The Impact of Unconditional Cash Transfers on Informality: Evidence from South Africa's *Child Support Grant*

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Abstract

The debate over the nature of informal employment and its implications for policy is still open and controversial. One of the main questions remains whether informality is a necessity or a choice. This paper looks at the *Child Support Grant* (CSG) in South Africa as a case study to test the importance of the "necessity channel" in a segmented labour market. I use cohort discontinuities in access to the grant to evaluate the impact of the CSG on workers' allocation across the formal and informal sectors. I show that mothers whose youngest child has been exposed to the grant are more likely to be formally employed than those who were not, with no impact on overall employment. Consistently with a fixed/search cost framework, these results are strongly non-linear in the number of children exposed. Lastly, I compare these results with the overall country level trend, where the informal sector has indeed been shrinking, but without a proportional increase in the size of the formal sector. I conclude that social assistance can prevent people from joining informal employment, however, this does not seem *per se* sufficient to increase the overall stock of formal jobs in the economy.

1 Introduction

Informality is a key feature of the labour market of many developing countries. The question of whether an informal job is a necessity or a choice is particularly relevant in emerging economies, where the informal sector employs a significant proportion of the population. Moreover, in the presence of a segmented labour market with a large informal sector, simple measures of employment (and unemployment) are a poor indication of labour market performance (Samba Sylla (2013)). When social protection is lacking, many workers may simply find it unaffordable to be unemployed and may therefore need to engage in subsistence-level activities in the informal sector. This would reduce the unemployment rate, but the quality, desirability and efficiency of the resulting pool of jobs may be far from optimal. The nature of informality has been extensively debated by labour market and development scholars, nonetheless many issues remain largely unanswered.

In order to shed more light on the topic, this paper analyzes a specific policy in South Africa. I look at an unconditional cash transfer, the *Child Support Grant*, to see if and how social assistance impacts workers' allocation in a segmented labour market. Access to this grant is subject to a child's age eligibility criterion and a means-test, which have

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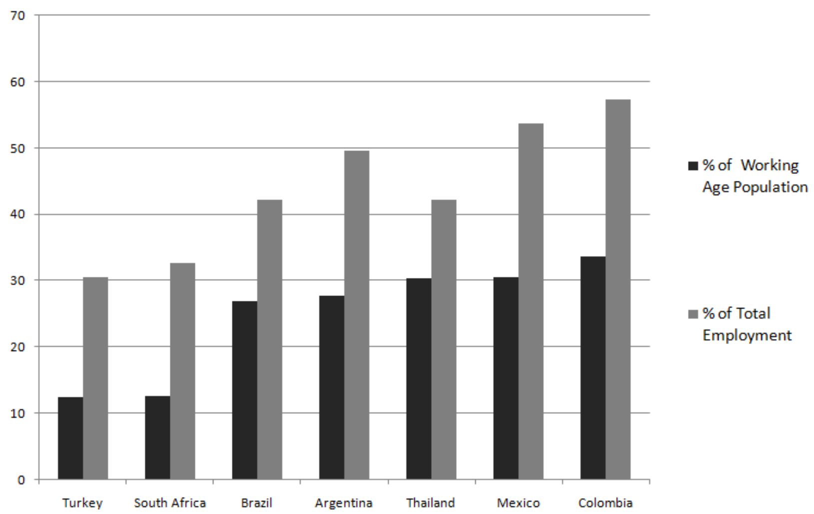
both been significantly reformed over time. While the age threshold is strictly applied, the means-test appears to occur more based on ethnicity than actual income. I exploit cohort discontinuities in access to the grant caused by reforms in the age threshold to evaluate the effect of the CSG on occupational choice.

South Africa has a relatively low level of informal employment and a surprisingly high level of unemployment, as already pointed out by Kingdon and Knight (2004). In Figure 1, I compare South Africa's informality levels to those of other countries at similar levels of GDP per capita in 2010. Indeed, we observe that informality in South Africa is low, both in absolute terms (% of working age population) and relative to formal employment. This has been referred to as the South African "puzzle": why do workers not enter informal employment rather than stay unemployed? Throughout this paper, I will argue that the answer likely lies in South Africa's generous and "unconditional" welfare grant system, which allows individuals to search for formal employment rather than to take informal jobs out of necessity.

Figure 1: Informality Levels in Selected Countries, 2010



Note: This graph plots average informality levels in 2010 (or 2009, when not available) for countries with similar levels of GDP per capita in 2010. The darker bar provides the share of informal employment over working age population. The grey bar plots the share of informality over total non-agricultural employment. These shares are calculated by the ILO according their guidelines on the measurement of informal employment.
Source: World Bank Database (`http://databank.worldbank.org/data/home.aspx`)

The debate on whether informality is a necessity or a choice has been ongoing for several decades, and can be traced back to the 1970s (Todaro (1969), who does not, however, write explicitly about informality, immediately challenged by Hart (1970, 1973), presumably the first to define and openly ask the question about the nature of the informal sector[1]). Overall, the literature proposes two opposite views of the informal sector and informal work. On one side, proponents of the "traditional" view portray informality as the outcome of a lack of formal jobs, therefore as a sector that allows low-paid, low quality employment

[1]Hart (1973):" The question to be answered is this: Does the 'reserve army of urban unemployed and underemployed' really constitute a passive, exploited majority...or do their informal economic activities possess some autonomous capacity for generating growth in the incomes of the urban (and rural) poor?"

in the absence of other, more desirable alternatives (most famously, Harris and Todaro (1970); and more recently, La Porta and Schleifer (2014)). In this view, the informal sector is portrayed as disconnected from the formal economy, and informal firms are depicted as low-productivity firms that would not thrive nor be competitive in the formal sector. On the opposite side, a more recent view sees informality as a mostly voluntary phenomenon (Maloney (1999, 2004), Packard (2007)). They underline the large mobility across sectors in both directions, and that, if asked, workers respond to be fairly contempt with their informal occupations. According to this view, informality is the result of a choice and not of a rationing of formal jobs. These studies have focused prevalently on self-employment in Latin America, and claim that up to 70% of informal employment occurs voluntarily, with only the residual being due to a shortage of formal jobs. Falco and Haywood (2016) also look at the rise of self-employment in Ghana and whether it is caused by "push" or "pull" factors. They conclude that the explanation lies in increasing returns to self-employment rather than necessity.

Other recent studies have argued that both explanations could hold simultaneously, therefore that informal work can be a necessity for some, while also being a desirable job opportunity for others (Günther and Launov (2012); Radchenko (2012), Falco et al. (2015), Bargain and Kwenda (2011)). They claim that the traditional, dualistic view of the labour market does not apply to the entire informal sector, but rather they underline important heterogeneity within the informal sector, where different types of workers coexist. Günther and Launov (2012) identify a separation between an "upper tier" informal sector where workers have a comparative advantage to enter, and a "lower tier" that occurs mostly out of necessity. Bosch and Maloney (2010) also claim that both views apply to the informal sector, where employees are involuntarily in the informal sector because of a lack of jobs and self-employed instead choose the sector because of higher returns. In terms of policy implications, this question has important repercussions on what is the most effective way to counter informality, or whether it should be countered at all. If the decision of holding an informal job comes from an individual unconstrained choice, then policies that incentivize formalization will have a greater impact. On the other hand, if informality provides a "job of last resort" in the absence of proper social support, then more generous social assistance may prevent workers from joining the informal sector.

Although the existing literature on informality is sizable, this debate is still ongoing. Methodologically, the trend in the papers cited above has been of a focus on structural approaches, by trying to identify econometrically clusters of workers within the labour market with respect to several outcomes (wages, job security, well-being etc.) or by observing transition in, out and across sectors with the use of panel data. Instead, my approach is to observe how individuals respond to a specific policy, and what that can tell us about the nature of informal employment and the role of policy. This is in line with the work by del Valle (2013, 2014) and Bianchi and Bobba (2012) in Mexico, who study the impacts on occupational choice of *Seguro Popular* and *Progresa* respectively. Del Valle studies the labour market repercussions of the introduction of *Seguro Popular*, a non-contributory health insurance, in Mexico. While such a policy should make formal employment relatively less attractive, his results show that the small increase in informality is only due to women being retained in the labour force, rather than workers reallocating away from the formal sector. The main conceptual difference from his paper is that while non-contributory health insurance changes relative payoffs across sectors, an unconditional cash transfer should not, and hence provides a suitable instrument to test exclusively the "necessity" channel. On the other hand, Bianchi and Bobba (2012) provide evidence that risk aversion plays an important role in allocation between wage and self-employment. They show that recipients of a conditional cash transfer are more likely to become self-employed. They use variation in the timing of the transfer to show that these results are driven by a higher willingness to bear risk amongst recipients rather than less binding liquidity constraints.[2]

There is a lack of quantitative evidence on the impacts of *Child Support Grant*, mostly due to difficulties in setting up a robust empirical strategy to capture its effects. Several attempts have been made to look at how the CSG affects children's education and health (Coetzee (2013), and for a full review see Eyal and Woolard (2013)), finding positive but limited effects on children's outcomes. The absence of significant effects on children might be due to the lack of conditionalities attached to the grant, but further research is needed. Only a few papers have begun to investigate the effects of this program on the labour market outcomes of the parents.[3]

Initially, I present a very simple conceptual framework to explain the possible impacts of an unconditional cash transfer on labour supply and informality. To estimate the causal impact of the grant on occupational choice, I exploit variation in cohort exposure to the CSG to check for discontinuities before and after implementation, in a similar fashion to a Regression Discontinuity (RD) design. Given that the CSG is subject to an age threshold that was constantly reformed, there is large variation in terms of eligibility for individuals born in adjacent years. These results show that mothers whose child was exposed to the CSG have the same employment rate as unexposed cohorts, but are significantly more likely to be in formal jobs. Lastly, I compare the country level evolution in the early 2000s with the expected trend based on the cohort estimates. This is the period where in only 5 years the share of households receiving the grant increased from 0 to more than 30%. This exercise shows that the micro results predict well the decline in informality for eligible over the period. However, this comes at the expense of lower overall employment and I do not observe a symmetric increase in the size of the formal sector. I conclude that these results are broadly consistent with a dualistic view of the labour market, where individuals queue for a limited stock of formal jobs and where negative externalities on non-recipients fully

[2]Another interesting study is the old-age pension system in South Africa, which provides an unconditional cash transfer, paid to individuals of a certain age regardless of previous pension contributions. Ardington et al. (2009) find that, contrary to what previous cross-sectional analyses had suggested, the positive income shock that occurs when an older member of the household reaches pension age leads to a significant increase in employment for working age individuals in the household. However, they do not make any distinction between formal and informal employment in their study.

[3]Eyal and Woolard (2011), OECD (2011) find some evidence that the CSG might increase employment. On the contrary, Bengtsson (2012) compares the marginal effect on earnings of having a child in the household before and after the CSG was implemented. He finds that CSG receipt lowers the marginal propensity to earn (through lower labour supply) and increases consumption and expenditure. Berg (2013) looks at how household respond in terms of expenditure when the grant lapses, finding no decrease in expenditure when the child reaches the age eligibility threshold.

offset any positive increase for grant recipients.

The paper proceeds as follows: Section 2 introduces the institutional context and various reforms. Section 3 presents the conceptual framework, and predictions of the possible effects of the grant. The data used and descriptive statistics are found in Section 4. In Section 5, I present the empirical strategy and the results. Section 6 concludes.

2 The South African *Child Support Grant*

The Child Support Grant is the largest social program in South Africa in terms of number of participants, reaching around 11 million individuals in 2012 (DSD et al. (2012)). It is generally considered to be the main anti-poverty policy of the South African government. It was first implemented in April 1998 in post-apartheid South Africa with the aim of reducing poverty and inequality. The other two main social grants are the *Disability* grant and the *Old Age Pension*, which cover either individuals who cannot work or who have reached pension age without a private pension. Coverage of these grants over time is presented in figure A1 in the Appendix.

The CSG was proposed by the Lund committee as replacement for the existing support system, the *State Maintenance Grant* (SMG). The SMG was subject to very strict requirements, such that "one parent had to be deceased or maintenance had to be petitioned for in court" (McEwen et al. (2009)). Moreover, having been designed during apartheid South Africa, this system had a significant racial bias. African children *de facto* did not have access to the grant, which was attributed almost exclusively to Coloured and Indian children (and White to a lesser extent).[4] For these reasons, take up of the SMG was overall lower than 1% in the early 1990s.

Table 1: Evolution of the CSG

Reform dates	Age limit	Amount	Amount ('10 R)	Means test
Q2 1998	7	100 R	185 R	1100 R rural, 800 R urban
Q2 2003	9	160 R	218 R	1100 R rural, 800 R urban
Q2 2004	11	170 R	234 R	1100 R rural, 800 R urban
Q2 2005	14	180 R	242 R	1100 R rural, 800 R urban
Q3 2008	14	230 R	257 R	2300 R
Q1 2009	15	240 R	250 R	2400 R
Q1 2010	16	250 R	250 R	2500 R
Q1 2011	17	260 R	248 R	2600 R
Q1 2012	18	280 R	252 R	2800 R

Note: The grant was introduced in April 1998. Column 4 gives the value of the grant in 2010 Rand, adjusting for inflation measured as CPI (*Source:* OECD.stat). The means test was fixed until 2008, when it was then set at 10 times the grant for individuals and 20 times the grant for married couples.
Source: Gomersall (2013) and Eyal and Woolard (2013)

[4] "Kruger (1998) states 0.2% of African children, 1.5% of White children, 4% of Indian children and 4.8% of Coloured children received the state maintenance grant in 1990" (McEwen et al. (2009))

The CSG is an unconditional, means-tested, cash transfer program, where the only eligibility requirements are having a) children of a certain age and b) income lower than a certain threshold. Hence, to be eligible, a grant recipient has to have low enough income and a child who is not older than a given threshold. At the end of the month when the child surpasses the age threshold, the grant is no longer paid. The CSG is paid per child, with no limitation on number of grants a person can receive.[5] Very few documents are required to have access to the grant: an identity card, a birth certificate, and proof of earnings, but this last requirement is flexible. The grant is paid to the "primary caregiver" of the child, hence it is not exclusive to the parents (contrary to the SMG system in place before). This allows members of the households other than the parents to access the grant, given that they can provide an official document showing they are taking care of the child.[6] However, women are almost exclusively the direct recipients of the CSG,[7] and the biological mother of the child appears to be the direct recipient a large majority of the time. Africans are disproportionately represented amongst CSG recipients, while less than 1% of recipients are white.[8] This underlines a complete reversal from the SMG system in place during the Apartheid.

Table 1 shows the date of introduction of the CSG, the amount of the grant in nominal and real terms, the coverage of the grant, the level of the means test, and the reforms in age eligibility. Despite being officially introduced in April 1998, the CSG took some time to be fully implemented. It is difficult to have a proper measure of take-up of the grant at the initial stages of the roll-out in 1998. Lund (2007), head of the committee behind the creation of this program, states that 9 months after the implementation of the program, only 18 200 grants were awarded in the entire country. She links this slow start of the CSG with administrative difficulties and overall confusion, but also to a lack of political will to truly implement the grant as it was intended. Other research, which focuses on the specific region of KwaZulu-Natal, has shown that the coverage of the CSG did not really take off before the year 2000, when take-up for eligible children began increasing dramatically (Case et al., 2005). Moreover, with the objective of extending its reach, the grant has been reformed several times since its implementation. The age threshold has been gradually increased from 7 years old in 1998 to 18 in 2012.

The amount of the grant is generally considered to be small (Lund (2007)), especially when compared to the less extended but more generous disability and pension grants. However, this does not seem to be true by either national or international standards. The size of the CSG is significant when compared to median earnings, especially in the informal sector, as I will discuss later. The average amount per child over the period is around 50 \$ '10 PPP, and its 1998 amount is comparable to that of *Progresa* in Mexico for the same

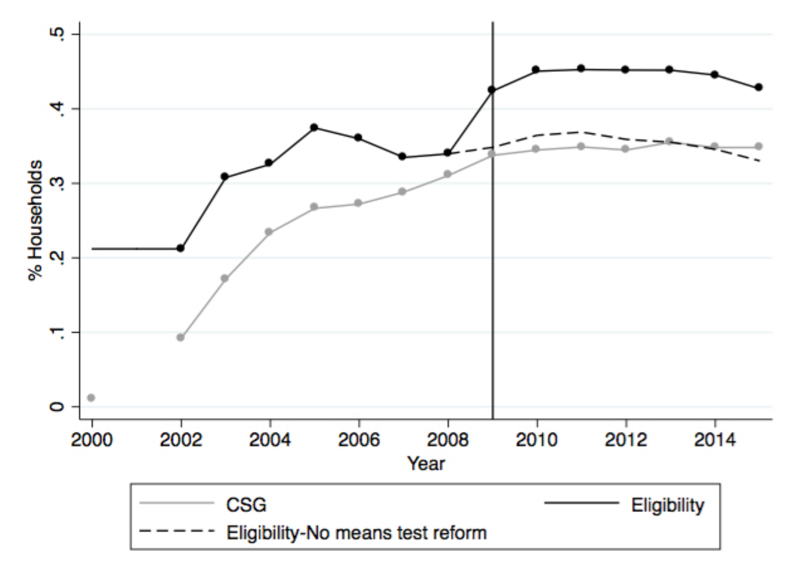
[5] This is true for biological children. For non-biological children, only up to 6 grants can be paid

[6] The South African government lists the following documents: "If you are not the child's parent, you must provide proof that you are the child's primary caregiver through an affidavit from a police official, a social worker's report, an affidavit from the biological parent or a letter from the principal of the school attended by the child." *Source*: South African Social Security Agency (http://www.gov.za/services/child-care-social-benefits/child-support-grant)

[7] In more than 98% of the case the grant is paid directly to them.

[8] All these descriptive statistics are calculated on the *National Income Dynamics Survey* (NIDS)

Figure 2: CSG Coverage & Eligibility, South Africa 2000-2015



Note: This graph plots CSG coverage and eligibility at the household level. It does not take into account the number of grants received by the household, but only if at least one member of the household is a recipient. Eligibility is drawn based on two criteria: 1) There is at least one child in the household who is age eligible, 2) There is at least one adult woman in the household who passes the means-test. The 2000 level of take-up is taken from administrative data. The pre-2002 levels of eligibility are missing as the GHS only starts in 2002, the line holds constant the 2002 level. The solid vertical line indicates the year of the means-test reform, while the dashed line after 2008 plots eligibility if the means-test had never been changed.
Source: Author's calculations on General Household Survey (2002-2015) and Gomersall (2013) for 2000

year (Bianchi and Bobba (2012)). The CSG was also constantly increased in order to keep up with inflation. In real terms, the amount of the transfer has increased by slightly less than 40% since its implementation.[9] The opposite is true for the means-test of the grant, which was initially set at 1100 R in rural areas and 800 R in urban areas, and has not been changed for the entire period from 1998 to 2008. Surprisingly, the means test threshold was set 30% higher in rural than urban areas, apparently in order to compensate for a lack of access to health and education services in those areas (Lund (2007)). Finally, in 2008 the means-test was harmonized to 10 times the grant for individual incomes, and at 20 times the grant for the pooled income of the caregiver and his/her spouse, and has not changed since. Lund (2007) states that the means-test was put in place to discourage richer individuals to apply, rather than as a strict threshold. Consistently, there is very little evidence that it is actually applied. In the absence of a proof of earnings, "the regulations accept alternative proofs of income, including an affidavit - a statement under oath" (Bengtsson (2012)), which make this constraint *de facto* non-binding.

Figure 2 draws the evolution of eligibility and take-up of the CSG over the past ten years in South Africa. Both eligibility and coverage have risen dramatically in the past decade. The largest increase in coverage occurs in the early 2000s, when the age-eligibility threshold was doubled in only three years from 7 to 14. This dramatic rise has made many more cohorts, and hence households, eligible to the grant. The age threshold was

[9]The amount of the grant in real terms is obtained by adjusting for inflation, measured by CPI at the national level. CPI data is obtained from OECD.stat.

stable from 2005 to 2009, and then gradually increased from 14 to 18 January 1st of every year. Contrary to the previous increase, this raise did not make new cohorts eligible, but rather increased duration for cohorts that were already receiving the grant. The means-test reform that occurred at the end of 2008 does not seem to have led to a discontinuous jump in take-up, which was increasing smoothly as from 2006 and then stabilizes around 2010. This is consistent with the view that the means-test is not strictly applied, and that age-eligibility is often times the only binding criteria. If the means-test was binding, we would have expected coverage to decrease for the entire period the means-test was fixed, as real and nominal salaries increased. Further evidence of the non-strict appliance of the means-test is that, prior to 2008, the means-test was significantly more binding in urban areas and for married couple, as in theory the pooled income of both spouses enters the computation. After 2008, when the means-test is equalised across urban/rural regions and doubled for married couple, we would have expected to observe very different evolutions for these subgroups[10], which is not the case.

3 Conceptual Framework

As mentioned before, the unique aspect of the CSG is its unconditionality. Given the *de facto* lack of a means test and any other requirement for recipients, I argue that this grant provides a pure income effect, without changing workers' payoffs across sectors. This is why it provides a good source of variation to distinguish informality out of necessity from informality as a results of workers' choices. The impact of the CSG will mainly depend on the characteristics of the labour market and how a worker responds to a positive income shock. Usually, the standard mechanism employed to formalize workers' response to an increase in unearned income is that of the reservation wage. The CSG should increase the reservation wage, which would cause the individual to stay inactive or search longer for a higher paid job. The impact on informality would then depend on the difference in wages between formal and informal employment, which I will delve into in Section 4, and non-monetary differences between formal and informal jobs, such as job security, flexibility, working conditions, which are all valued by the worker.

However, the standard reservation wage mechanism does not need to fully apply in the presence of labour market frictions, which could be present in the context of the South African labour market. First, we can think of a "subsistence-level" constraint, whereby individual income cannot fall below a certain level. In this scenario, workers may not be able to stop working and become unemployed, simply because they cannot afford it. In this view, unemployment is preferable to subsistence work, but only possible when there is some external source of income available to the worker. With this mechanism in mind, a positive shock in unearned income can allow individuals to become unemployed and look for "higher quality" work, which would not be possible without an external source of income (i.e. the grant).

[10]The four groups who experienced very different evolutions in the nominal means-test are: urban married, urban non-married, rural married and rural non-married

Another departure from a pure reservation wage mechanism occurs in the presence of search and/or fixed costs. We can think that finding a job requires an investment of both time and/or money. For example, around 10% of unemployed individuals in South Africa report using grant money to pay for transport costs when looking for a job.[11] Similarly, one could think that setting up self-employment activities requires a starting capital, which could be built up through social grants. In the presence of significant search and fixed costs, then the impact of the CSG on the employment could be positive. The question becomes relevant with respect to informality if we assume that these costs are disproportionate between formal and informal employment. The view of the informal sector as a "free entry" sector (i.e. no fixed/search costs) has been very popular in the literature. If search/fixed costs are higher when looking for formal jobs, then the CSG should increase formal employment relatively to informal employment. This mechanism would be particularly relevant if credit constraints are binding, which, despite South Africa's developed financial markets, seems to be the case at least with respect to household expenditure (Berg (2013)) and access to higher education (Gurgand et al. (2011)). The point here is that the CSG might allow recipients to become unemployed or stay unemployed for longer, and use this period to search higher quality employment. Whether this employment is formal or informal will depend on individual payoffs in each state, which include but also go beyond simple wages.

The CSG allows us to test whether this mechanism is plausible: if individuals are "stuck" in informal jobs for subsistence, then a positive income shock would allow search for formal employment and increase formality. Instead, if individuals choose to be informally employed, we should not observe any reallocation occurring because of grant receipt. These concepts also suggest to test for non-linearities in the effect of the grant on occupational choice: once an individual is able to search for a sufficient period and/or cover the initial investment necessary to find a formal job, longer or more intense exposure through an extra grant many not necessarily have the same effect.

4 Data and Descriptive Statistics

This paper combines several data sources to study in detail the labour market impact of the CSG. For the micro analysis, I will mostly focus on Census data. The advantage of this data is its large sample size,[12] and its questions on the date of birth of the youngest child, which allows to have information on CSG exposure regardless of whether the child is the household or not. This is particularly important following research by Hamoudi and Thomas (2014), who show how household composition in South Africa is endogenous to the receipt of social grants. The drawback of using Census data is that information on labour market outcomes only includes the bare essentials. As a robustness test, I will conduct the same analysis on the *National Income Dynamics Survey* (NIDS), which is the other data source in South Africa with fertility information. The advantage of this panel dataset is that it spans many years and has a very detailed labour market section, which allows to expand the scope of the analysis, but at the cost of a significantly smaller sample size.

[11] This statistics is calculated using the *National Income Dynamics Survey* (NIDS), which has detailed information on the job searching process.

[12] This is a 10% subsample of the overall Census, available for the years 2001 and 2011

For information on wages and CSG receipt over time, I will make use of the South African *Labour Force Survey* (LFS) for 2002 to 2007,[13] and the *General Household Survey* (GHS) (2002-2015). The LFS and GHS are nationally representative household surveys, with large sample sizes. In the LFS, there is no information on the Child Support Grant, while the GHS does not have detailed questions on informality status. Combined together, they allow to construct time-series both with respect to employment and informality (LFS) and the Child Support Grant (GHS), by subgroup of the population.

4.1 Measuring Informality

The measurement of informality often poses some challenges. This is not necessarily a problem of data. Informality is not a sharply defined concept, but rather a blurry status with different shades of intensity. There is no consensual definition of what exactly defines an informal job. The first theoretical distinction is between informal employment and the informal sector. A worker in informal employment is one for whom labour market legislation does not apply, while a worker in the informal sector is one employed by a firm operating informally, i.e. which does not follow labour market legislation. This distinction does not apply to the self-employed, for whom the two definitions coincide. For employees, informal employment and informal sector clearly overlap, but not perfectly. In theory, an informal firm cannot have a formal employee, but a worker can be informally employed in a formal firm. For example, a registered firm with an employee for whom it does not pay social security contributions. The trend in the literature has been to measure informal employment by affiliation to social security and the informal sector by whether the business is registered or not.

Census data has information on whether the sector of employment is formal or informal (based on whether the firm is registered), or whether the employer is a private household. There are some inconsistencies in the coding of this information in 2011 Census data, which will be addressed in the robustness checks.[14] The Labour Force Surveys have information on both the informal sector, similarly to the census, and informal employment, namely contract status (the presence of a written contract), social security affiliation for employees; firm size, and VAT tax registration for both employees and self-employed workers. This allows me test the correlation and the overlap between the informal sector and informal employment, which I present in Table A1. Overall, the theoretical distinction presented before seems to hold in the data. Individuals employed in the informal sector (non-registered firms) report not being affiliated to social security and not having a written contract in around 80% of the cases. Given that this is all self-reported data on the side of the worker,

[13] I exclude the two initials years of the LFS, 2000-2001, because of the problems of comparability in measurement of informal employment as pointed out in Kerr and Wittenberg (2015); Neyens and Wittenberg (2016).

[14] Workers are asked separately their industry of employment and their sector with three options: 1) Formal sector, 2) Informal Sector and 3) Private Households. This leads to a share of workers reporting to work in a private household, but whose reported industry of employment is not a private household. For these individuals, who account for around 10% of total employment, an informality status is not defined and are reported as missing. In my main estimations, I will impute their informality status based on the their industry and occupation. As a robustness check, I will show that the estimates barely change whether they are excluded from the estimation or imputed.

we can imagine that the remaining gap is due to measurement error, as respondents might not have clear information about the registration of the business or whether the employer is paying social security contributions. Consistently, informal employment is significantly larger than employment in the informal sector (i.e. we can think of informal sector employment as a subset of informal employment). With respect to the self-employed, we also observe that own-account workers are almost entirely in the informal sector, which is, however, also composed by some employers (i.e. self-employed individuals whose business employs other people).

Throughout this paper, my main focus will be on employment in the informal sector, as this is the definition that is consistently defined across the two main data sources (Census data and LFS). It should be underlined that this is a lower bound of overall informal employment, and that the formal sector is also comprised of a portion of worker who are not covered by labour market legislation. Instead, when running robustness estimations on the NIDS panel data, the main outcome will be informal employment, as this is the only definition available.[15]

4.2 Descriptive Statistics

In South Africa, employment in the informal sector accounts for around 30 per cent of total employment, slightly less than 15 per cent of working age population.[16] Africans are a great majority of the population, and they are overly represented in informal jobs, inactivity and unemployment, and underrepresented in formal jobs (Table A2). On the contrary, Whites are greatly overrepresented in formal jobs and make up very little of the informal and unemployed workforce. With respect to gender, women are as equally present as men amongst the informal and the unemployed, while they make up a great majority of the inactive population and only around 40% of formal employment. Young people are particularly concentrated in inactivity and unemployment, and underrepresented in formal jobs. People with no educational attainment are significantly concentrated in informality and inactivity, less in unemployment. This is consistent with the view that only certain individuals may afford to be unemployed, and that a portion of informal jobs may be characterized as disguised unemployment.

Only around 4% of the working age population is employed in agriculture. These jobs are mostly informal yet they account for a small portion of the stock of informal jobs. Self-employment is predominantly informal, but does not constitute the majority of employment in the informal sector. Public jobs are exclusively formal, yet they account for less than 15% of the total stock of formal jobs. On the other hand, more than 30% of formal sector employment is unionized, reflecting the importance of labour unions in South Africa.[17] Moreover, while part-time work is found exclusively in informal jobs, more than

[15]The exact definitions of informal sector/employment are: 1) *Informal Sector*= Total Employment - Work in Non-Agricultural Registered Businesses (2) *Informal Employment*= No Social Security Contributions (Employees) + No VAT registration (Self-Employed)

[16]Average for the 2002-2007 period calculated on the LFS. Instead, the estimates for informal employment are around 35% of total employment, and 17% of working age population.

[17]See Magruder (2012) for an interesting analysis of the employment effects of labor unions in South Africa

Table 2: Median Wages by Sector in South Africa, 2010 Rand

Median Monthly (Hourly) Wages	**Formal Sector**	**Informal Sector**	**Gap**
All	2660 R (13,3 R/h)	875 R (5,1 R/h)	1785 R (8,2 R/h)
Employees	2608 R (13,1 R/h)	875 R (5,0 R/h)	1733 R (8,1 R/h)
Self-Employed	6821 R (32,1 R/h)	893 R (5,2 R/h)	5928 R (26,9 R/h)
Employers	7823 R (38,8 R/h)	1412 R (7,9 R/h)	6411 R (30,9 R/h)
Own-Account	3547 R (19,6 R/h)	782 R (4,6 R/h)	2765 R (15,0 R/h)
Men	2728 R (13,4 R/h)	1166 R (6,1 R/h)	1526 R (7,3 R/h)
Women	2457 R (13,2 R/h)	722 R (4,5 R/h)	1735 R (8,7 R/h)

Note: Informal sector refers to individuals employed in non-registered businesses. Median wages are in 2010 Rand. Employers are self-employed individuals with at least one employee, while own-account workers have no employees. Wages are averaged over the reference period 2002 to 2007 for individuals aged 18 to 60.
Source: Author's calculations on LFS (2002-2007)

80% of informal workers still work full time. Indeed, the percentage of people working excessive hours, i.e. more than 50 hours a week, is higher in the informal sector despite the higher percentage of part time jobs.

Table 2 presents the median monthly earnings and hourly wages in the formal and informal sectors. Overall, wages are around three times higher for formal than informal employees. Interestingly, decomposing the gender gap in wages between formal and informal employment reveals how women are paid almost the same as men in the formal sector, while they are, on average, paid significantly less in the informal sector. This gap is not explained away by a higher prevalence of part-time amongst women, as hourly earnings are also lower. Median wages for employees and self-employed in the informal sector are very similar, while self-employed in the formal sector report by far the highest wages. In proportion to wages, the CSG is comparable to around 30% of the median informal wage, but only to 10% of the median wage in the formal sector. This shows again how the amount of the CSG cannot be considered small, in particular relative to returns to informal employment.

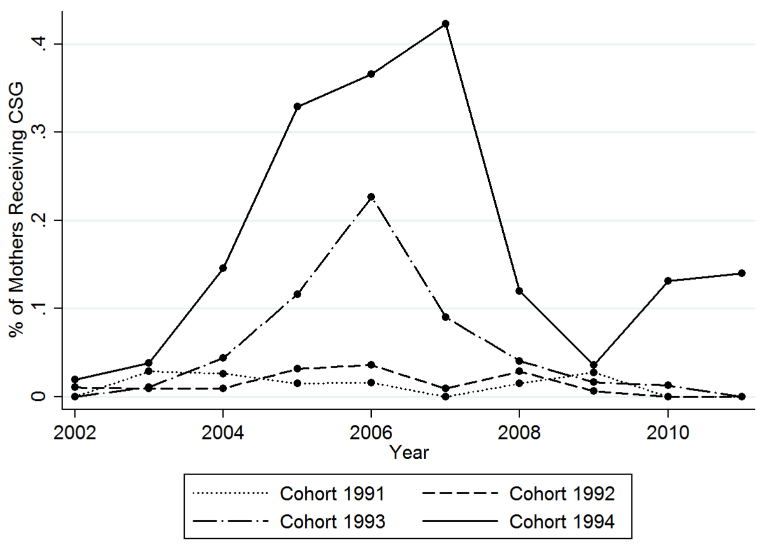
5 Empirical analysis

I divide the empirical analysis of the labour market impacts of the CSG in two parts. In a first part, I exploit variation in exposure to the grant based on the cohort of birth of the child. I also use variation in the number of children exposed to test the view that these effects are strongly non-linear, and hence consistent with a fixed/search cost framework. In a second part, I compare the expected evolution of employment and informality based on these micro estimates to what has actually happened in South Africa during the CSG roll-out.

5.1 Effects of the CSG on Sector Allocation

The age eligibility criteria and its reforms provide an interesting source of variation to evaluate the effects of the CSG. There are individuals who are always too old than the age threshold and therefore can never receive the grant, while other individuals are eligible for different durations depending on their date of birth. As shown in Figure 3, exposure to the grant is largely determined by the cohort of birth of the child. Individuals born before 1993 had virtually no access to the CSG, because they are on average always older than the age eligibility threshold. On the contrary, individuals born in 1993 are fully eligible in 2006, and partially eligible the year before (when the age threshold was increased to 14) and the year after, depending on what month they reach the age limit. Partial eligibility of a cohort occurs because children born at the beginning of the year are less exposed to the grant than children born at the end of the year, as they reach the age threshold sooner. Individuals born after 1994 are eligible for a longer period, up to the point when the child turns 18, as they benefit fully from all the latest age reforms.[18]

Figure 3: CSG Take-Up by Cohort of Birth, 2002-2010



Note: This graph gives the average take-up of mothers whose child was born in 1991, 1992, 1993 and 1994 for the period 2002-2010. Take-up before 2002 was virtually zero for these cohorts. Children born in 1992 and before are never eligible for the CSG for one full year, because they are older than the age threshold. On the contrary, cohorts born in 1993 are eligible for the full year in 2006, and partially eligible in 2005 and 2007.
Source: Author's calculations on GHS

[18]It is key to understand here that discontinuities in eligibility (and take-up) occur for cohorts in adjacent years, not adjacent months: individuals born in one year before or after can have significant differences in the eligibility and take-up of the CSG, but this does not occur for individuals born one month before or after, as their eligibility can only differ by maximum a few months.

Therefore, access to the CSG is determined by the year of birth, in the same way as duration of exposure. I consider this exposure to be exogenous, as it is determined by the age threshold set by the law. The only concern could be that mothers make their fertility decision because of the grant. However, this seems unlikely given that the introduction and the roll-out of the grant occur way after the threshold used in this analysis and these reforms could not have been anticipated. In any case, I will provide a test for this assumption later in the paper. Given this framework, the first instinct would be to perform a "Difference-in-Differences" estimation, comparing the outcomes of exposed and unexposed cohorts before and after CSG receipt. However, this estimation would rely on a "common trend" assumption, which is unlikely to hold in this case. By definition, for a given period of time, we cannot observe the same age evolution for different cohorts. If there are effects of the age of the child on the mother's labour decisions (which is most likely the case), then the identification assumption would not hold almost by construction. To solve this problem, I check instead for cohort discontinuities before and after the CSG was rolled-out, in the spirit of a Regression Discontinuity (RD) design, where the forcing variable is the cohort of the child and the threshold is set at cohort 1993. The advantage of this approach, compared to a diff-in-diff, is that any age effect should be captured away by the functional form on both side of the threshold, hence the "common trend" assumption amongst treated and non-treated cohorts is not required. Identification here relies on the assumption that, had the CSG not been implemented, we should not observe any discontinuity at the threshold with respect to labour market outcomes. Overall, this estimation should be understood as capturing the effect of having had any exposure to the CSG as opposed to none, regardless of the duration of the exposure and whether the grant is still being received. Formally, I estimate the following equation:

$$Y_i = f(c_i - 1993) + \mathbb{1}\{c_i \geqslant 1993\} \times f(c_i - 1993) + \beta_1 \mathbb{1}\{c_i \geqslant 1993\} + X' + \epsilon_i \quad (1)$$

Where Y_i is the outcome of interest for the mother of a child born in a given year; f is a function of the cohort of the youngest child centered at the cut-off point. I then introduce a binary variable for individuals whose youngest child is born after 1993, and interact it with the cohort of birth of the youngest child born. β_1 should capture the marginal effect of having had some access to the CSG as opposed to none. X' is a vector of covariates that include a control for household size and dummies for age, education, race, marital status and province. Standard errors are clustered at the household level.[19] In my main estimations, the forcing variable is always based on the youngest child born to a given mother, regardless of whether of this child is observed in the household or not. The advantage of this approach, which is possible using fertility information in the Census, is that I do not need to observe a child in the household to know whether the mother was treated or not. This takes away the concern of endogenous selection in the household with

[19]There is an open discussion on what is the correct way of clustering in an RD design with a discrete running variable. Lee and Card (2008) initially suggested that clustering of the standard errors should occur over the discrete values of the running variable, while in a more recent development, Kolesár and Rothe (2016) strongly advise against this practice, in particular when the number of clusters is small. In my estimations, with a maximum of 38 clusters, the standard errors drop significantly when clustering by the running variable. For this reason, I only cluster at the household level and not at the child cohort level.

respect to social grants pointed out by Hamoudi and Thomas (2014). The disadvantage of this approach is that fertility information is only asked to women under 50 years of age, so there is no information for women older than this threshold.[20]

The results are presented in Table 3. Encouragingly, we observe that in 2001, before the full roll-out of the CSG, there is no discontinuity at the threshold neither in the employment level nor in the share of informal jobs. This suggests that mothers of cohorts at the threshold were comparable in terms of labour market outcomes before the grant was received. In 2011, mothers whose child was born in 1993 are still as likely to be employed as mothers who did not have any access to the CSG. However, the composition of employment between mothers of exposed and non-exposed cohorts is not the same. Among the employed, those who had access to the CSG are around 2 percentage points less likely to be working informally. Figure 4 shows this graphically. While in 2001, we observe no significant difference in the composition of employment, in 2011 mothers of exposed cohorts are around 5-6% less likely to be holding an informal job rather than a formal one. From this estimation, it would seem that access to the CSG had no long term effects on mothers' employment rate, as mothers of exposed cohorts are as likely to be employed as unexposed ones. However, it does seem to have affected the allocation across formal and informal occupations, by increasing the share of formal employment.

Table 3: Labour Market Effects of the CSG on Mothers, 2001 & 2011

	Year 2001 - "Before"			**Year 2011 - "After"**		
	(1)	(2)	(3)	(4)	(5)	(6)
	Employed	Informal	Informal	Employed	Informal	Informal
CSG	0.0041	-0.0041	0.0025	0.0020	-0.0200**	-0.0223**
	(0.0069)	(0.0076)	(0.0104)	(0.0083)	(0.0079)	(0.0112)
Mean Y at Threshold	0.3781	0.3962	0.3962	0.4886	0.3675	0.3675
Observations	407,157	116,423	116,423	634,229	238,838	238,838
R-squared	0.1421	0.2604	0.2604	0.1530	0.1291	0.1291
Function Degree	Cubic	Quadratic	Cubic	Cubic	Quadratic	Cubic
Sample	All	Employed	Employed	All	Employed	Employed

Note: *** p<0.01, ** p<0.05, * p<0.1. This table gives the OLS estimates of Equation 1 on mothers' employment rate and informality share in 2001 and 2011 respectively (non-White only). The forcing variable is the cohort of birth of the youngest child ever born. CSG is a binary variable for the child being born in or after 1993, which indicates being part of a cohort that had access to the CSG. Mean Y at Threshold gives the mean of the outcome for the cohort 1992 (last unexposed cohort). All estimations include controls for: age of the mother, education, race, marital status, province and household size. Standard errors are clustered at the household level.
Source: Author's calculations on Census 2001 & 2011

The magnitude of the effects is also significant. If we consider that, at most, the take-up differential between the last unexposed cohort and the first exposed cohort was between 15-20% for one year (Figure 3), this leads to fairly large treatment effects in terms

[20]This makes the data censored at age 50. I consider this not to be an issue as long as the probability of being over 50 is not discontinuous at the threshold. Further discussion of this issue later in the Section.

of reallocation from informal to formal employment. In Table 4, I look at heterogeneous effects by intensity of treatment. I run the same estimation dividing the analysis between local municipalities that had different take-up rates in 2007. As shown in Figure A2 in the Appendix, the percentage of mothers receiving the CSG varies greatly across local municipalities, from 20 up to 70%.[21] I re-run the same estimation separating between local municipalities above and below the median in take-up. These results confirm that the discontinuity at the threshold is mostly driven by municipalities where take-up of the CSG was the highest, as shown in Figure A4 and Table 4.

Figure 4: Share of Informal Employment by Birth Cohort of Youngest Child, 2001 & 2011

(a) Year 2001 - “Before” (b) Year 2011 - “After”

Note: This graph gives the probability of being employed in the informal sector, conditional on being employed, for mothers by cohort of birth of the youngest child ever born, in 2001 and 2011 respectively. Therefore, before and after the CSG was fully rolled out. A quadratic function is fitted on each side of the threshold with 95% confidence intervals. As fertility information in Census data is censored at age 50, I only include mothers aged 39 or younger in the 2001 sample to compare the same population over time.
Source: Census (2001 & 2011)

The effects are entirely concentrated on mothers, likely because they are the only direct recipients of the grant. I do not find any evidence of an impact on other members of the household (see Figure A6 in the Appendix); in particular there is no effect on employment or its composition for the husband/partner. I can only link husbands/partners if they are in the same household as a mother. This estimation therefore is limited to people who are part of the household, and I cannot exclude that there might be an effect on people living outside the household and that the sample of other household members might be selected. However, this seems unlikely given that household size and its composition are smooth around the threshold.

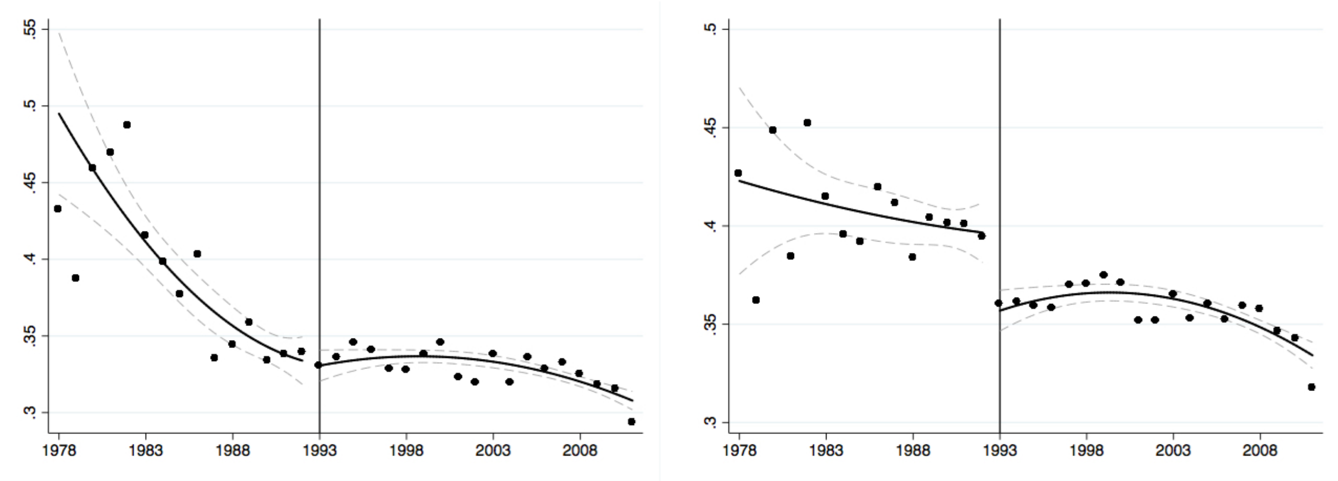
Non-married women living without a partner are the ones driving these results. This is not entirely surprising as they are likely to be the most credit constrained or unable to stay unemployed and look for a job, given that they cannot count on any income support

[21] The cause behind this large variation in take-up across municipalities is not entirely clear. Given the loosely applied means-test, these differences are most likely the result of administrative differences (awareness of the program, strictness in the application etc.) or different levels of overall welfare.

from a spouse. Instead, married women do not seem to respond to CSG receipt in terms of their allocation between the formal and informal sector. Moreover, I do not find any evidence that these effects are driven by labour migration. Mothers who have received the CSG are as likely to have migrated since 2001 and to be observed in the same province in which they were born as mothers who are non-recipients (see Figure A7). Hence, I do not find support for the view that this increase in formality is triggered by increasing migration towards urban areas.

Figure 5: Share of Informal Employment by Birth Cohort and Marital Status, 2011

(a) Married Women (b) Non-Married Women



Note: This graph gives the probability of being employed in the informal sector, conditional on being employed, for mothers in 2011 by cohort of birth of the youngest child ever born. A quadratic function is fitted on each side of the threshold with 95% confidence intervals. Panel (a) includes in the estimation only married women or living like married. Panel (b) limits the estimation to non-married women.
Source: Census (2011)

The view presented earlier in the paper is that the CSG might allow to leave informal employment out of necessity and intensify job search in the formal sector, which leads to a higher share of formal employment for those mothers who have had access to the grant. Therefore, this fixed/search cost framework predicts that there should be strong non-linearities in the effect of the grant, as once the resources and time to look for a formal job are covered, the effect should be null or small. To test this view, in Column 5 and 6 of Table 4, I focus exclusively on mothers with more than one child, and I run two separate estimations using the cohort of birth of the youngest child and the cohort of birth of the oldest child as forcing variables. The results show that the impact on the composition of employment occurs only when using the youngest of the two children, which is the one that determines whether a mother gets any access to the CSG as opposed to none. On the contrary, I find no effect when using the cohort of birth of the oldest child, which determines instead whether the mother gets an extra grant on top of the one already received for the youngest child. This is evidence that these effects may be strongly non-linear, and that benefits in terms of formal employment may occur only up to a certain point, which is consistent with a fixed/search cost framework where search for formal work requires an initial investment in terms of resources and time.

A decrease in informality can come from either the same job switching from informal to formal, or from a change in job directly, hence a switch from one job to another. In order to test this, I exploit the fact that in the Census individuals are asked detailed information about their occupation, which is then coded in different occupational codes. I regress this variable on the probability of having an informal job, and predict the fitted values and residuals separately.[22] The fitted values of this model should give the variation in informality that is explained by across-occupation variation, while the residuals should give the variation within the same type of jobs (where the same job is defined as the same occupation type). The results are presented in Table A3 in the Appendix. First, I confirm that excluding, rather than imputing, the missing values in the 2011 census does not change the results, as the coefficient remains close to 2pp. Moreover, it would seem that at least 1/2 of effect comes from variation across occupation, hence from mothers finding new, formal jobs rather than switching the status of their current job from informal to formal. Only the remaining half of the effect comes from variation within the same occupation. This is particularly important as it presumably shows that this is a "real" reallocation and not just a change in the nominal status of the job.

A lesson from the literature on informality is that self-employment may offer a desirable employment opportunity (Falco and Haywood (2016)), and studies have shown that cash transfer programs increase the propensity to enter self-employment, by both alleviating liquidity constraints and mitigating risk aversion (Bianchi and Bobba (2012)). In Table 5, I show that the share of self-employment does not increase at the threshold; instead, the coefficient is negative and insignificant. Moreover, I decompose informality status by self and wage employment to look in detail at how the composition of employment changes with the CSG. Both informal self and wage employment decrease at the threshold, and this decrease almost entirely benefits formal wage employment. The coefficient for formal self-employment is positive but insignificant, and close to zero. What these results suggest is that the CSG caused a reallocation from both self and wage employment in the informal sector to wage employment in the formal sector. Hence, I do not find any evidence that access to a cash transfer increases self-employment in South Africa. It remains to be shown whether these results would have been the same if men could also be the direct recipients of the grant. However, Abel (2013) finds similar results in the case of the *Old Age Pension*, where self-employment does not increase when an household member gains access to the pension. Therefore, it would not seem that credit/liquidity constraints are the main reason behind the stunningly low rate of self-employment in South Africa.

[22] I estimate the following equation: $Informal_i = occupation_i + \epsilon_i$. At the middle level of aggregation, there are 123 different occupational codes. The R2 when estimating this model is around 0.4

Table 4: Heterogeneous Effects on Informality Share by Municipality, Marital Status, Number of Children Eligible

$Y = (Informal \mid Employed)$	**Municipality**		**Marital Status**		**Children Eligible**	
	Low CSG	High CSG	Married	Non-Married	Oldest	Youngest
	(1)	(2)	(3)	(4)	(5)	(6)
CSG	-0.0128	-0.0270**	-0.0015	-0.0377***	-0.0068	-0.0210**
	(0.0110)	(0.0114)	(0.0112)	(0.0112)	(0.0060)	(0.0099)
Mean Y at Threshold	0.3270	0.4111	0.3395	0.3946	0.3639	0.3835
Observations	118,576	120,262	121,738	117,100	156,666	156,666
R-squared	0.1073	0.1455	0.1787	0.1427	0.1347	0.1345

Note: *** p<0.01, ** p<0.05, * p<0.1. This table gives the OLS estimates of Equation 1 on mothers' informality share in 2011. The forcing variable is the cohort of birth of the youngest child ever born except in Column (5). CSG is a binary variable for the child being born in or after 1993, which indicates being part of a cohort that had access to the CSG. Mean Y at Threshold gives the mean of the outcome for the cohort 1992 (last unexposed cohort). All estimations include controls for: age of the mother, education, race, marital status (not Column (3) and (4)), province and household size. In all the estimations, the functional form is a quadratic and the sample is those mothers who are employed. Column (1) & (2) estimate the regression separately by local municipality in which CSG take-up in 2007 was in the top 50% (High CSG) and bottom 50% (Low CSG). Column (3) & (4) separate married mothers from non-married ones. Women living with a partner are considered married even if not officially. Column (5) & (6) only include mothers with more than one child, then the estimation is run separately using the age of the oldest child and of the youngest child as forcing variables. White mothers are excluded from this estimation. Standard errors are clustered at the household level.
Source: Author's calculations on Census 2011

Table 5: Effects on the Employment Composition of Mothers, 2011

	Occupational Status	**Sector×Occupational Status**			
	Self-Employed (1)	Informal Self (2)	Informal Wage (3)	Formal Self (4)	Formal Wage (5)
All Employed Mothers					
CSG	-0.0057	-0.0098**	-0.0103	0.0040	0.0160*
	(0.0062)	(0.0043)	(0.0078)	(0.0047)	(0.0083)
Mean Y at Threshold	0.1382	0.0633	0.3042	0.0750	0.5575
Observations	238,838	238,838	238,838	238,838	238,838
R-squared	0.0105	0.0211	0.0961	0.0047	0.1068
Non-Married Only					
CSG	-0.0059	-0.0138**	-0.0241**	0.0080	0.0300***
	(0.0085)	(0.0060)	(0.0111)	(0.0063)	(0.0116)
Mean Y at Threshold	0.1355	0.0657	0.3288	0.0698	0.5356
Observations	117,100	117,100	117,100	117,100	117,100
R-squared	0.0087	0.0179	0.0861	0.0034	0.0983

Note: *** p<0.01, ** p<0.05, * p<0.1. This table gives the OLS estimates of Equation 1 on mothers' self-employment share in 2011 (Column 1). In Column (2)-(5), Equation 1 is estimated differentiating between wage and self-employment, where self-employed are individuals who own their business. The coefficients add-up in the following way: (1)=(2)+(4) and (2)+(3)+(4)+(5)=0. In the upper panel, the sample is composed of all employed mothers. In the lower panel, only non-married ones are included. White mothers are excluded from this estimation. Standard errors are clustered at the household level.
Source: Author's calculations on Census 2011

5.2 Robustness Checks

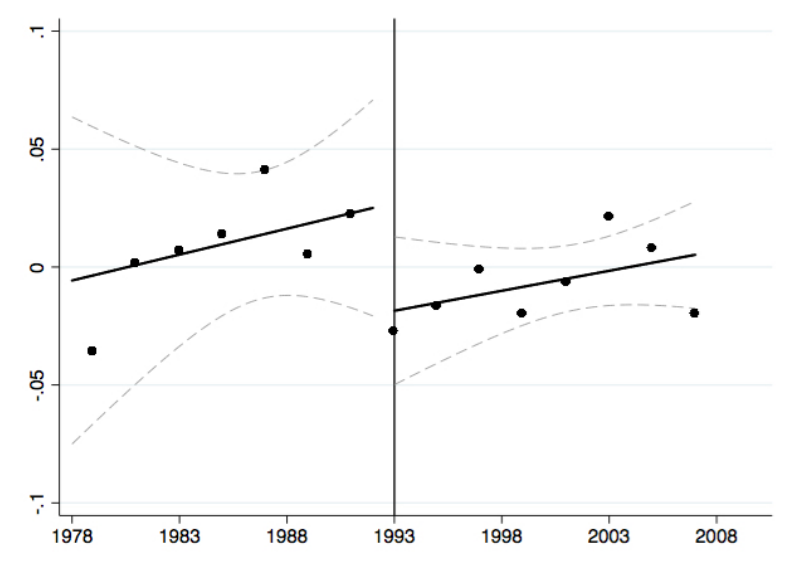
I perform several robustness checks for this estimation, presented in the Appendix. One concern is that fertility decision might be impacted by the the grant. Even though the roll-out of the grant occurs after the youngest child is born, exposed mothers might be more or less likely to have an additional child because of the grant, which would lead to selection. To alleviate this concern, I check that the log density of cohorts around the threshold, in the spirit of McCrary (2008). Graphical evidence, presented in Figure A8, shows that the there is no discontinuity at the threshold neither before nor after the roll-out of the grant. Fertility data in the Census is censored at age 50, meaning that older women are not asked about their birth history. This should not lead to selection as long as the probability of being 50 or older is not discontinuous at the cut-off point. The smoothness of the density around the threshold suggests that this is not the case and that the data being censored at 50 should not lead to selection. Furthermore, I also look at the distribution of pre-determined observables around the threshold. This is a standard check in an RDD-like analysis and should serve as an additional confirmation that individuals are comparable on each side of the discontinuity. Figure A7 in the appendix shows that the observables are well-balanced even when the sample is limited to employed mothers, and there is no jump in relevant covariates around the threshold: the share of mothers who are Black, married, have migrated, and their age, education and household size evolve continuously around the cut-off point, which suggests that we should not expect any discontinuity in labour market outcomes if not for the CSG.

As is standard practice in RDD, I also check the robustness of the results to the bandwidth size and functional specification, by gradually reducing the number of cohorts included in the estimation with a quadratic and linear fit respectively. These results are presented in Figure A9. With a quadratic fit, the results remain very stable as the bandwidth size decreases, with a drop in the share of informal employment of around 2 pp. A linear fit gives smaller estimates with a large window (around half those with a quadratic) and gradually converges to the same results as the bandwidth reduces, and the data resembles more closely a linear function.

Moreover, I perform a placebo test exploiting the fact that CSG take-up for whites is virtually zero.[23] I estimate Equation 1 on White mothers only and check that there is no discontinuity at the threshold (Figure A10). I find that the share of informal employment is smooth around the threshold for this group, which is consistent with the fact that they do not receive the grant. One additional concern could be that there are non-linearities in mothers' informal employment that are explained by the age of the child. Given that, at a point in time, cohort and age are collinear, I cannot control for age of the child while running this estimation. It seems unlikely that an age effect would change the sectoral composition of employment, without affecting the overall level. Still, to check that this is not an age effect, I perform a placebo estimation by setting a fictitious threshold for

[23]It is difficult to know from survey data whether this occurs because they do not apply or because there is an implicit rule that they should not access the CSG. Regardless, this group provides a good placebo check.

Figure 6: Residuals of Probability of Working Informally for Mothers, NIDS data, 2008-2015



Note: This graph gives the estimates of Equation 1 on probability of being informally employed, conditional on being employed, controlling for the age of the youngest child (and dummies for education, age, race, marital status and province). Informal employment is defined based on social security status for employees and VAT registration for the self-employed. A linear fit and 95% confidence intervals are plotted on each side of the threshold. The bin width is bi-annual, standard errors are clustered at the individual level to account for the panel structure of the data.
Source: National Income Dynamics Survey (2008-2015)

cohort 1983 in 2001 (hence the same age as cohort 1993 in 2011). In Figure A11, I show that in 2001 there is no jump or drop at the specific age threshold in terms of mothers' employment, or formality rate, suggesting that these results should not be capturing an age effect.

Lastly, I re-run the same estimation on a different dataset, the *National Income Dynamics Survey* (NIDS), a panel dataset that covers the period 2008-2015. There are two advantages to this data relative to the census: first, fertility information is asked to women of all ages, hence the sample is not censored above 50 years old. More importantly, the panel data spans many years (2008, 2010-11, 2012, 2014-15). This allows me to run the same estimations while controlling for age of the child, thereby taking away the concern that, in the cross-section, one cannot disentangle between age and cohort of the child. Reassuringly, I find very similar results when estimating Equation 1 on the NIDS.[24] In Figure 6, we see that there is still a clear discontinuity when averaging across years and controlling for age of the child. In Table 6, the point estimate is of the same sign but larger than with census data. This might be because the NIDS measures the wider concept of informal employment (based on social security status and VAT registration) rather than

[24] All the estimations and graphs on the NIDS are from "unweighted" data, meaning the sample weights are not included. When including sample weights, the results change significantly. As I focus on a subsample of the overall population, extreme weights in a regression are likely to change dramatically the estimations. To test this, I alternatively include the log of weights or trim the top of the "weights" distribution. After any of these two adjustments is made, the results are similar to those of Table 6. This procedure is suggested in the NIDS user manual, when running multivariate regression on a small sub-sample (Brown et al. (2013).

Table 6: Labour Market Effects of the CSG on Mothers, NIDS results, 2008-2015

	(1) Employed	(2) Informal	(3) Informal	(4) Monthly Salary	(5) Hourly Wage	(6) Hours Worked
CSG	0.0072	-0.0601*	-0.0453	0.0832	0.0528	0.0193
	(0.0203)	(0.0338)	(0.0492)	(0.0630)	(0.0547)	(0.0384)
Mean Y at Threshold	0.4168	0.6137	0.6137	-	-	-
Observations	19,923	7,805	7,805	7,805	7,805	7,805
R-squared	0.1578	0.1814	0.1815	0.4058	0.3585	0.0681
Function Degree	Linear	Linear	Quadratic	Linear	Linear	Linear
Sample	All	Employed	Employed	Employed	Employed	Employed

Note: *** p<0.01, ** p<0.05, * p<0.1. This table gives the OLS estimates of Equation 1 on mothers' employment rate and informality share, monthly and hourly salary and hours worked. The forcing variable is the cohort of birth of the youngest child ever born. CSG is a binary variable for the child being born in or after 1993, which indicates being part of a cohort that had access to the CSG. Hours worked, Monthly and hourly wages are in logs (Columns (4) to (6)). Missing values for hours worked and monthly salary are imputed. Mean Y at Threshold gives the mean of the outcome for the cohort 1992 (last unexposed cohort). All estimations include controls for: age of the mother, education, race, marital status, province, household size and **age of the child**. Informality is defined based on social security status for employees and VAT registration for self-employed. White mothers are excluded from this estimation. Standard errors are clustered at the individual level to account for repeated observations over time.
Source: Author's calculations on NIDS (2008-2015)

the informal sector. However, these effects are very imprecisely estimated due to the significantly smaller sample size of this dataset.[25] The other advantage of the NIDS is that it allows to go beyond the formal/informal divide, and look at other outcomes, such as wages and hours worked. Even though I lack the statistical power to estimate this convincingly, it would seem that the increase in formality did not affect the average number of hours worked, but it did raise wages. Indicatively, I find that wages are on average 8% higher at the threshold, which is consistent with the significantly higher pay in formal jobs.

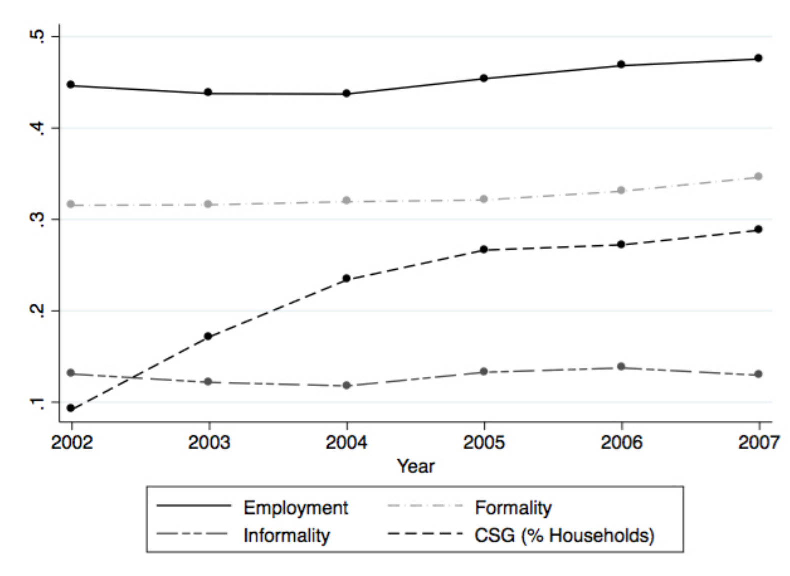
5.3 Country Level Trend

The drawback of an RDD methodology is that effects are inherently local, and cannot be easily generalized to the whole population. The concern is particularly relevant to test which view, between the "dualistic" and the "voluntary" view of the labour market in developing economies, is more pertinent. For example, it is particularly important to test whether the relative increase in formal employment is a "net" effect, or whether it comes at the expense of other workers. If workers queue for formal jobs, then the increase in formal employment due to the CSG may simply come at the expense of individuals or households who do not receive the grant, which drastically changes the policy implications.

Figure 7 draws the evolution of labour market outcomes over the 2002-2007 period. During the period of exponential growth of the CSG (2002-2005), we observe a marked decrease in informality (around 1 pp. in 3 years), but no proportional increase of the employment rate in the formal sector. This leads overall employment to decrease over the

[25]Due to the lack of statistical power, it is difficult to estimate a functional form that is higher than a linear. However, once controls are included, a linear function seems to fit the data quite well.

Figure 7: Employment Rates in the Formal and Informal Sectors, South Africa 2002-2007



Note: This graph plots average employment, informality and formality rate and the share of households receiving the CSG in South Africa over the period 2002 to 2007. Informality/formality status is based on business registration.
Source: Author's calculations on GHS and LFS

period. While this is only descriptive evidence, it is interesting to see that, coherently with the analysis presented before, the rise of the CSG occurs simultaneously to an important change in the relative size of the formal and informal sectors in South Africa. However, we also see that the results of Section 5.1 may not fully hold and explain the general trend at the country level.

In order to explore this further, I decompose this analysis in Figure A12 by four different groups: White men, white women, and Non-white men and women. As argued in Section 2, Whites in South Africa are almost never recipients of the CSG, while other ethnicities are. Moreover, the grant is only paid out to women. Coherently, I only find significant results for the subsample of non-white mothers, and never for men, even if they share the household with a recipient mother. This decomposition is interesting as it shows that the drop in informal and overall employment at the beginning of the period is entirely driven by non-White women. However, even for this subgroup that is the only direct beneficiary of the CSG, we can observe that the drop in informal sector employment is not matched by a symmetric increase in formal employment.

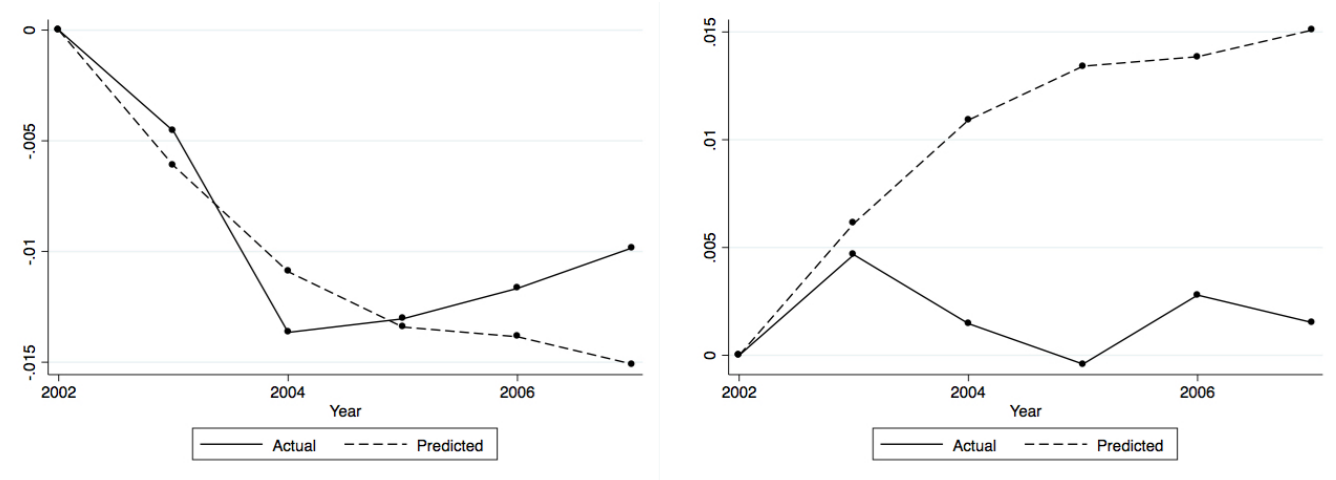
In Figure 8, I compare the expected impact on formal and informal employment of the CSG, if the micro results were to fully hold, with the actual evolution observed over the period. To net out time effects, I focus on the evolution relative to men, who should not be impacted directly by the grant.[26] What this analysis shows is that the drop in informal employment for women relative to men matches very well what we would expect given the results found in the previous section. On the contrary, we observe no relative increase

[26] I simulate the expected impact of the grant by multiplying the estimates of Table 3 (re-weighted by the take-up differential between cohort 1992 and cohort 1993) by the increase in coverage of the CSG.

in formal sector employment. The employment rate in the formal sector for non-White women remains fairly stable over the period, and the trend is not different from that of non-White men nor White women.

Figure 8: Predicted and Actual Evolution of Formality and Informality for Non-White Women Relative to Non-White Men

(a) Informal Employment (b) Formal Employment



Note: This graph plots the predicted and actual evolution for non-white women relative to non-white men for the period 2002 to 2007. The predicted line is drawn by simulating the evolution based on the starting level and the increase in CSG coverage multiplied by the effects found in Section 5.1
Source: Author's calculations on GHS and LFS (2002-2007)

The previous section showed that cohort exposed at least one year have the same employment rate, but a lower share of formal jobs. Instead, the country level trend shows an overall decrease in employment driven by a drop in informal employment. How to reconcile the empirical results of Section 5.1 with the country level trend that we observe? A possible explanation is the presence of strong externalities amongst grant recipients and non-recipients, who are in competition for the same jobs. While the grant gives a comparative advantage to eligible mothers during the search period, this advantage may come at the expense of non-eligible women. If women compete for a fixed pool of formal jobs, then the CSG will increase formal sector employment for recipients only as long as other individuals who do not receive it lose out. This is consistent with a "dualistic" view of the labour market, where individuals queue for formal jobs and take informal jobs out of necessity. Unless the CSG also increases the number of formal jobs available in the economy, for a fixed stock of formal jobs, any increase in formality for a certain group must be off-set by a lower number of jobs available for others.

Overall, the micro and macro analyses paint two very different pictures, which we could naively categorize as the "optimistic" and "pessimistic" view: from the results at the micro level, there seems to be no trade-off between the quantity and "quality" of jobs, where formal sector jobs are considered to be higher quality jobs. Higher formal employment does not come at the expense of lower overall employment. Instead, a more macro look, reveals that indeed the rapid expansion of the CSG occurs simultaneously to drop in informal employment, but this comes at the expense of a lower overall employment rate, and not through higher formal sector employment. These two sets of results are not necessarily inconsistent with each other. Instead, they may point at the presence of significant externalities that have to be taken into account when trying to understand the nature of informal employment and drawing policy implications.

6 Conclusion

This paper analyses the impact of the South African *Child Support Grant* on labour market outcomes, with a particular focus on informality. In the presence of fixed/search costs to enter formal employment, informal employment may occur out of necessity. By exploiting cohort discontinuities in access to the grant, I find that mothers of exposed cohorts have the same employment rate of mothers of unexposed cohorts, but are significantly more likely to be formally employed. These results are consistent with the view that informal employment is partly composed of jobs of "last resort", and that individuals show a clear preference for formal jobs over informal jobs. An unconditional cash transfer allows individuals to search for a formal job instead of working informally, and these effects are lasting beyond the period of exposure to the grant. Consistently with a fixed/search cost view, I also find strong non-linearities in the impact, as having one additional child exposed does not have the same effect.

I also check whether these micro results hold at the country level. In the years in which the CSG was rolled out, we do observe a shrinking in the size of the informal sector, entirely driven by non-White women. However, this drop is not matched by a proportional increase in formal employment, leading to an overall decrease in the employment rate. For non-white women, I find that the trend in informality resembles very closely the expected trend I would predict based on the micro analysis. However, with respect to the employment rate in the formal sector, the impact appears to be null. I conclude that, for a fixed stock of formal jobs, the presence of negative externalities on non-recipients, who are in competition or queuing for the same jobs, may offset any positive increase in formal sector employment. However, this analysis remains fairly tentative, so further research is needed to investigate these general equilibrium effects.

With this paper, I attempt to make a contribution to the literature on informality, job quality, and the labour market of developing countries more generally. First, this paper contributes to the literature analyzing the nature of informal employment. These results support the traditional, "dualistic" view of the labour market as opposed to the view that portrays informal employment as largely voluntary. However, the features of the South African labour market are very different from those of other developing economies, especially in Latina America, where self-employment is more widespread and of different nature. It is possible that the dualistic view applies to different extents to different contexts. An interesting direction for future research could be to replicate such an analysis to similar social programs in other emerging economies.

By showing that social assistance is a main driver in decreasing informal employment, this paper attempts to provide clearer policy implications of what are the effects of an unconditional cash transfer on the labour market. However, country-level analysis shows that this has not been sufficient to increase the overall stock of formal jobs. A possible policy implication would be that social assistance can foster a more efficient allocation of workers in the labour market, but that policies that increase supply of formal jobs are also necessary.

Lastly, this paper contributes to the literature that uses policy and policy evaluation as an instrument to understand labour markets. The debate over the nature of informal employment, which has been long ongoing in the literature, has mostly focused on structural approaches, to model and understand workers' and firms' behavior. This paper builds on the approach that policy evaluation can not only improve program design, but also help understanding the mechanisms that underlie the functioning of the labour market.

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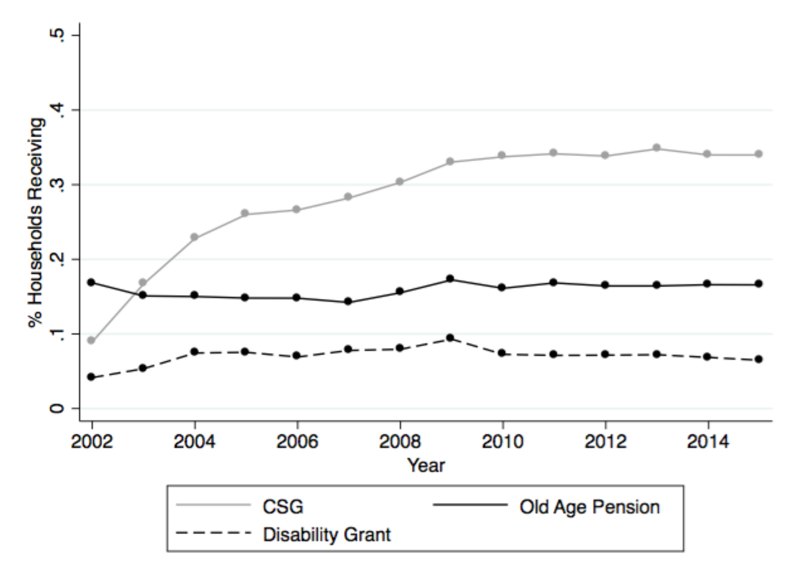
A Appendix

A.1 Descriptive Statistics

Figure A1: Coverage of Social Grants in South Africa, 2002-2015



Note: This graph draws the evolution of the three main social grants in South Africa over the period 2002 to 2015. The CSG experienced a dramatic increase in its coverage relative to the other grants, due to the reforms in age eligibility. Coverage refers to the percentage of households with at least one member receiving the grant.
Source: Author's calculations on GHS

Table A1: Overlap between Informal Sector and Informal Employment

Employees	Informal Sector	Informal Employment	
		Social Security	Written Contract
Social Security	78.89	1	64.52
Written Contract	77.88	74.99	1
Informal Sector	1	50.49	42.77
Self-employed	Informal Sector	Informal Employment	
		VAT Tax	Own Account
VAT Tax	98.21	1	92.95
Own Account	67.06	66.72	1
Informal Sector	1	95.49	90.75

To be read as: 78.89% of employees in the informal sector are not affiliated to social security. *Note:* Informal sector refers to individuals employed in non-registered businesses. Social security refers to individuals whose employer does not pay any social security contributions (pension, medical or unemployment insurance). Written contract refers to the presence of a written agreement between the employer and the employee. VAT tax refers to the business being registered for Value-Added Tax. Own account workers are self-employed workers with no employees.
Source: Author's calculations on LFS (2002-2007)

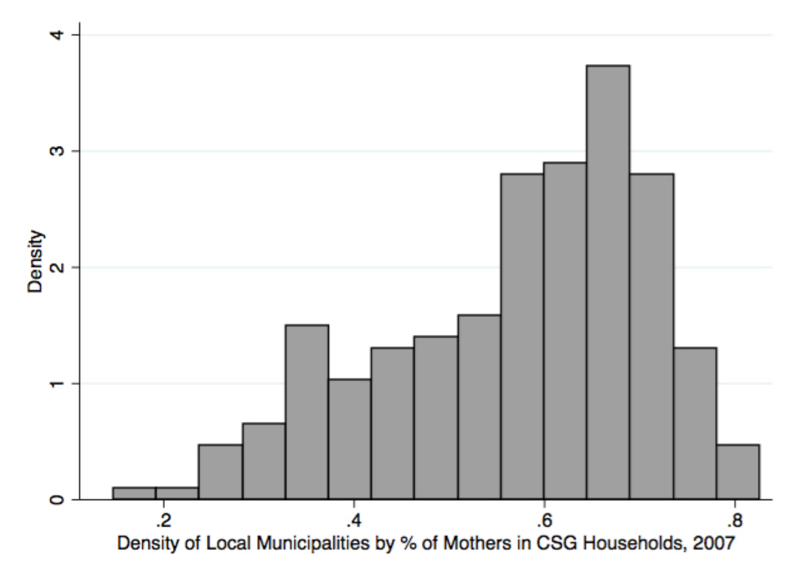
Table A2: Characteristics by labour market status, 2002-2007

Characteristics (pop %)	Informal	Formal	Inactive	Unemployed
Socio-Demographics				
African (76.71%)	89.00	59.96	82.79	88.27
White (10.85%)	3.44	21.90	6.99	2.38
Women (51.79%)	56.29	37.41	63.75	53.39
Young (<30) (40.74%)	26.94	28.03	50.74	56.84
No Schooling (27.30%)	44.12	17.55	33.21	22.32
Job Characteristics				
Agriculture (4.48%)	12.47	8.15	-	-
Self (8.79%)	48.92	6.55	-	-
Public job (6.93%)	1.18	19.58	-	-
Union (11.96%)	1.88	33.88	-	-
Part time (8.21%)	21.67	3.13	-	-
Excessive hours (9.30%)	22.85	18.07	-	-

To be read as: 89.00 per cent of informal workers are African, while 59.96 per cent of formal workers are African. *Note:* Informal sector refers to individuals employed in non-registered businesses. *Young* is a binary variable indicating individuals less than 30 years old. *No schooling* indicates individual with no educational attainment. *Self* indicates self-employed workers. The sample is restricted to the working age population aged 18 to 60. *Public Job* refers to an individual being employment by the national or local government, or by a government agency. *Union* refers to the worker belonging to a worker union. *Part Time* workers are those working less than 30 hours per week on average. *Excessive hours* refers to working more than 50 hours per week.
Source: Author's calculations on LFS (2002-2007)

A.2 Empirical Analysis

Figure A2: CSG Take-Up by Local Municipality, 2007



Note: This histogram gives the distribution of non-white mothers in households receiving the Child Support Grant across local municipalities in February 2007.
Source: Author's calculations on Community Survey (2007)

Figure A3: Employment Rate by Cohort of Birth of Youngest Child, 2001 & 2011

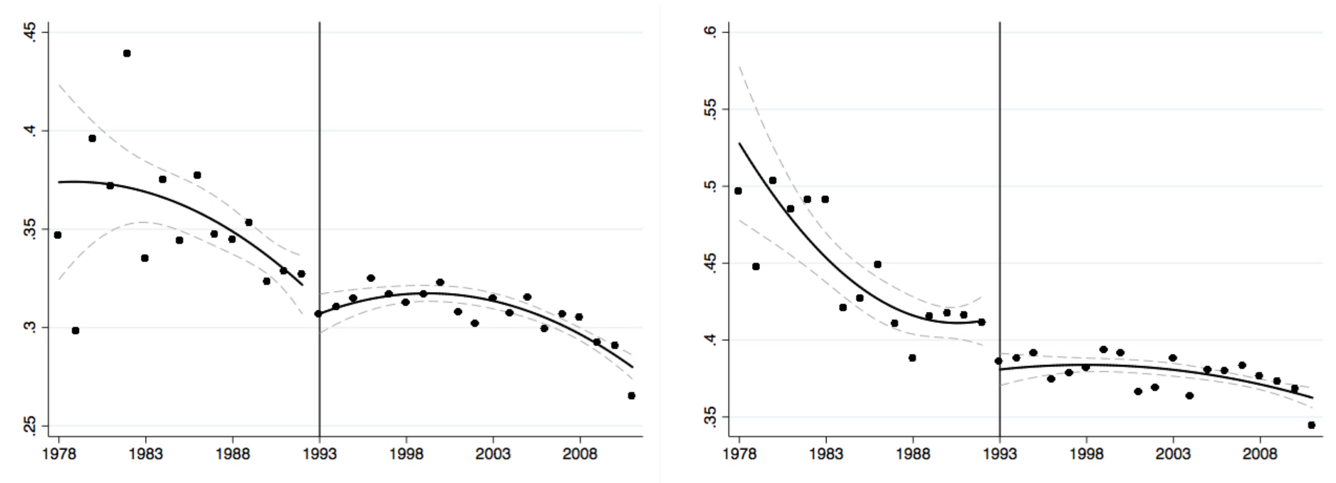
(a) Year 2001 - "Before"

(b) Year 2011 - "After"

Note: This graph plots the estimates of Equation 1 on the employment rate and the average employment rate by cohort of birth of the youngest child in 2001 and 2011. A cubic polynomial and 95% confidence intervals are fitted on both side of the threshold.
Source: Census (2001 & 2011)

Figure A4: Share of Informal Employment by Birth Cohort and Local Municipality, 2011

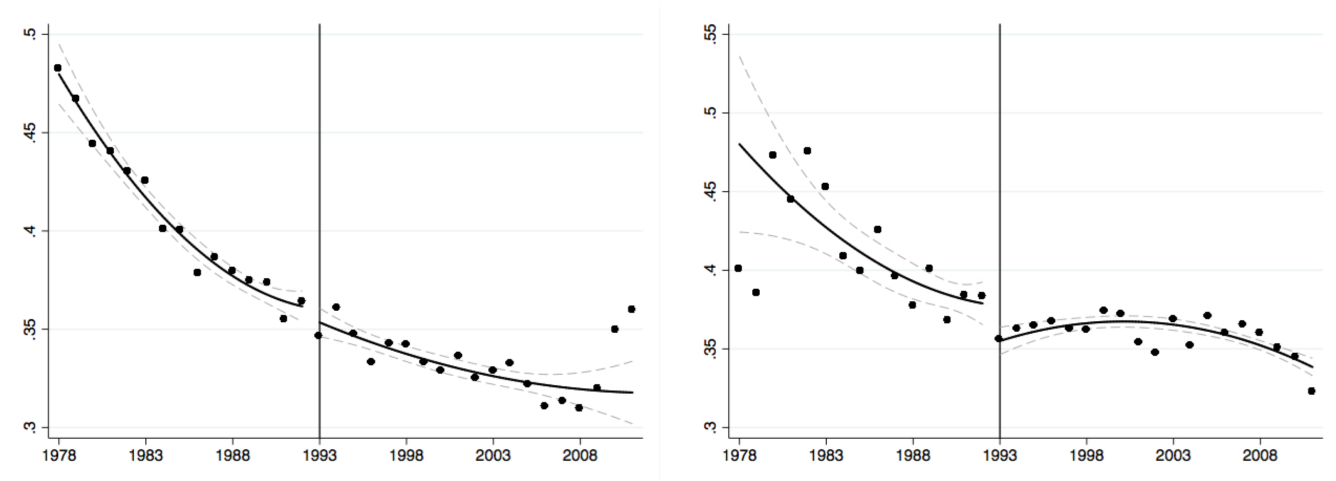
(a) Low CSG Municipalities (b) High CSG Municipalities



Note: This graph gives the probability of being employed in the informal sector, conditional on being employed, for mothers in 2011 by cohort of birth of the youngest child ever born. On the left panel, employed mothers sampled in local municipalities below the median take-up in 2007; on the right panel, employed mothers in municipalities above the median in 2007, as estimated on the Community Survey (2007). A quadratic function is fitted on each side of the threshold with 95% confidence intervals.
Source: Census (2011)

Figure A5: Share of Informal Employment by Oldest and Youngest Child, 2011

(a) Oldest Child (b) Youngest Child



Note: This graph gives the probability of being employed in the informal sector, conditional on being employed, for mothers in 2011 by cohort of birth of the oldest and youngest child ever born respectively. The sample is limited to mothers with more than one child. On the left, the forcing variable is the age of the oldest child. On the right, the forcing variable is the age of the youngest child.
Source: Census (2011)

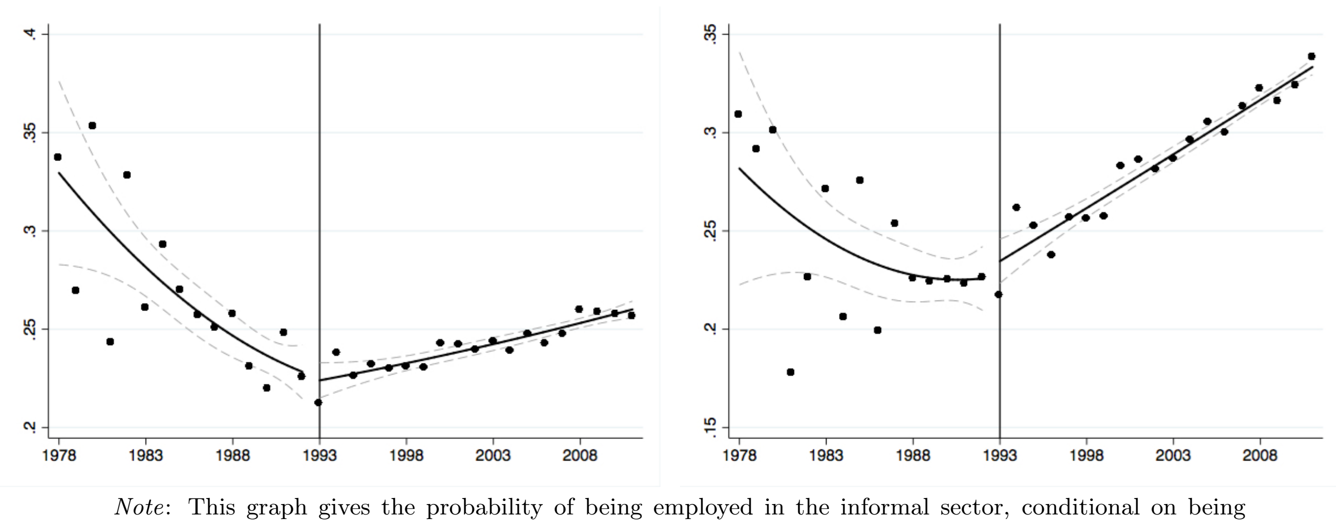
Table A3: Labour Market Effects of the CSG on Mothers, Within and Across Jobs, 2011

	(1) Informal	(2) **Within**-Occupation Variation	(3) **Across**-Occupation Variation
CSG	-0.0173**	-0.0087	-0.0086*
	(0.0085)	(0.0071)	(0.0051)
Observations	213,594	213,594	213,594
R-squared	0.1486	0.0236	0.1946

Note: *** p<0.01, ** p<0.05, * p<0.1. I estimate the following equation for employed mothers: $Informal_i = occupation_i + \epsilon_i$, and then separately predict the fitted values and the residuals of this equation. I then estimate Equation 1 having as a dependent variable the residuals (Column (2)) and the fitted values (Column (3)). The total effect is in Column (1) so that the coefficients add up in the following way: (1) = (2) + (3). All estimations include controls for: age of the mother, education, race, marital status, province and household size. Those individuals for whom informality status is missing are excluded, rather than imputed based on their industry/occupation as in Table 3. Standard errors are clustered at the household level.
Source: Author's calculations on Census 2011

Figure A6: Share of Informal Employment by Cohort of Birth of the Youngest Child, Husbands & Other Household Members, 2011

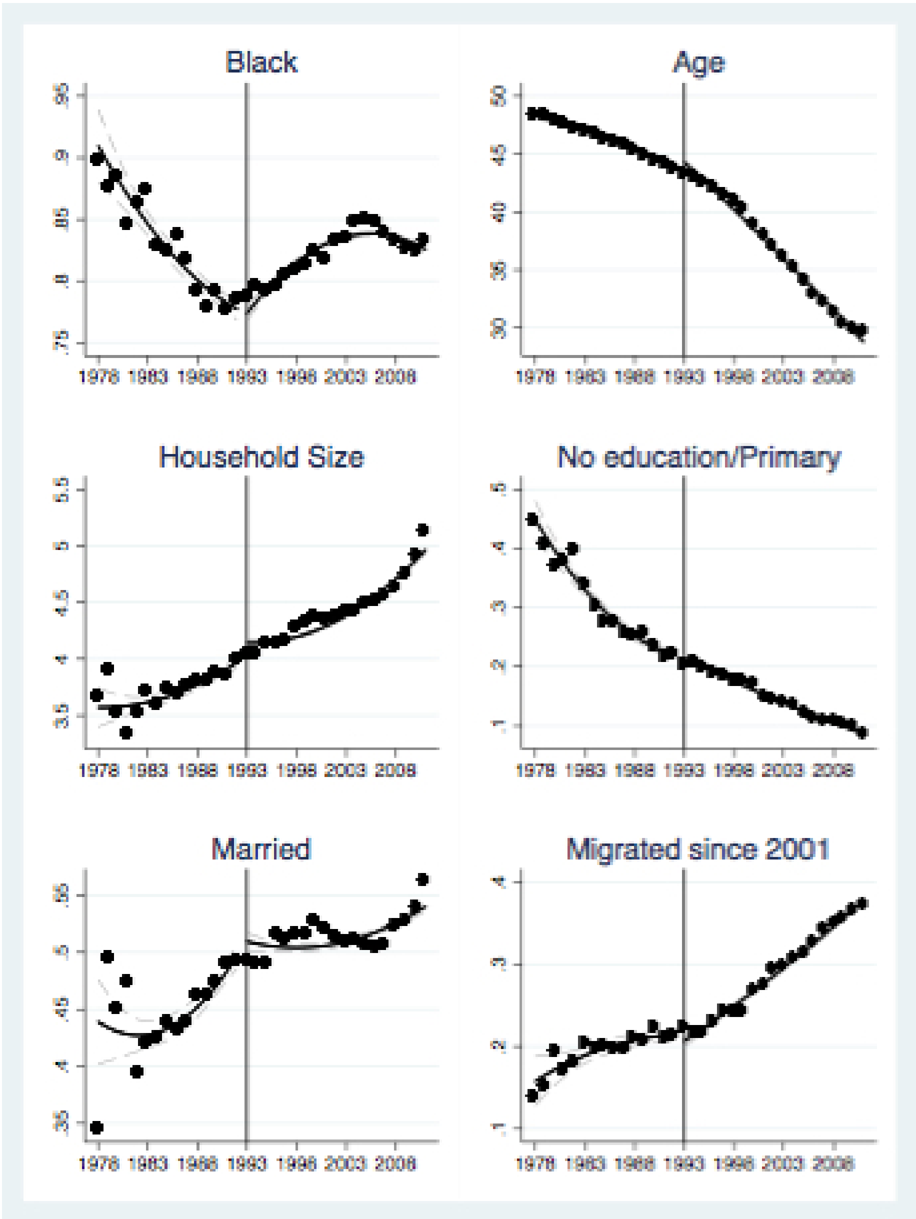
(a) Husbands (b) Other Household Members



Note: This graph gives the probability of being employed in the informal sector, conditional on being employed, for husbands (on the left) and other adult household members (on the right) in 2011 by cohort of birth of the youngest child ever born to the wife (panel (a)) or the woman in the household with the youngest child (panel b).
Source: Census (2011)

A.3 Robustness Checks

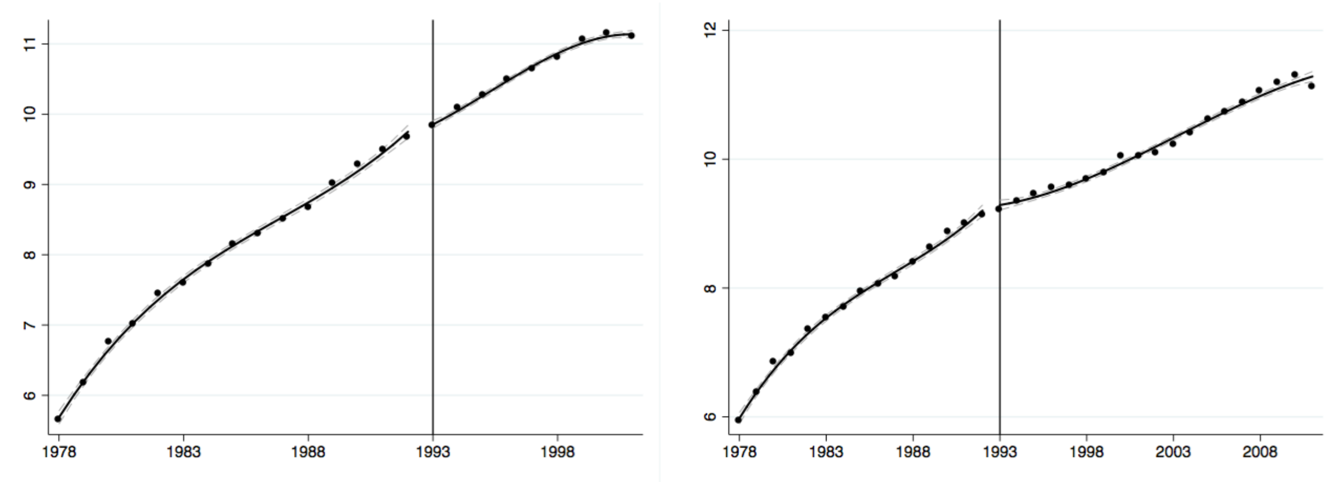
Figure A7: Observable Characteristics (Employed only), 2011



Note: These graphs estimate Equation 1 on a set of pre-determined observables characteristics, in order to check that individuals are comparable on both sides of the threshold. The sample is limited to employed non-white mothers. *Black* refers to the share of mothers who are neither Coloured nor Indian. *Age* is the age of the mother, not of the child. *Household size* refers to the number of individuals in the household. No education refers to the share of mother with no educational attainment. *Married* plots the share of mothers either married or living like married. *Migrated* gives the share of mother who have moved at least once since 2001. The scatter are the average values within each birth cohort of the youngest child, while the line represent the fitted value of Equation 1 and the area in grey represents 95% confidence intervals.
Source: Census (2011)

Figure A8: Density, 2001 & 2011

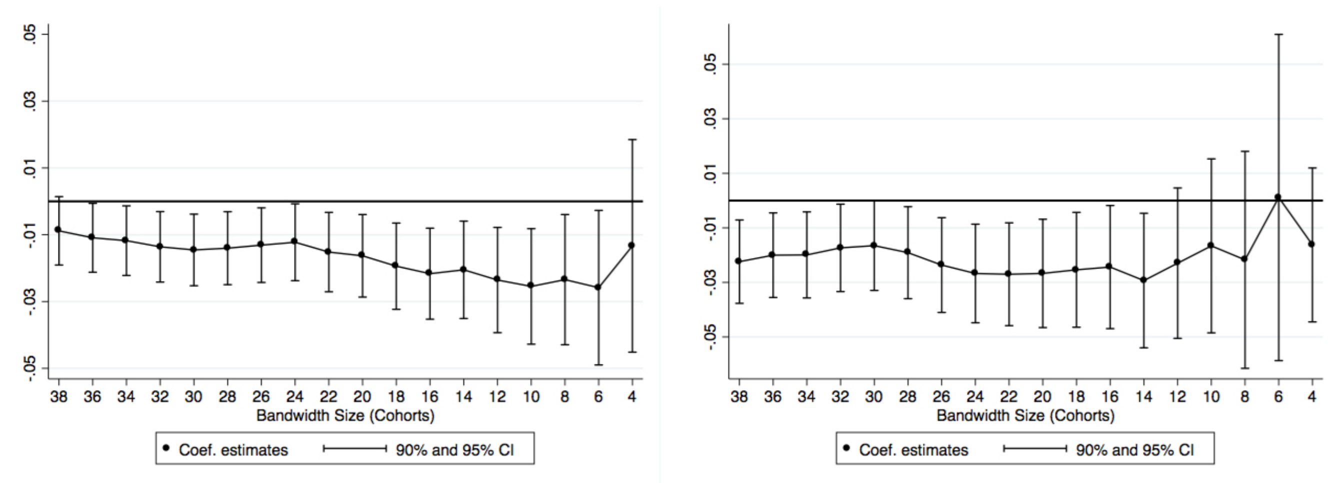
(a) 2001 (b) 2011



Note: These graphs give the log-density of mothers by year of birth of their youngest child. The sample is limited to mother aged 39 or less in 2001, and 49 or less in 2011 due to the sample design of the census, where only women under 50 are asked for fertility information.
Source: Census (2001 & 2011)

Figure A9: Bandwidth Sensitivity

(a) Linear Fit (b) Quadratic Fit

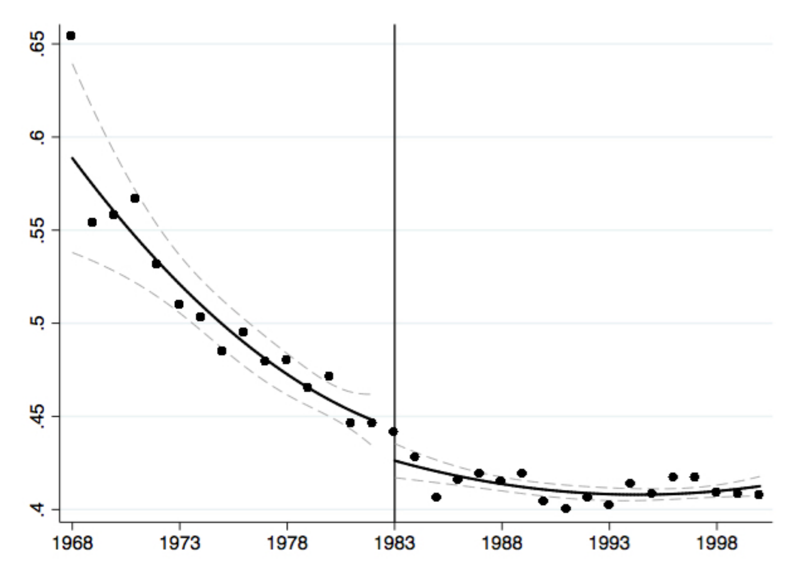


Note: Panel (a) tests the sensitivity of the estimates of Equation 1 to the size of the bandwidth with a linear fit. Panel (b) performs the same exercise with a quadratic fit. The boundaries around the coefficients are 95% confidence intervals.
Source: Author's calculations on Census (2011)

Figure A10: Placebo Test - White Mothers Only, 2011

Note: This graph estimates Equation 1 on the share of informal employment only on White mothers as a placebo test, given that this population group does not receive the CSG. A quadratic fit and 95% confidence intervals are plotted on each side of the threshold.
Source: Census (2011)

Figure A11: Robustness Test - Age of the Child Effect, 2001

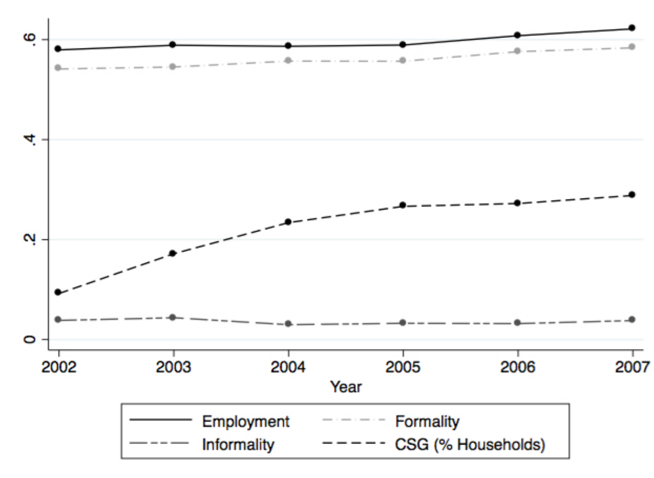


Note: This graph estimates Equation 1 on the share of informal employment setting a threshold at cohort 1983 in 2001, which is the same age as cohort 1993 in 2011, in order to test that there is no specific effect of the age of the child with respect to the share of informal employment. A quadratic fit and 95% confidence intervals are plotted on each side of the threshold.
Source: Census (2011)

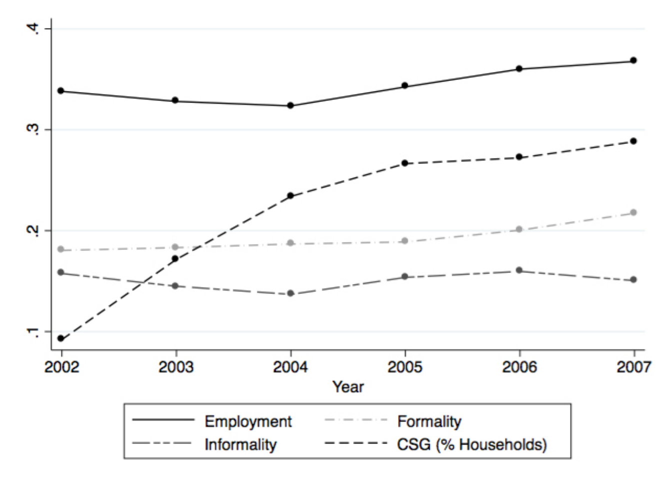
Figure A12: Employment in the Formal and Informal Sectors by Group, South Africa 2002-2007

Women

(a) White

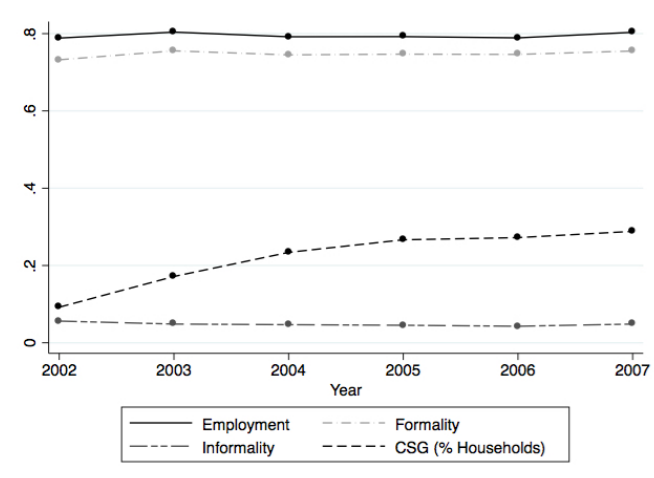


(b) Non-White

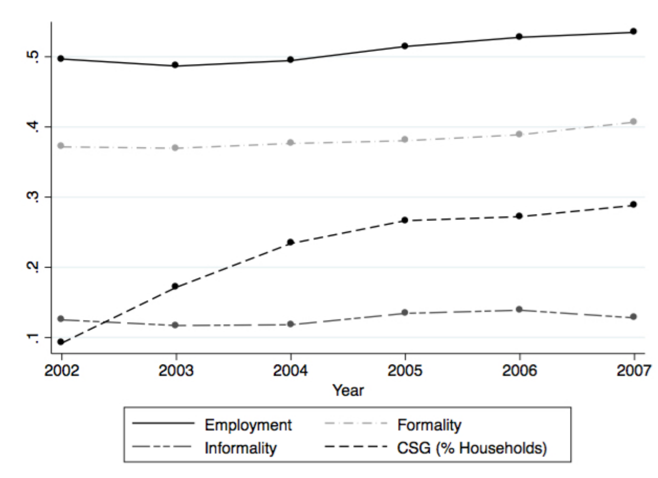


Men

(a) White



(b) Non-White



Note: These graphs plot the average employment, informality and formality rate and the average level of grant receipt in South Africa over the period 2002 to 2007, by race (White vs. Non-White) and gender. Informality/formality status is based on business registration. Non-white women are the only direct recipients of the CSG. *CSG* refers to the overall share of households with at least one recipient at the country level, not for the specific subgroup.
Source: Author's calculations on GHS, LFS (2002-2007)