similar income levels (Maloney, 2004; Schneider, 2002). Thus, a broader view of informal employment is preferred to conventional distinctions between formal and informal sectors. It also highlights the complex linkages between formal and informal economies.

A typology of formal-informal activities

We develop a typology based on the nature of informal activities’ interactions with the formal sector. Table 1 lists the four types of informal activities that we identify: (i) informal producers who compete with formal producers in product markets; (ii) informal traders who sell formal sector products and charge a fixed transaction cost margin; (iii) workers who are informally employed in producing formal sector products; and (iv) informally employed workers producing goods and services that are not produced by the formal sector (i.e., non-competitive producers).

The first category, ‘informal producers’, includes small enterprises producing goods and services that compete with formal sector firms producing similar products. Examples include processed foods, textiles and clothing. Informal producers generate employment for other informal workers, and they compete in product markets based on the price at which they can

¹ Calculations based on the 2004 Labor Force Survey (September).

supply their goods. Thus the main linkages between informal producers and the formal sector are through the purchasing of formal sector intermediates and through the selling of commodities under price competition to formal consumers. This employment type closely corresponds to the official definition of the informal sector (i.e., workers in unregistered or untaxed businesses). According to the September 2004 Labor Force Survey (LFS2004), about 1.55 million workers fell into this category out of a total employed workforce of 10.6 million (see fourth column in Table 2). Note that this is total informal sector employment less informal traders, who form the second category in the typology.

Table 1: Four types of informal employment

	Are distinct formal and informal goods produced?	Is there price competition between formal and informal goods?	Is there wage competition between formal and informal workers?
Informal producers (e.g., food, clothing, transport)	Yes	Yes	No
Informal traders (e.g., street vendors)	No	No (fixed margin)	No
Informally employed in formal sector (e.g., construction day laborers)	No	No	Yes
Non-competitive informal activities (e.g., domestic workers)	No	No (sold to formal sector)	No

‘Informal traders’ differ from informal producers because they do not produce a product but rather provide a service to consumers. Accordingly, they do not compete directly with the formal producers over price. Rather, as a generalization, they purchase formal sector goods, which they sell on to consumers with a fixed mark-up or margin. This means that informally traded goods will often have a higher price than those that are formally traded. This higher price is possible because informal traders often trade formally-purchased goods in smaller volumes than formal retailers (i.e., ‘regrating’ or price discrimination) or they trade in closer proximity to final consumers (e.g. at taxi ranks or along the road). According to LFS2004, about 805,000 workers are engaged in informal trade, thus forming a large part of South Africa’s overall informal sector (see fourth column in Table 2).

Table 2: Employment profile, 2004

	All workers	Formal sector workers	Informally employed workers	Informal sector workers	Skilled workers	Semi-skilled workers	Unskilled workers
Total employment (1000s)	10,556	6,754	1,451	2,351	2,048	4,826	3,682
Employment share (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Agriculture	10.3	6.9	9.8	20.3	2.0	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	2.0
Textiles and clothing	2.9	3.0	1.2	3.6	0.6	5.3	1.0
Other manufactures	9.3	12.4	3.1	4.0	9.1	12.6	5.0
Construction	7.3	4.7	8.9	13.6	2.5	11.0	5.1
Mining and utilities	4.4	6.9	0.0	0.0	2.5	7.4	1.6
Services	63.3	62.6	75.9	57.7	81.8	56.5	62.0
Retail trade	17.7	14.1	7.3	34.3	10.3	20.4	18.2
Restaurants	3.3	3.6	2.5	3.0	3.0	5.0	1.3
Transport	4.8	5.0	3.2	5.1	5.6	6.4	2.2
Business	9.1	13.3	1.0	2.0	16.1	10.5	3.4
Government	10.4	16.2	0.0	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 (R per worker)	19,662	26,175	10,015	8,032	38,609	19,198	9,792

Source: Own calculations using the 2004 Labor Force Survey (September).

Notes: 'Skilled' workers are professionals and managers; 'Semi-skilled' are sales and technicians; and 'Unskilled' are all others.

‘Informally employed’ workers work in the formal sector on a somewhat ‘casual’ basis. In other words, they do not have contracts, are not unionized, and do not receive benefits. Examples include day laborers in the construction sector or seasonal agricultural workers working on commercial farms. These workers compete with formal sector workers through their wage rates. In many developing countries the textiles sector provides a good example to distinguish informal producers from informally employed workers. To begin with, informal producers may produce textiles that compete in local markets against formally produced and imported goods. At the same time, other workers may be casually employed in formal textile factories alongside contracted labor, producing goods that are sold in both local and foreign markets. While the first type of formal-informal interactions is through price competition in product markets, the second type of interaction is through wage competition in labor markets.

Finally, we include a fourth type of informal activity: workers who produce goods that are not produced by the formal sector. These types of workers are a subset of workers informally employed in the formal sector. For example, domestic workers might be considered ‘casually’ employed in the formal sector (despite recent regulations), but they do not face competition from formal sector workers (since no formal sector firms produce domestic services). However, while there is no competition to produce these services, they are entirely sold in the formal sector and are thus dependent on demand from formal sector consumers (in this case private households receiving most of their incomes from the formal sector). Thus there are still important formal sector linkages for this type of informal activity.

While any typology is an abstraction for a more complex reality, the above classification of informal activities and employment has the advantage of providing a clear framework for understanding how alternative policies may have differential effects on specific actors within the formal and informal economies. Our typology is less concerned with grouping workers based on differences in their specific jobs (for example, taxi drivers versus domestic workers). Rather it identifies the various transmission channels linking formal and informal activities, such as product market prices, labor market wages, and informal trader margins. In the next section we implement this typology within a broader economywide context and develop an integrated multi-sector model of South Africa’s formal and informal economies.

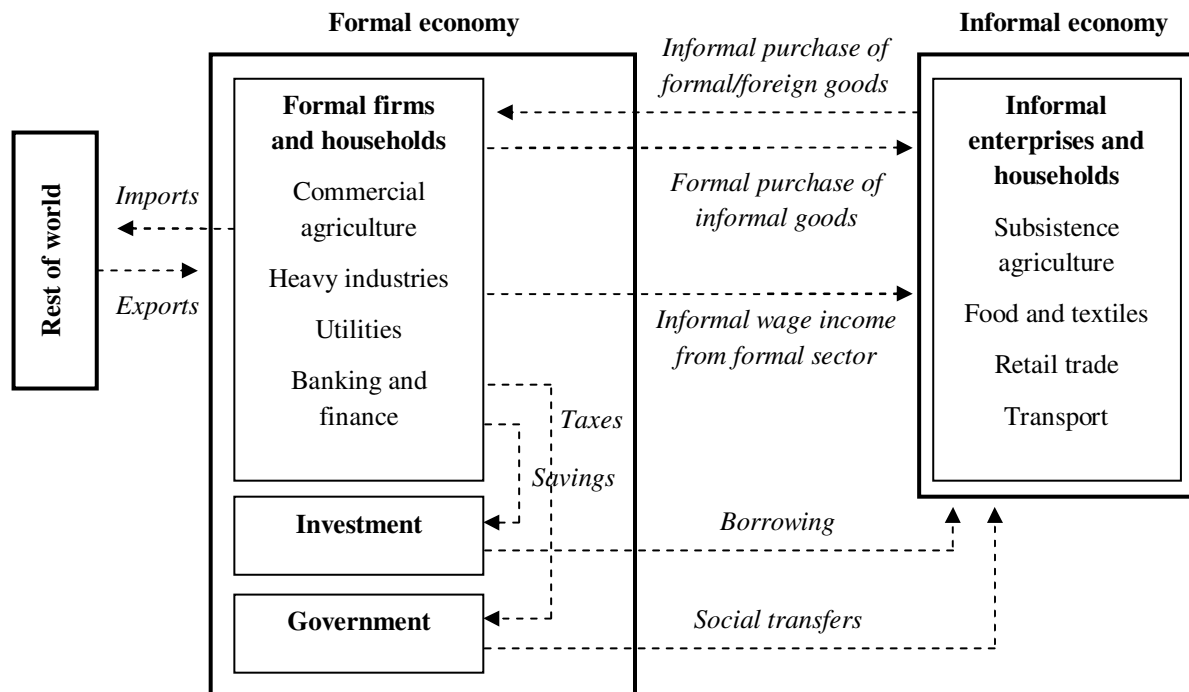
3. Measuring and modeling formal-informal linkages

In this paper we develop a multiregional computable general equilibrium (CGE) model that captures the observed structure of South Africa's formal and informal economies as well as the various linkages or transmission channels connecting their different economic actors (e.g., firms, traders, government and investors). A CGE model is a system of equations that describes the functioning or behavior of an entire real economy (i.e., it covers all sectors, institutions and markets). The parameters of the CGE equations are calibrated to observed data from a social accounting matrix (SAM). A SAM is an economywide database that accounts for all monetary flows in an economy within a specific year. It reconciles a wide range of data sources, including national accounts, household income and expenditure surveys, and labor force surveys. Our analysis therefore required the construction of both a specialized South African formal-informal model (SAFIM) and an accompanying SAM. The mathematical specification of SAFIM is included in the appendix. This section presents a conceptual framework of the model and discusses its structure and core assumptions.

Conceptual framework of formal/informal sector linkages

Figure 1 provides a conceptual framework of the formal/informal sector linkages in SAFIM. The model identifies two regions, representing the formal and informal economies. Each region produces and consumes commodities. The formal region produces a wide range of products and is fairly autonomous, since it produces most of the goods that it consumes and trades directly with the rest of the world. Formal sector firms and households pay taxes to the government, and invest their savings in formal financial institutions. By contrast, the informal region is far from autonomous, since it produces a narrower range of products and cannot trade directly with the rest of the world. Informal enterprises and households demand products that they do not produce themselves, and so they must purchase ('import') goods from the formal region (i.e., the top interregional arrow in the figure). But this implies that informal region households are spending more money than they earn, which is not sustainable in the long-run (i.e., does not describe an equilibrium situation). As shown in the figure, four linkages generate the earnings needed to finance the informal region's trade deficit with the formal region.

Figure 1: Conceptual framework for the formal-informal economywide model



Firstly, the informal region generates external earnings by selling (‘exporting’) products to the formal region. According to the 2000 Income and Expenditure Survey (IES2000), about five percent of formal households’ food purchases (in value terms) and three percent of their nonfood purchases were made in informal markets (see Table 3).² In fact, formal and informal households reported similar informal market expenditure shares, thus highlighting the importance of bidirectional formal/informal trade. While lower-income households spend a greater share of their income in informal markets, households in the top expenditure deciles still purchase informally produced and traded products. Overall, the 2002 SAM, which is based on IES2000, estimates that informal sector exports to the formal region cover 77.5 percent of the informal economy’s trade deficit with the formal sector (and, indirectly, with the rest of the world). This underlines the importance of product markets for understanding formal/informal linkages.

² We define ‘informal households’ as those earning any income from the informal sector, including incomes from workers that are informally employed in the formal sector (see Section 2). We also include households that contain only unemployed adult members. All other household are deemed ‘formal’.

Table 3: Informal market expenditure shares, 2000

	Share of purchases (value) in informal markets (%)			
	Food products		Nonfood products	
	Formal households	Informal households	Formal households	Informal households
All expenditure deciles	5.1	10.1	3.2	6.6
Deciles 1-5	13.4	13.5	9.8	9.7
Deciles 6-8	9.2	11.3	6.8	7.1
Deciles 9	5.1	5.4	4.6	5.5
Deciles 10	1.9	3.1	1.6	4.0

Source: Own calculations using 2000 Income and Expenditure Survey.

Note: 'Informal households' include all households reporting earnings from informal employment as well as households with all members that are unemployed.

The second source of external earnings for the informal economy is wages earned by workers that are informally employed in the formal sector. Following our two-region conceptual framework, these workers effectively 'migrate' to the formal region on a daily basis and remit their wages back to households in the informal region (e.g., domestic workers working for formal households). These remitted incomes can then be used to cover the cost of imports from the formal sector. According to the 2002 SAM, the remitted earnings from informally employed workers covered 15.1 percent of the informal sector's trade deficit.

The remaining two sources of external earnings for the informal sector lie outside of the product and labor markets. To begin with, the informal region is able to borrow externally in order to cover its formal sector purchases. This flow is reversed if informal households as a group are able to save some of their incomes. Secondly, and more importantly, informal households are net recipients of social transfers from the government, such as though public pensions or child support grants. Even though informal activities and households are exempt from direct (income and corporate) taxes, the social transfers from the government are still offset by indirect (sales and import) taxes that informal households effectively pay on their formal sector purchases (i.e., on final and intermediate demand). Netting out these indirect tax payments, the 2002 SAM estimates that government inward transfers account for 7.4 percent of the informal sectors' trade deficit with the formal sector.

The conceptual framework is a simple representation of the major linkages that need to be captured any comprehensive model of the formal and informal economies. It therefore provides a foundation for understanding the workings of the more detailed economywide model.

The formal-informal economywide model

SAFIM is a multiregional CGE model in which formal and informal economies are represented as regions within the broader South African economy. As seen in Table 2, the formal economy contains most of South Africa's heavier industries (e.g., mining and metals) as well as commercial agriculture and financial services. By contrast, the informal sector covers subsistence agriculture, some lighter manufacturing subsectors, such as food and clothing, and a significant share of trade and transport services. To capture this heterogeneity, SAFIM contains detailed information on demand and supply for 26 economic sectors/commodities in each of formal and informal regions. Producers in each sector and region employ labor and capital under the assumption of constant returns-to-scale and profit maximization. For this we use a nested production system, with a constant elasticity of substitution (CES) function determining factor demand, and a Leontief function combining value-added and intermediates.

SAFIM separates skilled, semi-skilled and unskilled workers, which are used with differing intensity in each sector and region. Skilled labor is assumed to be fully-employed earning a flexible real wage. By contrast, the supply of semi-skilled and unskilled workers is perfectly elastic at a fixed real wage, reflecting the high levels of unemployment observed for these skill groups in South Africa. Based on prevailing wages, all workers from the informal region can seek employment from both informal producers or from formal sector firms. This specification of labor markets, together with the separation of formal/informal regions, allows SAFIM to capture the three types of informal employment identified in Section 2: informal producers, workers informally employed in the formal sector, and non-competitive informal jobs (see Table 1). Finally, capital stocks are immobile across sectors and earn sector-specific returns. The model therefore reflects the complex labor market linkages between formal/informal sectors.

The second formal/informal economy linkage is trade. The model explicitly allows for both interregional and international trade (i.e., trade between the formal and informal regions, and between South Africa and the rest of the world). Import competition and export opportunities are captured by allowing producers and consumers in the formal and informal regions to shift between 'regional' and foreign markets depending on the relative prices of imports, exports and locally produced goods. More specifically, the decision of formal and informal producers to supply local, regional or foreign markets is governed by a non-nested

constant elasticity of transformation (CET) function. Similarly, substitution possibilities between local and imported goods are captured by a CES Armington function. This specification permits two-way trade between the formal and informal regions, which, as shown in Table 3, is an important characteristic of formal/informal interactions.³ This means that if the informal region is initially a net importer of a particular product then it can still become a net exporter if policies, prices and/or productivity improve. Finally, the model also captures the transaction costs that are generated by all goods entering or leaving the informal economy. The transaction costs are paid to the informal retail trade sector. SAFIM therefore captures how changes trade patterns between the formal and informal sectors generate incomes for informal traders. This is the fourth and final kind of informal employment identified in the typology (see Table 1).

Household income and expenditure patterns vary considerably across households living in the formal and informal economies. These differences are important, since the incomes earned by workers in different sectors benefit households differently according to their initial factor endowments. To capture these differences, the model further separates households in the formal and informal economies into four income sub-groups (i.e., expenditure deciles 1-5, 6-8, 9, and 10). These representative households receive factor incomes and social transfers from the formal sector government. This is the third linkage between the formal and informal sectors (see Figure 1). Despite these social transfers, informal households receive most of their income from lower-skilled workers, while formal households receive a greater share from capital and higher-skilled workers. All households save some of their income (based on fixed marginal propensities to save), but only formal households pay direct taxes (based on fixed tax rates). Tax rates are highest on higher-income formal households. All households use their remaining income to consume commodities under a Cobb-Douglas demand function.

Macroeconomic balance is maintained through three ‘closure’ rules. First, for the government account, all tax rates are fixed and direct and indirect tax revenues are pooled at the national level. These are used to pay for social transfers to households, which are per capita-based, and to cover public investment/savings, which are a fixed share of total revenues. The remaining revenues are used for public consumption spending, which generate demand for

³ Initial trade flows between the formal/informal economies was estimated using the informal market expenditure shares shown in Table 3, but for a more detailed range of products. Total demand is then compared to production, which was itself estimated using national accounts and labor income data from the 2004 Labor Force Survey. The CGE model is therefore calibrated to observed formal/informal production structures and consumer behavior.

formal sector products only. Secondly, for the foreign account, a flexible national exchange rate adjusts to maintain a fixed current account balance measured in foreign currency. Since the domestic price index is the model's numeraire, the exchange is the ratio of the price of tradables to non-tradables (i.e., the real exchange rate). Finally, for the savings-investment account, all savings rates fixed and the supply of loanable funds are pooled at the national level. This is used to finance investment spending, which generates demand for imported and formal sector commodities. Since the model is comparative static, there is no second period effect on productive capital stocks from changes in investment.

Calibration of the model

SAFIM is calibrated to the 2002 South African Formal-Informal Sector SAM. Gross domestic product (GDP) in the 2002 national SAM (see Thurlow, 2005) was disaggregated across formal and informal sectors using labor income shares from LFS2004. This assumes that the production technologies of the formal and informal sectors are the same, and that intermediate demand patterns can be allocated in proportion to workers' incomes. All government, investment and foreign export demand is allocated to formal sector products. Household consumption demand was separated into demand for formal and informal products using detailed informal market consumption shares from IES2000 (see Table 3). Together this provides an estimate of total demand in the formal and informal economies. Finally, we assume the foreign import penetration is the same across formal and informal sectors. Thus, at this stage, the difference between total demand and supply is the value of regional imports (i.e., a residual approach to estimating trade between two regions). Remaining household incomes and expenditures are based on government accounts and on reported non-factor incomes in IES2000. The final SAM represents the structural characteristics of the formal and informal economies, including production, trade and incomes. The initial or 'base' structure of SAFIM is shown in Table 4.

Table 4: Economic structure of South Africa's informal economy, 2002

	Share of total GDP (%)			Informal sectors' share of national total (%)		Informal trade shares and intensities (%)			
	Formal sector	Informal sector	National	GDP	Employment	Total exports	Total imports	Exports / Output	Imports / Demand
All sectors	100.0	100.0	100.0	7.1	22.3	100.0	100.0	66.6	73.7
Agriculture	3.9	9.3	4.3	15.2	43.9	8.6	6.2	82.5	82.6
Manufacturing	20.7	9.1	19.9	3.3	12.6	12.0	53.8	56.4	89.1
Food and beverages	3.2	0.6	3.0	1.5	6.4	1.8	18.5	90.0	99.2
Textiles and clothing	0.9	1.7	0.9	12.9	27.5	2.8	5.0	64.2	81.5
Other manufactures	16.6	6.8	16.0	3.0	9.7	7.3	30.3	49.5	85.1
Construction	1.7	10.0	2.3	31.2	41.7	19.3	0.0	73.6	0.0
Mining and utilities	12.1	0.0	11.2	0.0	0.0	0.0	5.6	0.0	100.0
Services	61.6	71.6	62.3	8.2	20.3	60.1	34.4	65.2	60.1
Retail trade	10.2	41.5	12.4	23.7	43.1	30.0	1.0	61.2	6.7
Restaurants	0.9	1.6	1.0	11.3	20.1	1.5	1.0	60.7	60.5
Transport	8.8	18.5	9.5	13.9	23.7	18.8	8.1	72.0	60.9
Business	19.9	3.1	18.7	1.2	4.9	0.9	16.5	22.2	87.8
Government	16.0	0.0	14.9	0.0	0.0	0.0	0.2	0.0	100.0
Other services	5.8	7.0	5.9	8.5	16.5	8.9	7.6	85.1	87.2

Source: Own calculations using the 2002 South African Formal-Informal Social Accounting Matrix.

Note: The 'informal' sector' in this table excludes the contribution of informally employed labor working in the formal sector (see Table 1).

The informal economy (narrowly-defined) contributes 7.1 percent to South Africa’s total GDP, but generates 22.3 percent of total employment (see columns 4 and 5 in Table 4). This reflects the low wage rates and high labor intensity of the informal sector. The largest informal sectors are retail trade (41.5 percent), transport (18.5 percent), construction (10.0 percent), and subsistence agriculture (9.3 percent) (see column 2 in Table 4). Key informal manufacturing sectors include food processing and textiles. Food processing is an important traded product between the formal and informal sectors. Formal products supply almost all informal food consumption demand, while 90 percent of informal food production is supplied to the formal sector (see columns 8 and 9 in Table 4). Overall, the high import and export intensities reflect the considerable bidirectional trade that exists between the formal and informal economies. The higher import intensity is consistent with the trade deficit that the informal sector runs with the formal sector. Earlier in this section it was said that interregional trade covers around three quarters of the deficit. This means that around half of the overall deficit is covered by informal ‘exports’ of retail trade, transport and construction. This underlines the importance of informal services over informal agricultural and manufacturing producers.

‘Informal households’ are those earning income from the informal sector, as well as from workers informally-employed in the formal sector. We also include households with all members unemployed. Based on this definition and according to IES2000, around two-thirds of South Africa’s population is part of the informal economy (see Table 5). Informal households are typically poorer than formal households, with 66.6 percent of the informal population in the lowest five expenditure deciles, compared to 24.9 percent of the formal population. By contrast, only 7.8 percent of the informal population is in the highest two expenditure deciles.

Table 5: Household population patterns, 2000

	Formal households	Informal households	All households
Population (1000s)	17,404	26,291	43,694
All expenditure deciles (%)	100.0	100.0	100.0
Deciles 1-5	24.9	66.6	50.0
Deciles 6-8	34.6	26.9	30.0
Deciles 9	17.6	5.0	10.0
Deciles 10	20.9	2.8	10.0

Source: Own calculations using 2000 Income and Expenditure Survey.

Note: ‘Informal households’ include all households reporting earnings from informal employment as well as households with all members that are unemployed.

In summary, SAFIM captures the initial economic structure of South Africa at a detailed sector level and across both factor and product markets. SAFIM's multiregional specification also allows it to capture the various formal/informal linkages depicted in the conceptual framework in Figure 1 (i.e., interregional trade, intersectoral labor migration, and social transfers). Finally, the model captures the four kinds of informal activities/employment identified in the typology in Table 1, including producers, traders and workers employed without contracts or benefits. SAFIM's detailed structural and behavioral characteristics, and its calibration to observed South African data, make it an ideal tool for examining socioeconomic policies.

4. Three policy simulations

SAFIM is used to assess the effectiveness of three different policies in generating employment and raising household incomes. These policies include trade liberalization, wage subsidies, and unconditional cash transfers. We also consider how previous national-level assessments of these policies may have concealed differential outcomes for formal and informal economies.

Trade liberalization

South Africa underwent rapid trade liberalization during the 1990s. At the same time both unemployment and poverty worsened. Further relaxation of trade restrictions has therefore been the subject of much debate. A number of sector studies find that liberalization reduced industrial employment, albeit only slightly (see for example Bhorat, 1999; Edwards, 2001). Economywide studies find divergent outcomes for industry and services, but also indicate an net decline in national employment (Thurlow, 2007; Herault and Thurlow, forthcoming). Within this context, we use SAFIM to simulate the impact of eliminating all remaining import tariffs in 2002. Table 6 shows the initial rates and tariff collections. We replace lost government revenues by raising direct tax rates in order to maintain public recurrent consumption spending at its initial level. Tax rate increases include both corporate and personal income tax rates and are proportional to initial rates (i.e., increasing tax rates is regressive).

Table 6: Initial tariff rates and collections, 2002

	Tariff collection share (%)	Foreign import value share (%)	Tariff collection rate (%)
Total GDP	100.0	100.0	2.8
Agriculture	2.9	2.2	3.7
Manufacturing	95.9	70.2	3.9
Food and beverages	5.0	2.5	5.6
Textiles and clothing	21.0	3.2	18.5
Other manufactures	69.9	64.5	3.1
Construction	0.0	0.1	0.0
Mining and utilities	0.0	11.2	0.0
Services	1.2	16.2	0.2
Retail trade	0.0	0.3	0.0
Restaurants	0.0	2.8	0.0
Transport	0.0	3.9	0.0
Business	1.1	2.5	1.3
Government	0.0	1.2	0.0
Other services	0.0	6.7	0.0

Source: Own calculations using the 2002 South African Formal-Informal Social Accounting Matrix.

Table 7 shows the changes in production under the three policy simulations. Trade liberalization reduces tariffs on South Africa's foreign imports, which reduces import prices and raises demand for imported products. The highest tariffs in 2002 were on textiles and clothing. Therefore, it is these sectors which face the largest increase in import competition when tariffs are eliminated, with the production of textiles and clothing declining by 4.7 percent (see column 3 in Table 7). Moreover, textile producers in both the formal and informal sectors are adversely affected by cheaper imported products. The overall increase in imports has macroeconomic implications, since it places pressure on the current account balance, which is assumed to be fixed in foreign currency. The real exchange rate therefore depreciates by two percent in order to offset some of the increase in foreign import demand and encourage foreign exports. This depreciation causes a slight increase in production amongst non-textile manufacturing sectors, such as processed foods, metals and wood products. However, since it is the formal sector that engages in foreign exports and not informal producers, it is formal producers of processed foods and other manufactured goods that benefit. Hence, while formal production in these sectors increases, it declines for informal producers, who face higher import competition without any improved access to foreign export markets.

Table 7: Changes in production under alternative policy simulations

	Change in gross domestic product from base value (%)								
	Trade liberalization			Wage subsidy			Unconditional cash transfer		
	Formal sector	Informal sector	National	Formal sector	Informal sector	National	Formal sector	Informal sector	National
Total GDP	0.32	-1.13	0.21	1.47	-0.07	1.36	0.01	2.01	0.15
Agriculture	0.25	-0.17	0.19	0.41	-0.27	0.31	0.79	2.30	1.02
Manufacturing	0.17	-7.87	-0.09	1.94	-7.25	1.64	0.13	1.69	0.18
Food and beverages	0.06	-1.12	0.05	1.97	-9.95	1.80	1.18	1.62	1.18
Textiles and clothing	-4.57	-5.33	-4.67	5.36	-5.80	3.92	1.45	5.21	1.94
Other manufactures	0.44	-9.13	0.15	1.76	-7.36	1.48	-0.15	0.82	-0.12
Construction	-0.20	-3.51	-1.23	3.02	-1.17	1.71	-0.57	-1.05	-0.72
Mining and utilities	1.34	0.00	1.34	1.99	0.00	1.99	0.20	0.00	0.20
Services	0.18	-0.06	0.16	1.24	1.02	1.22	-0.11	2.45	0.10
Retail trade	-0.24	0.00	-0.19	2.47	1.24	2.18	0.28	2.45	0.79
Restaurants	0.57	-0.41	0.46	6.42	0.77	5.78	0.38	5.17	0.92
Transport	0.33	-0.02	0.28	1.59	0.85	1.49	0.46	2.57	0.76
Business	-0.14	-0.61	-0.15	1.39	-0.01	1.37	0.01	2.16	0.03
Government	0.74	0.00	0.74	-0.58	0.00	-0.58	-0.95	0.00	-0.95
Other services	0.23	-0.23	0.19	2.18	0.74	2.06	0.22	1.65	0.34

Source: Results from South African Formal-Informal Model (SAFIM).

Note: The 'informal' sector in this table excludes the contribution of informally employed labor working in the formal sector (see Table 1).

Falling informal production reduces employment amongst informal producers (see column 2 in Table 8). This is especially pronounced for semi-skilled informal producers and workers, who are more intensively engaged in manufacturing. However, the increase in production within the formal sector (driven by expanding exports) generates additional jobs for formal workers, primarily for high skilled and unskilled workers in the service sectors. There is also increased demand for informally-employed workers in the formal sector, although this benefits mainly lower-skilled workers. Finally, the decline in informal production and foreign import prices encourages informal consumers to become more reliant of foreign imported goods. This shift in consumer preferences increases the amount trade between the informal and formal sectors, thus benefiting informal traders, who collect fixed transaction margins based on the volume of trade. Thus, while employment for informal producers falls under trade liberalization, there is a slight increase in employment amongst lower-skilled informal traders.

Table 8: Changes in employment under alternative policy simulations

	Base employment (1000s)	Change in employment from base (%)		
		Trade liberalization	Wage subsidy	Unconditional cash transfer
Total employment	10,556	-0.13	3.60	1.58
Skilled	2,048	0.00	0.00	0.00
Semi-skilled	4,826	-0.42	6.03	1.28
Unskilled	3,682	0.17	2.42	2.83
Formal workers	6,754	0.42	5.63	0.49
Skilled	1,898	0.14	-0.03	-0.33
Semi-skilled	3,524	0.52	8.77	0.63
Unskilled	1,332	0.57	5.41	1.26
Informally-employed	1,451	0.43	0.53	0.82
Skilled	0	0.00	0.00	0.00
Semi-skilled	357	0.05	-0.08	0.79
Unskilled	1,095	0.55	0.73	0.83
Informal traders	805	0.01	2.61	5.29
Skilled	18	-0.45	2.23	4.72
Semi-skilled	265	0.02	2.61	5.31
Unskilled	522	0.02	2.61	5.31
Informal producers	1,545	-3.16	-1.86	5.11
Skilled	132	-1.94	0.17	4.09
Semi-skilled	681	-5.73	-3.59	3.34
Unskilled	733	-0.99	-0.61	6.94

Source: Results from South African Formal-Informal Model (SAFIM).

Note: 'Formal workers' is formally employed workers in the formal sector; 'informally-employed' is informally employed workers in the formal sector (see Table 1).

Overall, trade liberalization causes employment to fall slightly, despite an overall increase in national GDP. This is consistent with the findings of previous studies (see for example Thurlow, 2007). However, national results hide divergent outcomes for formal and informal sectors. Total informal production declines significantly leading to a similar decline in informal employment. By contrast, formal sector producers and their workers, especially in the service sectors, benefit from improved access to foreign export markets, which more than offset the losses caused by increased import competition. Total formal GDP therefore rises and creates new formal sector employment opportunities. The opening of South Africa's economy since the early 1990s may therefore have contributed to small size of South Africa's informal sector relative to the formal economy. Moreover, model results indicate that trade liberalization alters the composition of the informal economy. There is shift in employment away from informal producers towards informal traders and workers informally-employed in the formal sector. This is consistent with the observation that South Africa has a small informal producer sector and a disproportionately large informal trader sector (Blaauw, 2005).

Table 9 shows changes in household incomes following trade liberalization. These income changes include a six percent increase in direct taxes that is needed to offset lost revenue from eliminating import tariffs, which amounts to 9.6 billion rand (i.e., about 1 percent of national GDP in 2002). This tax increase only affects formal households and is based on tax *collection* rates. Overall there is a slight decline in real household disposable incomes due to falling employment. This offsets lower consumer prices and slightly higher national GDP. However, impacts across household groups differ significantly. Previous studies find that trade liberalization benefited households in the middle of the income distribution (Thurlow, 2007). Our results are consistent, since incomes rise for national deciles 5-9, but fall for other household groups. Disposable incomes for the highest expenditure decile fall substantially because most households in this group are in the formal sector and face the highest marginal tax rates. They therefore bear the brunt of the required revenue-replacing tax increase. However, there are different distributional implications from trade liberalization for formal and informal households. It is informal households at the top of the income distribution that benefit the most from trade liberalization. This is because these informal households have fewer unemployed members compared to lower income informal households. They are also not subject to the increase in direct taxes, and are less affected by the drop in employment for semi-skilled workers. Thus,

while the bottom nine deciles for formal households experience rising incomes, the bottom eight informal deciles experience declining incomes. Thus, the decline in incomes amongst poorer households observed at the national-level is driven by falling informal household incomes.

Table 9: Changes in incomes under alternative policy simulations

	Change in income from base (%)		
	Trade liberalization	Wage subsidy	Unconditional cash transfer
All households	-0.29	1.51	1.39
Deciles 1-5	-0.09	2.13	24.13
Deciles 6-8	0.09	2.68	5.29
Deciles 9	0.15	2.44	1.14
Deciles 10	-0.53	0.89	-1.81
Formal households	-0.31	1.59	-0.80
Deciles 1-5	0.24	3.23	6.47
Deciles 6-8	0.30	3.49	2.44
Deciles 9	0.17	2.68	0.34
Deciles 10	-0.56	0.88	-2.08
Informal households	-0.21	0.99	16.15
Deciles 1-5	-0.46	0.84	44.85
Deciles 6-8	-0.39	0.84	11.76
Deciles 9	0.02	1.14	5.52
Deciles 10	0.15	1.25	4.04

Source: Results from South African Formal-Informal Model (SAFIM).

Note: 'Incomes' are post-tax (i.e., disposable); 'Informal households' include all households reporting earnings from informal employment as well as households with all members that are unemployed.

In summary, trade liberalization has different implications for South Africa's formal and informal sectors. It substantially reduces informal employment by raising import competition without providing additional opportunities for informal producers to access foreign export markets. By contrast, formal producers are better able to take advantage of these new foreign market opportunities and their production expands as a result. Trade liberalization also alters the composition of the informal sector, by reducing product market space for informal producers, increasing opportunities for informal traders, and encouraging informal workers to seek 'casual' employment in the formal sector. Ultimately, it is the adverse effect that trade liberalization has on the informal sector that reduces total employment in spite of new employment opportunities in the formal sector. This highlights the need for policies to support further employment creation and raise incomes amongst poor households.

Wage subsidy

There is ongoing debate in South Africa regarding the effectiveness of a wage subsidy to reduce unemployment. Two studies have examined this policy option using national CGE models (Pauw and Edwards, 2006; Go et al, 2009). These studies find that a wage subsidy targeted towards lower-skilled workers raises the overall level of employment, despite the need for compensating tax increases and possible inflexibilities in the labor market. In this section we provide a seven percent wage subsidy to all semi-skilled and unskilled workers in the formal sector, which is only slightly below the 10 percent wage subsidy simulated in previous studies. We target a lower wage subsidy so that the required increase in direct taxes to maintain a balanced fiscal budget is the same as under the previous trade liberalization scenario.

The wage subsidy reduces the cost of workers for firms and increases demand for labor. There is consequently a substantial increase in employment for semi-skilled and unskilled labor in the formal sector (see column 3 in Table 8). There is also a modest shift in demand away from skilled workers and capital.⁴ The largest increases in employment are within the more labor-intensive sectors, which benefit the most from the subsidy. These sectors include textiles and clothing and construction, whose formal sector production expands significantly under this policy simulation (see column 4 in Table 7). Overall, national employment rises by 3.6 percent as a result of the wage subsidy.

Again the national results hide differential outcomes for the formal and informal sectors. This is because the wage subsidy reduces the cost of production in the formal sector, but does not benefit informal producers. As a result, the price of formal products declines relative to informal products. This causes consumers to shift demand towards formal products at the expense of informal producers, whose production declines significantly (see column 5 in Table 8). It also encourages greater export growth, which only benefits formal sector firms. Informal workers therefore migrate towards those sectors that face a smaller penetration of formal sector products and fewer opportunities for export displacement. This includes much of the service sector, where trade intensities are lowest (see the final two columns of Table 4). Despite this migration to services, there is still a sharp overall decline in employment amongst informal producers. Falling

⁴ Our simulation is broadly equivalent to that of Pauw and Edwards (2006) and to the ‘medium’ case simulation presented in Go et al (2009).

formal sector prices and increased trade with the formal sector does, however, benefit informal traders. Increased formal sector production also benefits workers that are informally-employed in the formal sector, despite the substantial overall shift in labor demand towards formally-employed workers (i.e., who are eligible to receive the subsidy).

Even though informal production declines slightly, informal households' disposable real incomes still rise as a result of the wage subsidy. This is partly because of the offsetting increase in employment for traders and informally-employed workers in the formal sector. However, the main driver behind rising informal incomes is the sharp decline in consumer prices caused by the lower cost of production. This result suggests that, if producers pass the cost reduction onto consumers, then real incomes will rise even amongst non-recipient households in the informal sector. Again, it is informal households towards the higher-end of the income distribution that benefit more than lower-income informal households. This is because semi-skilled workers in the informal sector are more heavily concentrated amongst higher-income informal households. By contrast, higher-income formal sector households are more reliant on high-skilled workers, who did not receive the wage subsidy in our simulation. Moreover, these higher-income households experience the largest increases in direct taxes in order to cover the cost of the subsidy. Consequently, it is lower-income formal sector households that benefit the most from the targeted wage subsidy.

In summary, a targeted wage subsidy greatly expands employment and real incomes, but favors households towards the middle of the national income distribution. This is because informal producers face increased competition from subsidized formal sector producers. This encourages a shift in the composition of informal employment towards traders and casual employment. Thus, while our results are consistent with previous national-level studies, they again highlight the importance of taking formal-informal linkages into account, as well as considering the effects of employment policies on both labor and product markets.

Unconditional cash transfers

An alternative policy to the wage subsidy that has also received considerable attention in South Africa is an unconditional cash transfer or a 'basic income grant'. These transfers would be paid to all South Africans irrespective of age, work status or income-level. The policy would be

financed by increased taxes. Numerous studies have examined the impact of the cash transfer on household welfare. Thurlow (2002) uses a CGE model to estimate the economywide impact of providing a R100 per person per month transfer to all South Africans. In this section we simulate a smaller transfer of R60 per month, since this would already involve a direct tax rate increase twice the size of the previous simulations (i.e., 13 percent instead of 6 percent).

Our results are consistent with those from previous studies. The cash transfer increases disposable incomes for all households, except for formal sector households in the highest expenditure decile (see the final column of Table 9). These households experience the largest increases in tax rates in order to maintain a balanced fiscal budget. Given their importance in determining the absolute level of formal sector consumption spending, the required increase in taxes more than offsets the additional income from the cash transfer, causing real formal sector incomes to fall. The transfer also has different implications for households within the informal economy. More specifically, the value of grant as a percentage of current incomes is much larger for lower-income households. Real per capita incomes therefore increase by 44.9 percent for the bottom five informal deciles, compared to only 4.0 percent for the highest informal decile.

Large increases in informal household incomes generate additional demand for informally produced products, especially for processed foods, informal restaurants, and transport services (see column 8 in Table 7). This increase in demand generates additional employment and marketing opportunities for informal producers, whose employment rises substantially. The increase in income also generates additional demand for imported and formal sector products, which benefits informal traders. Overall, the unconditional cash transfer raises national production and employment, despite some slight adverse implications for formal sector production. However, the fiscal burden of the cash transfer is significant, representing more than two percent of national GDP in the current simulation, and almost five percent for the R120 per capita grant that is currently being debated. Our analysis indicates that there would have to be a substantial increase in direct taxes, with severe implications for higher-income households. We do not consider the effects of the grant on capital flight, declining foreign investment, and tax evasion, any of which would increase the necessary tax increases and could possibly undermine long-term economic growth. However, despite its relatively small and possibly overestimated impact on national production, the results from our analysis do confirm the strongly pro-poor outcomes of an unconditional cash transfer.

5. Conclusion

Unemployment is one of South Africa's most pressing social challenges. Existing studies identify the underperformance of the formal sector and the existence of barriers-to-entry in the informal sector as the primary explanations for high unemployment. Our study has extended this literature by considering the linkages between the formal and informal economies. We adopted a broader view of informal employment, by including workers that are informally employed in the formal sector. We found that this explains some of South Africa's disproportionately small informal sector. However, even under this broader view, our results indicated that most of the interactions between the formal and informal sectors occur within product markets. We therefore adopted an economywide perspective and accounted for formal-informal interactions in both factor and product markets. Finally, we considered differences in behavior amongst informal activities. Drawing on a typology of informal employment, we developed a multi-region CGE model that is empirically-calibrated to the structure and behavior of South Africa formal and informal economies. We used the model to examine three policies designed to expand production and employment.

Model results indicated that, while trade liberalization reduces national employment, it has sharply different implications for formal and informal sectors. Formal sector production and employment expands, in part due to enhanced production efficiency and improved export opportunities. By contrast, increased import competition undermines informal producers and encourages informal workers to move into trading and 'casual' employment in the formal sector. This result suggests that past trade liberalization may explain some of the small size of South Africa's informal sector, as well as its concentration within trading rather than production. While formal sector households are the main beneficiaries of trade liberalization, lower import prices also benefit higher-income informal households. The overall effect of liberalization is, however, a widening of the income gap between rich and poor households, and between formal and informal sectors. Further trade liberalization is therefore unlikely to generate the employment and income opportunities needed to significantly reduce unemployment in South Africa.

We also examined the impact of introducing a wage subsidy to stimulate labor demand, and an unconditional cash transfer to directly raise incomes. A wage subsidy raises employment

substantially at the national-level. However, it also favors formal sector producers, whose lower cost of production allows them to reduce their market prices. This heightens competition between formal and informal producers in domestic product markets, and causes a substantial decline in informal employment. Increased trade with the formal sector does, however, benefit informal traders. A wage subsidy would therefore further narrow South Africa's informal sector towards the greater trading of formal/imported products. By contrast, an unconditional cash transfer stimulates demand for informally produced products and causes a substantial increase in informal producer employment, while also benefiting informal traders. The cash transfer also has the largest positive impact on lower-income households' incomes, and helps narrow the income gap between formal/informal households. However, the large size of the cash transfer requires substantial increases in tax rates, which adversely affect formal sector households, especially at the higher-end of the income distribution. Moreover, the cash transfer is less effective at stimulating national production than a wage subsidy.

Beyond their policy implications, our findings confirm the need to assess the differential implications of policies on formal and informal economies. This is because the results of previous studies have hidden sharply divergent outcomes for formal/informal enterprises and households, which should ideally be considered when assessing alternative socioeconomic policies. Finally, our results highlight the importance of capturing differences in behavior across the full spectrum of informal activities, as well as the need to consider both labor and production market conditions when designing policies to address South Africa's unemployment challenge.

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