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## Public job-creation programs: The economic benefits of investing in social care? Case studies in South Africa and the United States

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## **Working Paper No. 671**

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### **Public Job-creation Programs: The Economic Benefits of Investing in Social Care? Case Studies in South Africa and the United States**

by

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**ABSTRACT**

This paper demonstrates the strong impacts that public job creation in social care provisioning has on employment creation. Furthermore, it shows that mobilizing underutilized domestic labor resources and targeting them to bridge gaps in community-based services yield strong pro-poor income growth patterns that extend throughout the economy. Social care provision also contributes to promoting gender equality, as women—especially from low-income households—constitute a major workforce in the care sector. We present the ex-ante policy simulation results from two country case studies: South Africa and the United States. Both social accounting matrix-based multiplier analysis and propensity ranking-based microsimulation provide evidence of the pro-poor impacts of the social care expansion.

**Keywords:** Social Care; Job Creation; Gender Equality; Pro-Poor Growth.

**JEL Classifications:** C15, C67, D33, E24, J48

## 1. Introduction

According to estimates by the World Bank, United Nations Development Programme (UNDP), and International Labour Organization (ILO), since the onset of the 2007 global financial and economic crisis—the Great Recession—at least 30 million more women and men joined the ranks of the unemployed, for an astounding total of 200 million people out of a work. On a world scale, and combined with the fuel and food price spikes of 2008, over 150 million more than what was expected prior to the crisis have been trapped in poverty,<sup>1</sup> and recent price spikes are set to exacerbate these trends. Indeed, sudden declines in aggregate demand have always had serious repercussions for employment, and the evidence from previous financial crises shows that, despite stabilization of GDP growth, employment recovery in the aftermath of crises lags by five to seven years.<sup>2</sup>

Yet thin employment opportunities, especially for the poor, are not a problem exclusive to times of crisis. Most rural workers have access to agricultural work only seasonally and, therefore, despite distress migration, the uncertainty of a job is daunting; others work under highly informal conditions, suffering from underemployment and unpredictable spells of no employment at all. Own-account workers also depend too often on unstable sources and levels of income, with earnings from sales highly volatile.<sup>3</sup> In addition, some countries experience deeply rooted structural unemployment. In South Africa, for example, deeply structural factors have excluded about 25 percent of the population<sup>4</sup> from access to work opportunities for more than a decade and a half. Material deprivation is often accompanied by hopelessness, marginalization, social exclusion, exposure to increased violence, and susceptibility to dangerous ideologies.

Even where there have been success stories, as is the case in some parts of the world—Latin America in the last decade, in particular—inclusive growth has not taken sufficiently deep roots to lift the extremely and chronically deprived out of poverty. In the era of globalization, predictable

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<sup>1</sup> See World Bank (2008a). The World Bank estimates that, due to the financial crisis, between 53 and 79 million people are falling below the poverty line of \$1.25 and \$2.00 per day, respectively; see Ravallion (2009). See also Shen and Ravallion (2009) and World Bank (2008b).

<sup>2</sup> Buvinic (2009).

<sup>3</sup> See the following contributions to Rodgers and Kuptsch (2008): J. A. Ocampo, “The Links between Economic and Social Policies: A Conceptual Framework”; E. Kalula, “The Decent Work Agenda: An African Perspective on Research Needs and Priorities”; and J. Ghosh, “New Research Questions in the Decent Work Agenda, a View from Asia.” See also ILO (2010).

<sup>4</sup> SSA (1998–2009). The latest unemployment figures place the unemployment rate for the fourth quarter of 2009 at 24.3 percent. See stats online at <http://www.statssa.gov.za/keyindicators/keyindicators.asp>.

and sufficiently well paying work opportunities remain beyond the reach of 1.4 billion people living in extreme poverty, with half of this population having no access to paid work at all.

Public job-creation programs, alternatively known as public works (PW) and employment guarantee (EG) schemes, have emerged as government initiatives that aim to redress seasonal, cyclical, and structural joblessness for the poor by offering a minimum-pay job to those ready and willing yet unable to find work. With a minimal wage effectively discouraging the better off from taking advantage of such programs as beneficiaries, the work entitlement and the income they offer provide a lifeline for the low-skilled poor. In this regard, when all else fails, the state effectively acts as the “employer of last resort.” Though many such program initiatives have been introduced over the years,<sup>5</sup> the best known and largest in scale are the New Deal programs (following the 1929 Great Depression) in the United States and the recent Mahatma Gandhi National Rural Employment Guarantee Act (MG-NREGA) in India and the Expanded Public Works Programme (EPWP) in South Africa, which were first introduced in 2005–06 and 2004–05, respectively.

When countries consider direct job creation through PW and EG programs, meaningful work projects need to be identified, and usually those prioritized are selected to bridge existing gaps in physical infrastructure. This paper argues that an additional target for work-project consideration is that of social care delivery. Gaps exist in care services for the young, the elderly, the sick, and the permanently ill or severely disabled. We show that investing in mobilizing unused domestic labor resources—that is, providing *earned* income to (previously unemployed) job holders that serve the needs of their communities—yields strong pro-poor income growth patterns, stronger than investment in other types of projects. But it also contributes to another key developmental goal: that of promoting gender equality. It does this in at least two ways: by reducing the burden of unpaid work for women and girls, and by expanding and supplementing the income-earning options for women, which is certain to increase the labor force participation of women who live in poverty.

Making progress in reaching development objectives—exemplified in the UN Millennium Development Goals—points to the extraordinary importance of public investment in areas traditionally understood as “women’s [unpaid] work.” From better health outcomes to clean water and sanitation, public spending is necessary. What needs to be made evident is that, in addition to human development, such spending makes good economic sense both from the standpoint of enriching human capital resources and from the standpoint of pro-poor development and growth.

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<sup>5</sup> For a comprehensive history of such initiatives, see Kaboub (2007) and Antonopoulos (2009). As a 2007–09 crisis mitigation intervention, several countries, including China, introduced or expanded previously smaller-scale programs.

Closing gaps today results in healthier, more educated citizens with higher productivity and income-earning potential tomorrow. The economics literature has highlighted, for instance, that early childhood development programs spur the cognitive as well as the noncognitive skills of children, which has positive economic impacts.<sup>6</sup> Caring for elderly and chronically ill patients at their homes has proved to be more cost effective than providing similar care under alternative institutional settings. In addition, the relief of time from unpaid care provisioning improves the chances for accessing paid work and/or the productivity of workers whose sick family members otherwise depend entirely on their care.<sup>7</sup> These social benefits, in and of themselves, warrant investment in public provisioning, but there exists a different and equally compelling argument, which is the focus of this paper.

Shifting parts of unpaid care work to paid work<sup>8</sup> by expanding the domain of social services brings about powerful pro-poor and economy-wide employment outcomes that are superior, in fact, to those obtained in equally needed but less labor-intensive physical infrastructure investment. This is accomplished via the direct employment opportunities created, as well as indirect ones through inter-industry linkages and aggregate demand growth from the new jobs. Furthermore, there are distributional consequences of the job creation. We analyze therefore, in what follows, the direct and indirect job creation and the distributional impacts of social care expansion through employment for two countries, South Africa and the United States. Our specific focus lies on the effects of labor demand adjustment on employment and income via expanding public service delivery. To the best of our knowledge, the topic has been overlooked in the literature.<sup>9</sup>

The paper is organized as follows. Following this section, section 2 presents our methodology and data; section 3 shows the employment impacts of the proposed interventions, while section 4 discusses the income distribution and poverty reduction results we obtain. Section

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<sup>6</sup> See Dickens, Sawhill, and Tebbs (2006) and Heckman and Masterov (2007) for macroeconomic impacts of the early education through productivity growth. Golin, Mitchell, and Gault (2004) provide a concise summary of literature review on a series of research on estimating benefits of a high-quality, intensive pilot projects—the Abecedarian project in North Carolina, HighScope Perry Preschool Study, and Title I Chicago Child-Parent Centers. Additional references include Barnett et al. (2004) and Barnett, Lamy, and Jung (2005). Heckman et al. (2010) provides a new summary on the cost-benefit analysis of the Perry Preschool program.

<sup>7</sup> The cost-effectiveness is documented in the medical literature; see, for example, Casiro et al. (1993) and Fields et al. (1991). See MetLife (2006) on the potential gain in worker productivity from paid care relief.

<sup>8</sup> For a comprehensive discussion on the intersections of gender inequality, paid and unpaid work, and employment guarantee programs, see Antonopoulos (2010).

<sup>9</sup> It should be noted, though, that we do not attempt to estimate the impact of social care on the changes in mothers’ labor force participation rates; see Bergemann and van den Berg (2006), Blau and Tekin (2007), Kimmel (1995), and Lefebvre and Merrigan (2008), among others. Nor do we endogenize the labor supply response of newly hired workers in the social care network whose family members are recipients of the care.

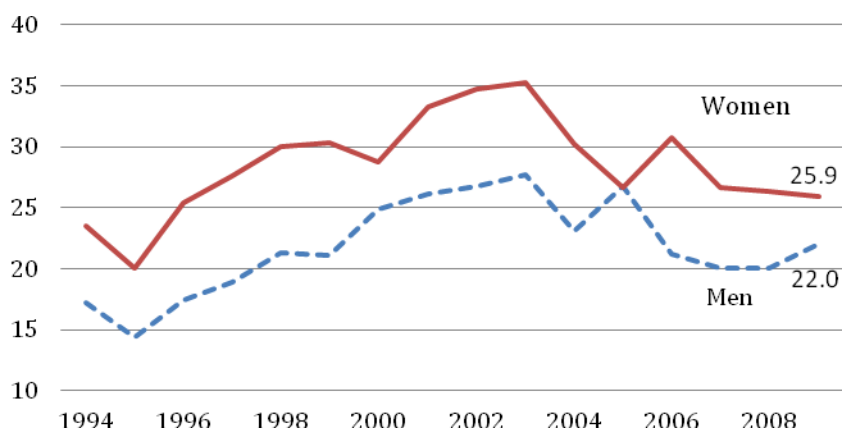
5 concludes. Before turning to the next section, we conclude section 1 by presenting the economic and social contexts within which social care expansion's impacts are proposed and, subsequently, evaluated through an ex ante simulation exercise.

## **Background Context: Unemployment and Social Care Investment in South Africa and the United States**

### ***South Africa***

The persistent high unemployment rates in South Africa in the aftermath of the apartheid era (see Figure 4) compelled the government to introduce the EPWP direct job-creation initiative in 2004. The program consists of job opportunities provided to unskilled, unemployed, poor individuals who work on projects that are labor intensive.

**Figure 1. Unemployment Rates by Gender in South Africa (in percent)**



Source: *Key Indicators of the Labour Market*, 6th ed., Geneva: ILO, 2009

They are hired at a minimum wage and, while receiving training and accreditation, they provide services for their communities. There are three main EPWP sectors designated for job creation: (1) labor-intensive physical infrastructure investments, including the building of roads, bridges, and irrigation systems; (2) environmental investments—creating work opportunities in public environmental improvement programs; and (3) social service—creating work opportunities in public social programs, with a focus on home- and community-based care (HCBC) and early childhood development (ECD).

HCBC provides comprehensive services, including health and social services, by formal and informal caregivers in the home, aiming to restore and maintain a person's comfort, function, and health, including providing care toward a dignified death. The prevalence of HIV/AIDS, tuberculosis, and malaria has accentuated the need for expanding service delivery. As of 2003, there were 892 HCBC sites, mostly run by nongovernmental organizations with the help of volunteers. As an employment program, the EPWP-HCBC program targeted the unpaid volunteers who were unemployed and often the adult dependents of the terminally ill and people living with the sick family members who were not in receipt of a state grant.

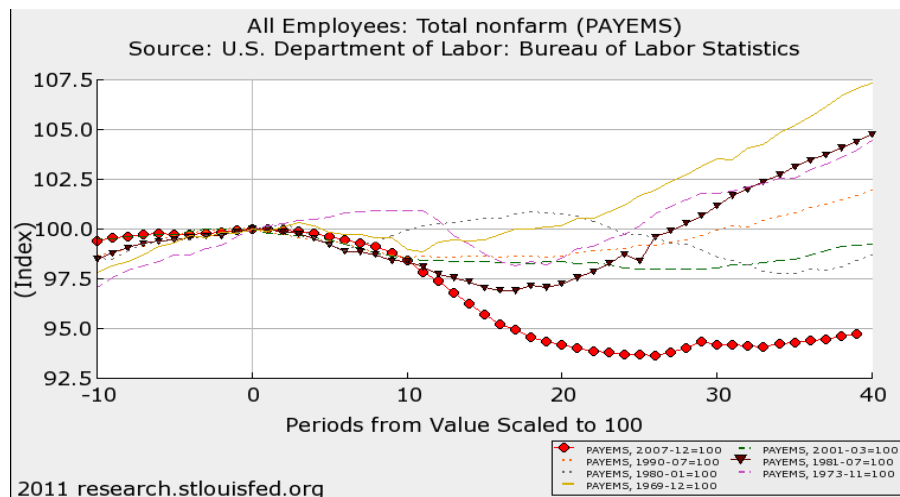
The ECD program set out to provide temporary jobs, skills and accreditation to 19,800 practitioners over five years, who would earn income but also would be involved in training, thereby improving the care and learning environment of children. The target workers were previously unpaid volunteers, unemployed and/or underemployed parents and caregivers in all ECD programs. It was envisaged that they could be reached through (a) learnerships leading to various levels of educational attainment and qualifications corresponding to accreditation of teacher aides, kindergarten teachers, et cetera; (b) work/employment/skills programs for very low-skilled, unemployed people to be recruited and trained in sites designated for receiving indigent subsidies; (c) direct and immediate creation of work opportunities in targeted ECD sites in very poor areas; (d) on-the-job training and certification for ECD support staff, such as vegetable and legume gardeners, cooks and administrators; and (e) short-term, three-month employment opportunities in auxiliary tasks for 3,000 unemployed parents through existing schools and local authorities.

Antonopoulos and Kim (2008) proposes a massive scaling up of EPWP if the program is to reduce unemployment, as the existing scale was incommensurate to the jobless problem at hand. Specifically, they propose the development of an ECD cadre that would extend the range, duration, and number of job opportunities to include two-year appointments for child care workers, school nutrition workers, teachers' aides, school caretakers, school clerical workers, cooks, vegetable gardeners, and administrators for local ECD sites. The proposed expansion of HCBC program would create a cadre of community health workers, nutrition and food security workers, direct-observation therapy practitioners, and TB and malaria officers. The scale of the proposed expansion is 9.3 billion rand, roughly 1 percent of GDP in 2000. This scale would cover the ECD of all children living in poor households and about 20 percent of the population, mostly those in need of home-based care for HIV/AIDS patients. They analyzed ex ante policy impacts of expanding social care provisions under EPWP, using a social accounting matrix (SAM)-based multiplier analysis.

## United States

The Jobless recovery is a hallmark of the Great Recession. Figure 2 shows the trends in duration and severity of employment losses in the seven recessions since 1969. For each spell of recession, a seasonally adjusted nonfarm payroll employment level is indexed to be 100 at the start of the downturn and plotted to a period ranging 10 months before the onset to 40 months afterward. The current recession (the line with red diamonds on the graph) started with a moderate impact on employment for the first 12 months, but unleashed its full destructive force thereafter. It is obvious that unemployment hysteresis has settled into the US labor market.

**Figure 2. Nonfarm Payroll Extended Job Loss Trend from the Last Seven Recessions (1969–current)**



Source: Current Employment Statistics, Bureau of Labor Statistics, via Federal Reserve Economic Data (FRED2) issued by the Federal Reserve Bank of St. Louis

Similar to the South Africa study, Antonopoulos et al. (2010) investigates the impacts of investing in localized community-based *social care services*; in particular, home-based health care and early childhood development as an effective employment policy. Instead of short-term public sector employment as a countercyclical measure, this proposal calls for a permanent expansion of public service delivery that, as it turns out, mostly hires women. Their stable earnings may dampen volatile income shocks from highly cyclical male-oriented jobs, such as construction. An aging population and advances in medicine are extending life expectancy of the elderly and disabled patients for who HBC can be cost effective without compromising quality of care. In 2007 alone, almost 1.5 million seniors and disabled persons received home-based care, according to the

National Home Health Aide Survey. The ECD programs for children from poor households—Head Start and Early Head Start—are not reaching the intended group, with merely 21 percent of eligible kids participating (Iruka and Carver 2006).

Home-based care in the United States consists of managed health care that deals with basic medical care for post-operative recuperation, managing chronic illness, and other noninvasive care performed by nurses and nursing assistants. The early childhood development programs offer child care with an educational component—for cognitive and noncognitive growth—for children under age five, before they enter a school-based educational system.

Most of the workers in these occupations are women. In home-based health care, 88 percent of the care providers are women and minorities (52 percent), especially African American women (30 percent). Recent immigrants constitute 21 percent of the workforce. The wage rate is low, at \$10.31 as of 2008 on average, and the annual mean earnings are \$21,440 (King et al. 2009). The majority of jobs in early childhood development are preschool teachers and assistants and child care workers, whose average wage rate is \$11.32 per hour—much lower than private industry average of \$18.08 (BLS 2009a).

Previous studies<sup>10</sup> assessing both long-term and short-term benefits of expanding social care did not take into account distributional impacts of employment in the sector: who would receive jobs from the expansion and how much income they would receive from the jobs. Employment opportunities created directly and indirectly from the expansion may or may not reach the disadvantaged groups in the labor market—women, the less educated, and poor households—depending on the occupations and industries in which these jobs are created. A job as an administrator in the health care industry is likely to be held by a highly educated male worker from an affluent household, while a less-educated woman from a middle-class household would be more likely to take a job as a child care provider or preschool teacher. The individual characteristics of workers determine their likelihood of employment, and earnings vary across occupations and industries. We use a microsimulation method based on statistical matching techniques to analyze the distributional issues.

To highlight the employment effects of the investment in care, we compare the results to that of investing in infrastructure construction. Our policy simulations consist of \$50 billion on increasing final demand for social care versus for construction. We find that investment in care is a more cost effective and equitable way to create jobs than infrastructure construction.

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<sup>10</sup> See Antonopoulos et al. (2010) for a summary of the literature.

## 2. Methodology

Input-output analysis depicting Inter-industry linkages through which multiplicative processes generate employment seems an appropriate tool to assess the industry-specific, ex ante policy at the macro level. Absence of price changes in the analysis seems a secondary concern in a recessionary environment in which inflationary pressures from a large-scale policy intervention are negligible and slack conditions are prevalent in factor markets.

We demonstrate two different methods to assign jobs created by the policy simulations. A social accounting matrix with various household types decomposed by relevant demographic and economic characteristics is used in the South African case study. The detailed decomposition makes it feasible to incorporate a flexible job-targeting scheme to maximize the poverty reduction effect.<sup>11</sup> The method is simple, and it is intuitively easy to grasp the underlying mechanism of job creation. A drawback, however, is that we cannot examine within-group heterogeneity that is a part of the ideal distributional impact analysis. A microsimulation technique enhances the distributional impact analyses. The statistical technique in the US case study is a propensity ranking system with multiple imputations, instead of estimating behavioral functions of labor supply and earnings of the population. The method emphasizes the effects of individual characteristics on each individual, rather than estimating the group-supply function by exploiting variations across individuals.

### South Africa: SAM-based Multiplier Analysis

Multiplier analysis based on the SAM thus provides an adequate simulation platform to analyze policy impacts on disaggregated subgroups of households as well as industries. The method accounts for multiplicative direct and indirect impacts of an external demand stimulus. This method, however, rests on the supposition that the technical coefficients of production remain constant. Hence, modification of the SAM is necessary if an intended simulation exercise entails, in one form or another—a new technology requirement stemming from the labor intensity requirement of the EPWP, for instance.

An administrative requirement for intensive use of unskilled and poor workers with a large-scale intervention renders a new sector in terms of input composition and linkages to the rest of the economy. To incorporate the labor-intensity requirement of the EPWP, we develop a simple hypothetical integration method to circumvent a rebalancing of the SAM without sacrificing the accuracy of multiplier-effect analysis. A new *hypothetical* sector is simply inserted into the existing SAM, as shown in Table 1, with a scaled-down value of its gross output. The scaling down generates

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<sup>11</sup> See Appendix D of Antonopoulos and Kim (2008) for more on the job allocation formula.

insignificant values for new accounts associated with the sector and, hence, may not violate an acceptable margin of error used in a conventional technical balancing. The insignificant values, however, preserve backward linkages that generate multiplicative effects of the intervention on the sector. The method is also flexible enough to incorporate policy exercises (in this study, employment targeting for the poor) into the SAM (Kim 2008).

**Table 1. A Reformulated Schematic SAM**

	<b>Factors</b>	<b>EPWP Factors</b>	<b>Households</b>	<b>Activities</b>	<b>EPWP Sector</b>	<b>Exogenous</b>
Factors	0		0	Factor Incomes	0	...
EPWP Factors	0	0	0	0	Factor Incomes	...
Households	Distribution	Distribution	Redistribution	0	0	...
Activities	0	0	Demand	Input-Output	Hypothetical Input-Output	...
EPWP Sector	0	0	Hypothetical Demand	Hypothetical Use	0	...
Exogenous	...	...	...	...	0	...

Source: Authors' calculations

The original South African SAM includes 26 productive sectors and 20 different household types, decomposed by location, residence type, race, and three-tiered income level. Construction of the hypothetical sector, called the EPWP social sector, relies on the data from Friedman et al. (2007). They describe detailed input costs for a social service initiative under the EPWP in South Africa. The initiative focuses on two projects: early childhood development (ECD) projects and home- and community-based care (HCBC). The projects are more labor intensive and employ more women and unskilled labor than the existing education and health sectors. Wage payments for unskilled labor account for 32 percent of the total expenditure for the initiative, as compared to 4 to 7 percent for relevant sectors in the economy. Wage payments for unskilled women account for 19 percent of the total expenditure vis-à-vis 2 to 5 percent from the relevant sectors. The total size of the injection (9.3 billion rand) is equivalent to 1 percent of the South African GDP at factor costs, or

8 percent of the total value of output of the relevant sectors—namely, education and health—measured by total production costs.<sup>12</sup>

The policy simulation is to increase the final demand for social care services—early childhood development and home- and community-based health care—by 9.3 billion rand, roughly 1 percent of GDP in 2000. For comparison purposes, we also simulate a infrastructure construction expansion of the same magnitude. Using administrative data on a sample water reticulation project—a water-main installation—we construct a new EPWP infrastructure sector.<sup>13</sup> We devise a formula-based employment targeting for direct EPWP unskilled jobs to the poor, taking into account the unemployment rate, depth of poverty, and size of population by each poor household type. The formula is in no way a socially optimal allocation of jobs, but rather an attempt to incorporate the degree of hardship and a plain idea of fairness across various poor household types. Table 2 shows the resulting allocation of the direct unskilled jobs. African ultrapoor (household income below the 25th percentile) households living in ex-homelands—rural tribal regions—receive the most jobs largely due to the relatively large number of households among the poor (23 percent of all poor) and the second-deepest poverty based on their mean household income, according to the South African National Household Survey in 2000.

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<sup>12</sup> See Table A1 in the Appendix for the sectoral input composition of the education, health, and EPWP social care sectors.

<sup>13</sup> The new sector is constructed from administrative data on a water-main installation contract under the EPWP. For the intermediate input composition, the authors examined the detailed expense records from the project and reclassified them according to the industry classifications used in the SAM. The wage payment records reveal the labor composition by skill level, and gender decomposition follows the existing pattern within the construction industry in the SAM. The new infrastructure sector may not be the best representation of all the infrastructure projects under the EPWP, but it represents the labor-intensity requirement. For instance, wages for male unskilled workers account for 19 percent of total expenditures in the EPWP water project, but only 12 percent in the construction sector. Moreover, unskilled job distribution in the existing structure is more biased toward nonpoor workers than in the targeting scheme developed in the paper.

**Table 2. Employment Targeting: Shares of EPWP Unskilled Jobs**

Household Type	Shares of EPWP Unskilled Jobs (%)
Urban Formal African Poor	3.5
Urban Formal African Ultrapoor	16.3
Urban Formal Colored Poor	0.5
Urban Formal Colored Ultrapoor	1.8
Urban Informal African Poor	2.5
Urban Informal African Ultrapoor	6.8
Rural Commercial African Poor	2.6
Rural Commercial African Ultrapoor	13.8
Rural Commercial Colored Poor	0.1
Rural Commercial Colored Ultrapoor	0.3
Ex-homeland African Poor	8.5
Ex-homeland African Ultrapoor	43.3

Note: Nonpoor households are excluded to emphasize the targeting nature of the program. See appendix D of Antonopoulos and Kim (2008) for more details on the formula.

Source: Authors' calculations

## United States: Input-Output and Microsimulation

To analyze the employment impact of our proposed intervention we combine two different quantitative methods; at the macro level we make use of input-output analysis and at the micro level we employ a microsimulation model. Input-output analysis allows for calculation of aggregate changes in employment, while the microsimulation distributes these jobs by matching them to individuals who are most likely to occupy them based on nationally representative survey data.

The employment multiplier matrix is computed from the US input-output table, which includes 201 detailed industries. The detailed classification allows distinction of specific industries under the care sector—home-based health care and early childhood development.<sup>14</sup> The jobs created directly and indirectly from the multiplicative process are classified by industry and occupation based on the National Industry-Occupation Employment Matrix compiled by the Bureau

<sup>14</sup> The induced multiplier effects from household consumption of goods and services are not included in the study, as the multipliers seem too high to be relevant. Other studies—for instance, Pollin, Heintz, and Garrett-Peltier (2009)—econometrically estimate the induce effects separately. We chose to underestimate the total effects by dropping the induced effects, instead of the ad hoc treatment.

of Labor Statistics. This step produces a cross-tabulation of jobs by industry and occupation that subsequently feeds into the microsimulation.

To assign jobs, we create a statistical ranking of occupations and industries for each individual by estimating the likelihood of their being employed in each job category. The method is to estimate a multinomial probit regression by industry and occupation and then predict probabilities for each.<sup>15</sup> For each individual, industries and occupations are ranked based on the highest propensity score. Then we estimate the likelihood of employment for each individual, using a probit regression and propensity score.<sup>16</sup> With these three sets of information, we then assign employment status to each individual in the employable pool using an iterative procedure, stepping through industry and occupation pairs, selecting those individuals most likely to be employed in that industry-occupation pair, in order of their likelihood to be employed, until all of the available jobs were assigned. Once we assign jobs, we allocate earnings to those individuals who receive a new job. The method was imputation by hot decking.<sup>17</sup>

Our policy simulation assumes an investment of \$50 billion on projects that increase social care provisioning. Divided equally between home-based health care and early childhood development for children under the age of five, this amount is equivalent to one half of the total gross output of the two industries combined in 2006. In input-output analysis, the spending is interpreted as the increase in final demand of commodities by the amount. The increased final demand for child day care (North American Industry Classification System, NAICS 6244) and home health care services (NAICS 6216) leads to increasing labor demand in both industries, directly as well as in other industries that supply intermediate inputs to them. The injection of funds into the relevant private sectors, not to general government, reflects the current mechanism for the bulk of service delivery. In other words, although centers that act as service providers must meet certain state-level criteria, these entities do not act as government contractors whose activities otherwise would have fallen into the government production category.<sup>18</sup>

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<sup>15</sup> Independent variables for the industry and occupation multinomial logits were census division, metropolitan status, age, marital status, sex, educational attainment, and race.

<sup>16</sup> Independent variables for the employment probit were census division, metropolitan status, age, age squared, marital status, sex, educational attainment, and race.

<sup>17</sup> A three-stage Heckit model was used to predict imputed wage and usual hours for each individual in the pool, within age-sex cells. These, together with census division, metropolitan status, marital status, spouse's labor-force status, industry and occupation of assigned job, and dummies for the age category of the youngest child and the number of children, were used in the imputation procedure.

<sup>18</sup> A small exception to this convention was made for pre-K facilities under local school systems, which are counted as government activities under the current industry account convention, and thus may not suit the industry assumption. However, dominance of private providers allows us to use the "private" assumption in the study, even if care comes from "social" provisioning.

In the following sections, we analyze the results from the two case studies on employment, income distribution, and poverty reduction.

### **3. Employment**

Care provision by nonhousehold institutions, public or private, can address unemployment and the poverty of women simultaneously, as they form the majority of workers in the relevant industries and earnings from their paid work contributes to their household income. The indirect employment generation from multiplier effects is not trivial, and the magnitude largely depends on the intensity and diversity of input sources—in other words, the strength of the backward linkages. In this section, we introduce two case studies from South Africa and the United States, focusing on the employment generation potential of bringing unpaid care work into the paid work domain.

#### **South Africa**

Table 3 exhibits the number of full-year jobs created from the simulation. The injection, equivalent to 1 percent of GDP in 2000, on the social sector generates 571,505 direct jobs in the sector, while the linkages to other sectors and households generate 192,893 jobs. The requirement on labor intensity under the EPWP allocates the majority of direct EPWP jobs to unskilled workers (545,191), while only 26,314 jobs go to skilled workers, resulting in a 20.7 unskilled to one skilled job ratio. Overall, for every three jobs created due to the social care expansion, an additional job opens up within the economy. Job creation within the care sector turns out to be greater for women than for men across skilled and unskilled categories. The infrastructure expansion of the same scale yields 262,406 jobs within the new construction sector, as it generates 138,842 indirect jobs. The direct-to-indirect job ratio is 1.9, which is expected as the exogenous wage rates for the sector are 1.5 to 1.7 times higher than they are in the social care sector.

**Table 3. Direct and Indirect Job Creation by Gender and Skill Level from Social Sector Expansion and Water Reticulation**

<b>Social Care</b>	<b>Women Unskilled</b>	<b>Women Skilled</b>	<b>Men Unskilled</b>	<b>Men Skilled</b>	<b>Total</b>	<b>Unskilled Total</b>	<b>Skilled Total</b>
Direct	317,007	16,386	228,184	9,928	571,505	545,191	26,314
Indirect	66,053	23,511	69,875	33,455	192,893	135,927	56,966
<b>Total</b>	<b>383,060</b>	<b>39,897</b>	<b>298,059</b>	<b>43,383</b>	<b>764,398</b>	<b>681,118</b>	<b>83,280</b>

<b>Infra-structure</b>	<b>Women Unskilled</b>	<b>Women Skilled</b>	<b>Men Unskilled</b>	<b>Men Skilled</b>	<b>Total</b>	<b>Unskilled Total</b>	<b>Skilled Total</b>
Direct	5,201	2,306	218,224	36,674	262,406	223,425	38,980
Indirect	46,500	17,926	48,178	26,170	138,774	94,678	66,104
<b>Total</b>	<b>51,701</b>	<b>20,232</b>	<b>266,402</b>	<b>62,844</b>	<b>401,180</b>	<b>318,103</b>	<b>105,084</b>

Source: Antonopoulos and Kim (2008) and authors' calculations

Distribution of employment by household-level poverty status is illustrated in Table 4. There are over 11 million workers from nonpoor households that comprise 62 percent (11.2 million) of the total labor force; meanwhile, 2.6 million out of 6.4 million unemployed are from the nonpoor household type. The unemployment rate by poverty status reflects the inequality in the labor market: 23.1 percent for the nonpoor type, whereas 62.9 percent of the ultrapoor type are unemployed. Ultrapoor workers receive most of EPWP direct jobs (78 percent) as designed in the allocation formula. However, over 88 percent of indirect jobs (170941/192893) belong to workers from nonpoor households, for the distribution follows the wage-income flow in the South African SAM.<sup>19</sup> As much as the highly unequal distribution reflects the selection of skill level of workers into poverty status, it demonstrates the need for a direct intervention in the labor market to ameliorate the perpetual inequality in the economy. The smaller number of EPWP unskilled jobs in the infrastructure sector means fewer jobs for poor and ultrapoor households than in the care sector. The shares of indirect jobs by household type follow an approximately identical distribution as in the care case, with 88 percent of indirect jobs to the nonpoor households and the remaining 9 and 3 percent to the poor and the ultrapoor, respectively.<sup>20</sup> The skill-intensive nature of infrastructure puts the workers from poor households at a disadvantage, and attributes to the higher unemployment rates ex post compared to social care.

<sup>19</sup> See Table A2 in the Appendix for a detailed distribution of jobs by 20 different household types and gender-skill levels.

<sup>20</sup> This is true even with very different intermediate input compositions between the two cases. It implies that higher-order effects outweigh the secondary effects via backward linkages.

**Table 4. Labor Market Condition and Jobs Received, by Household Type**

	Base			Jobs Created: Social Care		
	Labor Force	Unemployed	UE (%)	Direct	Indirect	UE (%)
Nonpoor	11,282,393	2,604,134	23.1	26,028	170,941	21.3
Poor	3,875,849	1,910,895	49.3	96,776	17,380	46.4
Ultrapoorest	3,084,604	1,940,813	62.9	448,701	5,462	48.2

	Base			Jobs Created: Infrastructure		
	Labor Force	Unemployed	UE (%)	Direct	Indirect	UE (%)
Nonpoor	11,282,393	2,604,134	23.1	3,8701	122,944	21.6
Poor	3,875,849	1,910,895	49.3	3,9808	12,035	48.0
Ultrapoorest	3,084,604	1,940,813	62.9	183,897	3,795	56.8

Source: Antonopoulos and Kim (2008) and authors' calculations

## United States

A 50 percent expansion of the social care sector—early childhood education and home-based care for elderly and chronically ill patients—in terms of gross output in 2006, equivalent to \$50 billion, generates approximately 1.2 million jobs in the economy, of which 8 out of 10 new jobs (956082/1186342) are within the care sector (Table 5). The same level of expansion in infrastructure construction and maintenance yields half a million jobs, with 6 out of 10 new jobs (345955/555942) in the construction sector.

**Table 5. Total Employment Distribution across Industries**

Industry	Social Care	Infrastructure
Agriculture	2,928	1,969
Mining	520	2,463
Utilities	773	1,808
Construction	4,489	345,955
Manufacturing	16,797	46,402
Wholesale	7,139	11,421
Retail	4,432	36,628
Transportation and Warehousing	7,020	12,715
Information	4,989	4,312
Financial and Real Estate services	13,621	11,474
Professional and Business services	57,672	55,675
Education	688	719
Health Care and Social Assistance	21,046	675
Social Care	956,082	107
Leisure and Hospitality	15,650	6,509
Other services	3,113	5,009
Government	69,384	12,099
<b>Total</b>	<b>1,186,342</b>	<b>555,942</b>

Source: Antonopoulos et al. (2010)

Table 6 depicts the job distribution in absolute numbers and shares by various characteristics of the workers hired, including the unemployed and some persons out of the labor force for reasons other than retirement or illness. A microsimulation based on propensity-score matching is used to assign the new jobs by matching potential workers' socioeconomic characteristics to the job openings. The gender composition of job assignments shows almost exactly inverse ratios between social care and construction. Over 90 percent of jobs go to women in social sector investment, as more than 80 percent of jobs are created within the sector. On the other hand, infrastructure construction generates over 88 percent of jobs for men, as most jobs (almost 71 percent) are created in male-dominated industries—construction and manufacturing. The decomposition of job assignments by educational attainment highlights the greater inclusiveness of social care investment. Over 42 percent of jobs generated by the latter go to people with less than a high school diploma, compared to only 14 percent of jobs created by the infrastructure investment for this most disadvantaged group in the labor market. In the infrastructure case, the majority of jobs (62.6 percent) are assigned to workers with high school diplomas. This fact is largely driven by the construction-related jobs typically held by men with high school diplomas. Although social care investment more highly favors the group with less than a high school diploma, it also provides more

opportunities to people with at least some higher education than does infrastructure investment (31.1 to 23.4 percent, respectively). This reflects the certificate requirement for preschool teachers and certain childcare providers that are under state or federal regulations for reimbursement purposes. On the other hand, infrastructure investment raises the demand for engineers and architects, jobs the Standard Occupational Classification system identifies as a part of the “professional and business services industry and professional occupations.” Typically, these occupations require a college-degree level of education, which accounts for the job assignment—in our simulation—to higher-education attainment groups.

The inclusive nature of social care investment is further reinforced by the job assignment by household annual income. Forty-five percent of jobs go to workers from households with income below the 4th decile (approximately \$39,000 a year). Home health aides, who comprise one of the major occupation groups in social care, are mainly women from low-income households: 45 percent of the workers are from households under 200 percent of the federal poverty line.<sup>21</sup> The social care expansion thus aids those workers specifically. The infrastructure case, on the other hand, provides one half of the jobs created to workers from the middle-income group.

**Table 6. Distribution of Jobs Created by Public Investment on Social Care and Infrastructure in the United States**

<b>Social Care</b>			<b>Infrastructure</b>		
	<b>Jobs Assigned</b>			<b>Jobs Assigned</b>	
	Number	Percent		Number	Percent
<i>Gender</i>			<i>Gender</i>		
Male	116,525	9.9	Male	489,814	88.6
Female	1,059,401	90.1	Female	63,051	11.4
<i>Education</i>			<i>Education</i>		
Less than HS	500,959	42.6	Less than HS	77,482	14.0
HS Grad	308,810	26.3	HS Grad	345,897	62.6
Some College	196,407	16.7	Some College	46,609	8.4
College Grad	169,750	14.4	College Grad	82,877	15.0
<i>HH Income</i>			<i>HH Income</i>		
1st-4th decile	530,763	45.1	1st-4th decile	194,915	35.3
5th-8th decile	395,846	33.7	5th-8th decile	279,438	50.5
9th-10th decile	249,330	21.2	9th-10th decile	78,516	14.2
<b>Total</b>	<b>1,175,939</b>	<b>100.0</b>	<b>Total</b>	<b>552,869</b>	<b>100.0</b>

Source: Antonopoulos et al. (2010)

<sup>21</sup> It is not clear whether the low skill requirements of care work attracts unskilled workers from low-income households or the low wage rates of care work cause workers to be in low-income households. It may be jointly determined, and thus a direction of causality is hard to establish.

## **4. Effects on Income, Inequality, and Poverty Reduction**

The large-scale employment policies pose consequences on household income and inequality. How the jobs are distributed, either by targeting design of the program or the private market system, influences overall income inequality. The composition of workers in affected industries, as well as the inter-industry linkages, largely shapes the outcome. The targeted nature of the EPWP contributes to the income growth of the poor and ultrapoor workers, although the total impacts are not as great as they would be under the more equitable labor market. The relatively low skill requirements tend to benefit the workers from poor households in the United States.

We examine the effects of the proposed policy intervention on income growth and inequality using the concept of “pro-poor” growth as defined by Kakwani, Khandker, and Son (2004). This study defines growth as being pro-poor only when income growth is higher for the poor than for the nonpoor. As we will see below, even when we include indirect job creation in the calculations, EPWP job creation allocates jobs in a manner that results in pro-poor growth. In the case of the United States, it is the very composition of workers in the care sector—mostly women from low-income households—that accounts for the pro-poor nature of the investment in social care. Poverty reduction follows naturally, as the wage earnings contribute to the workers’ household income. The depth of poverty predetermines the extent to which the external margin of poverty is reduced. Regardless, the investment attributes to the reduction in the internal margin of poverty.

### **South Africa**

Table 7 shows aggregated changes of income and distribution across nonpoor, poor, and ultrapoor household groups. It is worthwhile to note that even with the targeted job distribution in favor of the poor and ultrapoor, most of the income growth goes to the nonpoor, since they harness most of the highly paid skilled jobs and most of the unskilled jobs from indirect effects. The biased benefit distribution highlights the sharply skewed employment-income distribution to the nonpoor. It may be the case that employment determines the poverty. Even within the argument of direction of causality, one cannot deny the strong evidence of the dependence on wage income overall and the lack of viable self-employment opportunities for the poor and ultrapoor in South Africa, in which total income of the bottom half is less than 8 percent of the top half of the population. The skewed base income gives rise to the higher income growth rates for the poor and ultrapoor—5.6 and 9.2 percent growth, respectively—compared to a 1.3 percent incline for the nonpoor. Scaling up the social care sector at the level of 1 percent of GDP may not make a large difference in terms of

overall income distribution. However, it should be remembered that the participating households do receive significant benefits from the program.

In the infrastructure expansion, the income changes reflect the skill-biased job creation that benefits nonpoor households in that the income growth for the group remains similar. Meanwhile, total income growth for the poor and ultrapoor households is less than half the level in the social care expansion.

**Table 7. Changes in Aggregate Income Level by Household Group (in millions of rand)**

<b>Social Sector</b>	<b>Nonpoor</b>	<b>Poor</b>	<b>Ultrapoor</b>
Base (pre-intervention)	640,846	38,410	15,986
Increment	8,535	2,137	1,467
New	649,381	40,546	17,453
<b>% Change</b>			
Base (pre-intervention)	100	100	100
Increment	1.3	5.6	9.2
New	101.3	105.6	109.2
<b>Income Distribution</b>			
Base (pre-intervention)	92.2	5.5	2.3
Increment	70.3	17.6	12.1
New	91.8	5.7	2.5

<b>Infrastructure</b>	<b>Nonpoor</b>	<b>Poor</b>	<b>Ultrapoor</b>
Base (pre-intervention)	640,846	38,410	15,986
Increment	8,393	1,084	680
New	649,239	39,494	16,666
<b>% Change</b>			
Base (pre-intervention)	100	100	100
Increment	1.3	2.8	4.3
New	101.3	102.8	104.3
<b>Income Distribution</b>			
Base (pre-intervention)	92.2	5.5	2.3
Increment	82.6	10.7	6.7
New	92.0	5.6	2.4

Source: Antonopoulos and Kim (2008) and authors' calculations

Table 8 displays the poverty reduction effects for participating households only. The income of participating households shows the opposite trends: the poor and ultrapoor households move further above the poverty line under the infrastructure expansion. The result is simply attributable

to the higher wage rates (1.7 times higher) in the infrastructure case. Under the social care expansion, the program wage rate for unskilled workers is exogenously set comparable to the near-poverty level, minimum wage rate to impose a certain degree of self-targeting. The higher participation rates of households in the EPWP programs under the social care expansion is reflective of the lower wage rates and more labor-intensive nature of care provision.

**Table 8. Income Changes of Participating Households (in rand, mean values)**

	<b>Poverty Line (rand) Equivalency Scale Adjusted</b>	<b>Depth of Poverty</b>		<b>Infra- structure</b>	<b>Participation Rate (as % of total households)</b>	
		<b>Before</b>	<b>After Care</b>		<b>Care</b>	<b>Infrastructure</b>
Urban Formal African Poor	15,513	-480	6,240	10,974	3.0	1.3
Urban Formal African Ultrapoor	18,770	-10,952	-4,232	502	29.2	12.0
Urban Formal Colored Poor	16,458	-429	6,291	11,026	2.8	1.1
Urban Formal Colored Ultrapoor	16,277	-8,861	-2,141	2,594	24.2	9.9
Urban Informal African Poor	12,196	-860	5,860	10,595	4.4	1.8
Urban Informal African Ultrapoor	14,630	-8,496	-1,776	2,958	23.2	9.5
Rural Comm. African Poor	13,801	-1,051	5,669	10,403	4.6	1.9
Rural Comm. African Ultrapoor	18,595	-10,794	-4,074	661	26.6	10.9
Rural Comm. Colored Poor	13,622	-203	6,517	11,252	1.2	0.5
Rural Comm. Coloured Ultrapoor	15,833	-8,100	-1,380	3,355	19.7	8.1
Ex-homeland African Poor	14,079	-1,333	5,387	10,121	5.6	2.3
Ex-homeland African Ultrapoor	17,375	-10,354	-3,634	1,101	25.5	10.5

Source: Antonopoulos and Kim (2008) and authors' calculations

A closed system of the SAM enables us to examine the multiplier effects on macro indicators. In the case of social care expansion, the 1 percent spending on social care expansion produces an extra 0.8 percent GDP growth, as in Table 9. Significant spending on food, a part of care services in Friedman et al. (2007), boosts the production in agriculture directly, while other sectors benefit from multiplier effects of indirect backward linkages as well. The infrastructure expansion benefits the manufacturing sector the most due to the heavy use of manufactured intermediate

inputs. But the net GDP growth is lower, at 0.68 percent, after deducting the original injection equivalent to 1 percent of GDP. The lower GDP in level terms comes in part from the higher shares of intermediate input composition in the infrastructure case.

Table 10 shows the multiplier effects on tax revenue. Sales and indirect taxes are paid by the industries, while the “direct tax” is another name for income taxes paid by the individuals. On average, the manufacturing sector pays higher share of their gross output on sales taxes (4–7 percent with 22 percent on petrol products, compared to 1–6 percent on the service sector), according to the SAM. Nonpoor households pay higher tax rates in terms of percent of their income, and that contributes to the higher direct tax receipt in the case of infrastructure expansion. The social care expansion—effectively, aggregate demand stimulus—increases tax revenue by 1.5 percent, or over 3 billion rand, equivalent to over a third of total spending on the social care expansion. The infrastructure expansion collects even more taxes, at 4.7 billion rand, which raises the tax revenue growth by 2.1 percent. But the lower tax receipts from the care expansion does not imply that it is less sustainable than the infrastructure expansion. Ironically, it underscores the more equitable distribution of jobs and income toward the poor and the ultrapoor. The positive macroeconomic impacts prove that the social care expansion is a viable policy tool that not only addresses the unemployment among the poor but also improves macroeconomic conditions.

**Table 9. Impacts on Sectoral and GDP Growth (in millions of rand)**

	<b>Agriculture</b>	<b>Manufacturing</b>	<b>Services</b>	<b>GDP (value added)</b>
Base	241,457	1,132,106	1,040,440	835,651
Increment (care)	8,477	12,435	15,948	15,187
Growth Rate (%)	3.50	1.10	1.50	1.80
Increment (infra.)	2,524	13,137	12,336	14,072
Growth Rate (%)	1.05	1.16	1.19	1.68

Source: Antonopoulos and Kim (2008) and authors' calculations

**Table 10. Multiplier Effects on Tax Revenue (in millions of rand)**

	<b>Sales</b>	<b>Indirect</b>	<b>Direct</b>	<b>Total</b>
Base	83,933	18,529	121,085	223,548
Increment (care)	1,456	284	1,573	3,314
Growth Rate (%)	1.70	1.50	1.30	1.50
Increment (infra.)	1,650	174	2,930	4,754
Growth Rate (%)	2.0	0.9	2.4	2.1

Source: Antonopoulos and Kim (2008) and authors' calculations

## United States

Tables 11a and 11b show the changes in individual median and mean earnings of those who are assigned jobs in social care and infrastructure construction. The comparison highlights the disparate distributional impacts of the two investments. It is noteworthy to mention that the mean-to-median earnings ratio decreases as the level of educational attainment increases among workers. It is more so for workers in social care than in infrastructure construction, which is indicative of the stronger equalizing effect of social care investment.

Workers with less than a high school diploma tend to benefit the most in relative terms from both of the simulated investments compared to workers with higher levels of educational attainment. Their median and mean earnings increase the most among all the groups. Infrastructure construction turns out to raise earnings of the least educated workers more than social care investment does. The result is attributable to much higher hourly wage rates of construction workers—\$21.87 on average within the industry (BLS 2009b). Even unskilled construction laborers earn more than \$14.30 per hour, significantly more than the \$11.30 per hour that a preschool teacher earns on average. For the least-educated workers in social care, ex ante median earnings (\$3,120) are less than half of mean earnings (\$7,641), which suggests a highly skewed distribution of the least educated workers along their earnings level. Thus, the likely outcome of the social care investment would be close to the median earnings change for the workers.

**Table 11a. Changes in Median Earnings by Individual**

<b>Education</b>	<b>Social Care</b>			<b>Infrastructure</b>		
	Before	After	Change (%)	Before	After	Change (%)
Less than HS	3,120	7,000	124.4	7,000	17,000	321
HS Grad	15,000	26,500	76.7	18,000	30,000	80
Some College	14,000	30,000	114.3	15,000	30,002	107
College Grad	26,000	55,000	111.5	28,000	52,000	92
<b>Income</b>						
1st–4th decile	7,000	22,029	214.7	8,060	27,500	278
5th–8th decile	20,000	30,000	50.0	22,000	33,000	55
9th–10th decile	30,000	34,002	13.3	35,000	38,000	10

Source: Authors' calculations

**Table 11b. Changes in Mean Earnings by Individual**

<b>Education</b>	<b>Social Care</b>			<b>Infrastructure</b>		
	Before	After	Change (%)	Before	After	Change (%)
Less than HS	7,641	12,893	68.7	11,583	21,900	135
HS Grad	21,654	31,382	44.9	23,163	35,304	56
Some College	22,950	33,169	44.5	23,994	33,960	43
College Grad	44,475	67,694	52.2	45,693	69,284	53
<b>Income</b>						
1st–4th decile	9,940	29,862	200.4	10,863	33,787	231
5th–8th decile	23,503	40,183	71.0	25,227	43,875	79
9th–10th decile	50,810	46,903	(-7.7)	55,879	51,569	(-8)

Source: Authors' calculations

For workers with higher educational attainment (some college or more), social care investment appears to raise median earnings relatively more than infrastructure construction investment does. The occupational composition of the jobs created by social care investment may explain the difference: the sector hires more managers and professionals than infrastructure, and these jobs, unlike the lower-skilled occupations, usually offer wages comparable to similar jobs in the construction sector. Thus, social care investment appears to be more beneficial to highly educated workers than to those with the least education in terms of earnings. But one should note that social care investment generates many more jobs for workers with less than a high school diploma (500,959) than does infrastructure construction (77,482).

Workers from the poorest households (1st–4th decile) definitely receive the largest jump in earnings: a more than 200 percent increase in all measures from both types of investment. The very

low initial earnings of the group are attributable to the jump. Earnings for workers from middle-income households (5th–8th decile) increase by more than 50 percent, and the infrastructure investment seems to be a slightly better investment for that group. Workers from high-income households (9th–10th decile) show a moderate gain in median earnings but a moderate loss in mean earnings. This result implies that earnings from their new jobs are below the earnings from their previous jobs. It may be indicative of a downward transition of some of the newly hired workers from the high-income groups. Again, the infrastructure investment raises the earnings of all groups more than the social care investment does, simply due to relatively higher wage rates in construction industries.

## 5. Conclusion

The ex ante evaluation of social care expansion demonstrates that investment on caring for the elderly, chronically ill, and children under school age is an effective employment-generation policy. The labor-intensive nature of care giving is attributable to large employment multipliers in the care sector. Direct job creation within the sector accounts for 75–80 percent of all jobs created within and across the sectors combined. We also found that the investment on care is pro-poor, since workers from poor households take up the most of newly created jobs either by targeting design, as in the case of the EPWP, or by the market wage rates. The low wage rates in the sector do not deter pro-poor growth, in part because the initial income level of poor households is so low that even the small wage earnings are enough to lift their ex post income higher in relative terms. On the other hand, the lower wage rates discourage nonpoor workers, who perhaps have higher reservation wage rates than the poor ones, to take up the job opportunities in the low-paying care sector. Our microsimulation results for the US care expansion, compared to construction, confirm this view.

The social care expansion also contributes to the reduction of poverty directly through employment. The change in income from comparable expansion in construction seems to reduce income poverty more than that of the care sector. However, one should note that number of jobs for the low-income households (1st–4th decile) under the care expansion is more than 540,000, whereas less than 195,000 jobs go to the households in the case of infrastructure expansion. In other words, the internal margin of poverty for the participating households may be reduced more under the construction expansion, but the overall reduction of the external margin of poverty is much greater under the care expansion.

Aside from labor market analysis, we provide contextual evidence on the hidden demand for care. The insufficient coverage of Head Start and other early childhood development programs

is evident from the data. The distributional consequences of the short supply of care can be significant for the next generation, according to Heckman (2011). Aging baby boomers imply higher demand for home-based health care in the United States. The prevalence of HIV/AIDS, tuberculosis, and malaria in South Africa warrants the wider establishment of a home- and community-based care system.<sup>22</sup>

It should be reiterated that the methods used to compute aggregate job creation under labor-surplus conditions and low inflationary pressures does not require us to account for general equilibrium price effects. Input-output analysis, accordingly, is adequate and sufficient for the task at hand, and for both country case studies. Moreover, the detailed classification of industries in the analysis makes it possible to identify and utilize industry-level production technologies. The disaggregation and accurate representation of specifics in the key industries makes up for whatever loss there may be due to absence of price adjustments in the model.

Distribution of jobs in South African study may seem incomplete, since the unit of classification is still an aggregated group of household, whereas the US case study employs microsimulation. In defense of using the specific aggregated groups in the SAM, we invoke the detrimental effects of the apartheid era: strict segregation and unequal treatment in education and employment have left the majority of African population unskilled, poor, with low levels of education, and inexperienced as participants in forms of decent paid work. The great deal of in-group homogeneity, created by racialized segregation, among the majority of the unemployed and the bifurcation of those characteristics used in the statistical matching process across the whole population make the microsimulation technique based on propensity matching inadequate.

To generalize the framework developed in this paper, it may be desirable to develop a computable general equilibrium model with detailed industry classifications that allows for supply bottlenecks and market failures in the sense of slack conditions and the underemployment of resources in factor markets. Furthermore, ex post program evaluations of the EPWP, provided that necessary datasets are made widely available, could contribute to refinement of the ex ante methods in the paper.

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<sup>22</sup> Hence, increasing life expectancy would have called for home-based care for the elderly in South Africa as well.

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## Appendix

**Table A1. Summary of Sectoral Input Compositions  
(% of total)**

	<b>Education</b>	<b>Health</b>	<b>EPWP</b>
Capital	9.8	9.3	0.0
Male Skilled	20.8	8.7	1.9
Female Skilled	32.0	16.6	3.2
Male Unskilled	2.1	1.9	0.0
Female Unskilled	2.0	5.4	0.0
EPWP Male	0.0	0.0	13.4
EPWP Female	0.0	0.0	18.6
Agriculture	0.1	0.2	10.5
Utilities	0.4	1.0	0.3
Construction	0.6	0.6	0.8
Manufacturing	12.1	23.7	39.9*
Service	18.6	25.5	11.3
Exogenous Accounts	1.5	7.1	0.0
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Note: The original 25 industry-level data are aggregated into five sector levels for reporting purposes. EPWP social sector includes nutrition assistance—food security program—which accounts for 31 percent of total expenditure on food. Food production, mainly processed food industry, is defined as manufacturing sector in the table.

Source: Authors' calculations based on SAM-SA and Friedman et al. (2007)

**Table A2. Job Distribution of Social Care Investment by Gender Skill Level, across Household Types**

Household Type	Direct Jobs Distribution				Indirect Jobs Distribution			
	Men Unskil.	Men Skilled	Women Unskil.	Women Skilled	Men Unskil.	Men Skilled	Women Unskil.	Women Skilled
Urban Formal African Nonpoor	0	2,677	0	5,468	21,066	9,020	19,316	7,846
Urban Formal African Poor	8,064	28	11,203	86	2,000	95	3,541	123
Urban Formal African Ultrapoor	37,108	2	51,552	8	282	7	857	11
Urban Formal Colored Nonpoor	0	1,380	0	2,393	10,056	4,649	10,655	3,434
Urban Formal Colored Poor	1,172	4	1,628	8	412	14	665	12
Urban Formal Colored Ultrapoor	4,036	0	5,607	1	59	0	75	2
Urban Formal White	0	4,853	0	6,518	6,872	16,351	6,562	9,353
Urban Informal African Nonpoor	0	139	0	188	6,957	470	5,004	270
Urban Informal African Poor	5,638	6	7,833	21	1,267	19	1,568	30
Urban Informal African Ultrapoor	15,623	0	21,704	2	181	1	516	3
Rural Commercial African Nonpoor	0	149	0	325	9,488	503	3,927	467
Rural Commercial African Poor	5,882	6	8,172	15	1,162	19	1,255	21
Rural Commercial African Ultrapoor	31,476	1	43,728	4	403	2	672	5
Rural Commercial Colored Nonpoor	0	20	0	37	1,377	66	1,109	54
Rural Commercial Colored Poor	213	1	296	1	281	2	269	2
Rural Commercial Colored Ultrapoor	724	0	1,006	0	40	0	26	0
Rural Commercial White	0	368	0	309	972	1,240	276	443
Ex-homeland African Nonpoor	0	276	0	928	4,738	929	5,487	1,332
Ex-homeland African Poor	19,432	16	26,996	56	1,687	55	2,612	80
Ex-homeland African Ultrapoor	98,817	4	137,282	16	577	13	1,662	22
<b>Total</b>	<b>228,184</b>	<b>9,928</b>	<b>317,007</b>	<b>16,386</b>	<b>69,875</b>	<b>33,455</b>	<b>66,053</b>	<b>23,511</b>

Source: Authors' calculations