Ex-ante Evaluation of Public Job-Creation Programs: *the economic benefits of shifting social care from unpaid to paid work*

Case studies of South Africa and the United States

by

Rania Antonopoulos* and Kijong Kim

April 2011

* Kindly direct comments and communications to rania@levy.org

Abstract

This paper demonstrates that shifting unpaid care work to the paid (social) care provisioning domain entails large employment opportunities. Furthermore, when underemployment is rampant , investing in mobilizing underutilized domestic labor resources that bridge gaps of community-based services, yields strong pro-poor income growth patterns. 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 ex-ante policy simulation results from two case studies of South Africa and the United States. Both social accounting matrix-based multiplier analysis and propensity ranking-based microsimualtion provide evidence of the pro-poor impacts of the social care expansion.

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

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

1. Introduction

According to World Bank, UNDP and ILO estimates, 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 persons 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[i] 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 stabilisation of GDP growth, employment recovery in the aftermath of crises lags behind by five to seven years.[ii]

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 are highly volatile.[iii] In addition, some countries experience deeply rooted structural unemployment. In South Africa, for example, for over a decade and a half, deeply structural factors have excluded about 25 per cent of the population[iv] from access to work opportunities. Material deprivations are often accompanied by hopelessness, marginalization, social exclusion, exposure to increased violence, and susceptibility to dangerous ideologies.

Even in instances of success stories, as the case is for some parts of the world and Latin America in the last decade in particular, inclusive growth has not taken sufficiently deep roots to lift the extreme and chronically deprived out of poverty. In the era of globalization, predictable and sufficiently 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, but 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 is a life-line 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 [v], 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 Expanded Public Works (EPWP) in South Africa, which were first introduced in 2005-6 and 2004-5 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 labour resources- i.e., providing *earned* income to (previously unemployed) job holders that serve the needs of their communities yields strong pro-poor income growth patterns, stronger that investment in other types of projects. But also, it contributes to another key developmental goal, that of promoting gender equality. It does that in at least two ways: (a) by reducing the burden of unpaid work for women and girl-children; and (b) 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 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, it is acknowledged that public spending is required. 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 of pro-poor development and growth.

Closing gaps today result in healthier, more educated and hence citizens with higher productivity and income earning potential tomorrow. The economics literature has highlighted, for instance, that early childhood development programs spurs the cognitive as well as non-cognitive skills of the children, which have positive economic impacts.[vi] Caring for elderly and chronically ill patients at their home has proved to be more cost effective than it is 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 totally depend on their care otherwise.[vii] These social benefits, in and of themselves, warrant investments in public provisioning but there exists a different and equally compelling argument, which is the focus of this paper.

4

Shifting parts of unpaid care work to paid work[viii], i.e., by expanding the domain of social services, brings about powerful pro-poor and economy-wide employment outcomes, superior in fact to those obtained in equally needed but less labor intensive physical infrastructure investments. 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[ix].

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 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, an aftermath of apartheid era, as in figure 1, have compelled the government to introduce a direct job creation initiative, the Expanded Public Works Program (EPWP) in 2004. The program consists of job opportunities provided to unskilled, unemployed poor individuals who work in projects that are labor intensive.

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 services–creating work opportunities in public social programs, with a focus on home and community based care (HCBC) and early childhood development (ECD).

Figure 1. Unemployment rates by gender in South Africa (percent)
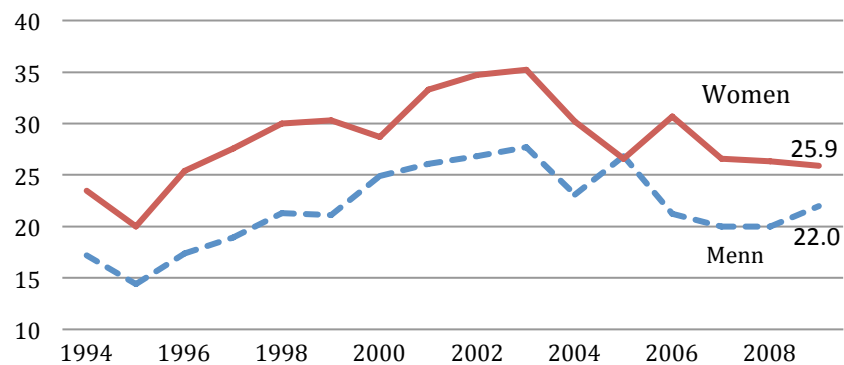
Home and community based care (HCBC) provides comprehensive services, including health and social services, by formal and informal caregivers in the home, aiming to restore and maintain a person's comfort, function and health, including providing care towards a dignified death. The prevalence of HIV/AIDS, tuberculosis and malaria has accentuated the need for expanding service delivery. As of the 2003, there were 892 HCBC sites, mostly run by non-governmental 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 programmes. 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, etc.; (b) work/employment/skills programmes 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, 3-month employment opportunities in auxiliary tasks for 3,000 unemployed parents through existing schools and local authorities.

Antonopoulos and Kim (2008) proposed a massive scaling up of EPWP, if the program were to reduce unemployment, as the previous scale was incommensurable to the jobless problem at hand. Specifically, they propose the development of an ECD cadre that extends the range, duration and number of job opportunities to include two-year appointments for child care workers, school nutrition workers, teacher 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 proposed expansion is R 9.3 billion, roughly 1 percent of GDP in year 2000. This scale would cover the ECD of all children living in poor households and about twenty percent of the population, mostly in need of HBC for HIV/AIDS patients. They analyze ex-ante policy impacts of expanding social care provision under the Expanded Public Works Program (EPWP), using a social accounting matrix-based multiplier analysis.

The United States

The Jobless recovery is a hallmark of the Great recession. Figure 2 shows the trends of the duration and severity of employment losses of 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 afterwards. 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 set in the U.S. labor market.

Figure 2. Nonfarm Payroll Extended Job Loss Trend from the last 7 recessions (1969-current)
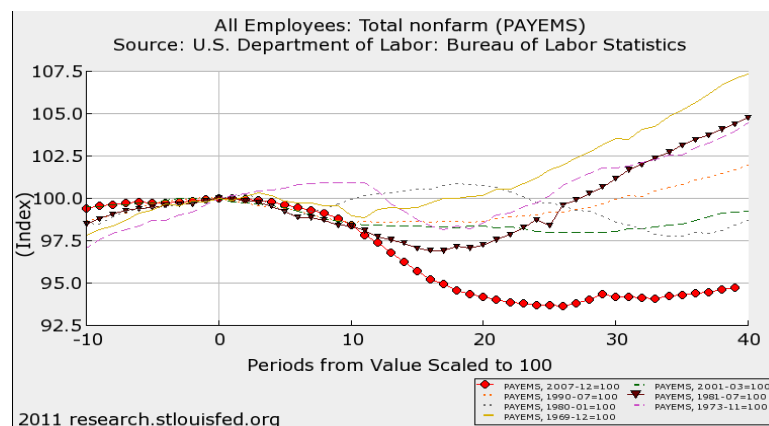
Source: Current Employment Statistics (CES), Bureau of Labor Statistics, via Federal Reserve Economic Data (FRED2) by the Federal Reserve Bank of St. Louis

Similar to the South Africa study, they investigate 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 (Antonopoulos et al. 2010). Instead of a 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. 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 disables persons received the HBC according to the National Home Health Aide Survey. The ECD programs for children from poor households, i.e. Head Start and Early Head Start, are not reaching the intended group, with merely 21 percent of eligible kids participating (Iruka and Carver 2006).

The home based care in the U.S. consists of managed health care that deals with basic medical care for post operation recuperation, managing chronic illness, and other non-invasive care performed by nurses and nursing assistants. The early childhood development programs offer child care with educational component- for cognitive and non-cognitive growths- for children under age 5, before they enter a school-based educational system.

Most of the workers in the occupations are women. In home-base health care, 88 percent of the care providers are women and minority (52 percent), especially African American women (30 percent). Recent immigrants contribute 21 percent of the workforce. The wage rate is low at $10.31 as of 2008 on average, and the annual mean earnings at $21,440 (King et al. 2009). The majority of jobs in the 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[x] 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, i.e. women, 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 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 on 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 the infrastructure construction.

2. Methodology

Input-output analysis depicting Inter-industry linkages through which multiplicative processes generate employment seems appropriate tool to assess the industry specific, ex-ante policy in macro level. Absence of price changes in the analysis seems a secondary concern in the recessionary environment in which inflationary pressure from a large scale policy intervention is 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[xi]. The method is simple and 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. Microsimulation technique enhances the distributional impact analyses. The statistical technique in the U.S 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: Social Accounting Matrix 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 impact of an external demand stimulus. The 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 to the existing SAM, as shown in table 1, with a scaled-down value of its gross output. The scaling-down generates 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

	Factors	EPWP Factors	Households	Activities	EPWP Sector	Exogenous
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: Author's 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 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 existing education and health sectors. Wage payment for unskilled labor is 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.[xii]

The policy simulation is to increase the final demand of the social care services- early childhood development and home and community-based health care- by R 9.3 billion, roughly 1 percent of GDP in year 2000. For comparison purpose, we also simulate the infrastructure construction expansion of the same magnitude. Using administrative data on a sample of water reticulation project- water main installation, we construct a new EPWP infrastructure sector[xiii]. We devise a formula-based employment targeting for direct EPWP unskilled jobs to the poor, taking into account 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 an attempt to incorporate the degree of hardships 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 25 percentile) households living in ex-homeland- 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.

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 targeting nature of the program. See appendix D of Antonopoulos and Kim (2008) for more detail on the formula.
Source: Author's calculations.

The 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 U.S. 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[xiv]. The jobs created directly and indirectly from the multiplicative process are classified by industry and occupation based on the National Industry-Occupation Employment Matrix by the Bureau of Labor statistics. This step produces a cross-tabulation of jobs by industry and occupation that subsequently feeds into microsimulation.

To assign jobs, we create a statistical ranking of occupations and industries for each individual by estimating the likelihood of being employed in each job category. The method is to estimate a multinomial probit regression for industry and occupation and then predict probabilities for each.[xv] For each individual, industries and occupations are ranked based on highest propensity score. Then we estimate likelihood of being employed for each individual, using a probit regression and propensity score.[xvi] With these three sets of information for each individual, we assign employment status to those 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 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.[xvii]

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 5, 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 fund to the relevant

private sectors, not to general government, reflects the current mechanism of 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.[xviii]

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 non-household institutions, public or private, can address unemployment and poverty of women simultaneously, as they form the majority of workers in the relevant industries and earnings from the 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 backward linkages. In this section, we introduce two case studies from South Africa and the United States, focusing on employment generation potential of brining unpaid care work into 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 20.7 unskilled per 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 time 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

Social Care	Women Unskilled	Women Skilled	Men Unskilled	Men Skilled	Total	Unskilled Total	Skilled Total
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
Total	383,060	39,897	298,059	43,383	764,398	681,118	83,280

Infra-structure	Women Unskilled	Women Skilled	Men Unskilled	Men Skilled	Total	Unskilled Total	Skilled Total
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
Total	51,701	20,232	266,402	62,844	401,180	318,103	105,084

Source: Antonopoulos and Kim (2008) and authors' calculation.

Distribution of employment by household-level poverty status is illustrated in table 4. There are over 11 million workers from non-poor 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 non-poor household type. The unemployment rate by the poverty status reflects the inequality in the labor market: 23.1 percent for the non-poor type whereas 62.9 percent of the ultra poor type is unemployed. Ultra poor 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 non-poor households, for the distribution follows the wage income flow in the South African SAM[xix]. 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 causes less jobs to the poor and ultra-poor households than in the care sector. The shares of indirect jobs by household type follow approximately identical distribution as in the care case, with 88 percent of indirect jobs to the non-poor households and remaining 9 and 3 percent to the poor and the ultra-poor respectively[xx]. The skill-intensive nature of infrastructure puts the workers from poor households at disadvantage, and attributes to the higher unemployment rates ex-post compared to the case of social care.

Table 4. Labor market condition and Jobs received by Household Type

	Base			Jobs created (Social Care)		
	Labor force	Unemployed	UE (%)	Direct	Indirect	UE (%)
Non-Poor	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
Ultra Poor	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 (%)
Non-Poor	11,282,393	2,604,134	23.1	38701	122,944	21.6
Poor	3,875,849	1,910,895	49.3	39808	12,035	48.0
Ultra Poor	3,084,604	1,940,813	62.9	183897	3,795	56.8

Source: Antonopoulos and Kim (2008).

The Unites States

Fifty percent expansion of 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, as show in 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
Total	1,186,342	*555,942*

Source: Source: Antonopoulos, Kim, Masterson, and Zacharias (2010).

Table 6 depict the job distribution in absolute numbers and shares by various characteristics of workers hired, including unemployed and some persons out of labor force of reasons other than retirement and 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 assignment 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 dominant industries – construction and manufacturing.   The decomposition of job assignment 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. For 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 high school diploma, it also provides more opportunities to people with at least some higher education than infrastructure investment (31.1 to 23.4 percent respectively). This reflects the certificate requirement for preschool teachers and certain child care providers that are under state or federal regulations for reimbursement purposes. Infrastructure investment raises the demand for engineers and architects whose jobs are categorized in professional and business services industry and professional occupation, which typically require a completed college education for qualification. These requirements seem to explain the job assignment to higher-education 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 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.[xxi] The social care expansion thus aids those workers specifically. The infrastructure case, on the other hands, 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 U.S. (number of jobs and percent)

Social Care	Jobs assigned		Infrastructure	Jobs assigned	
	number	percent		number	percent
Gender			*Gender*		
Male	116,525	9.9	Male	489,814	88.6
Female	1,059,401	90.1	Female	63,051	11.4
Education			*Education*		
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
HH Income			*HH Income*		
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
Total	1,175,939	100.0	Total	552,869	100.0

Source: Antonopoulos, Kim, Masterson, and Zacharias (2010).

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, influence the 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 ultra-poor workers, although the total impacts are not as great as it would be under the more equitable labor market. The relative low-skill requirements tend to benefit the workers from poor households in the U.S.

The concept of 'pro-poor' growth by Kakwani, Khandker, and Son (2004) is a way to examine the resulting income growth and inequality. They define growth as pro-poor if it reduces the inequality between the poor and the non-poor. The reduction occurs only when the income growth is higher for the poor than the non-poor. Applying the concept of 'pro-poor', we evaluate the effects on income and growth of the policy simulations of South Africa and the United States. The targeted nature of EPWP job allocation results in the pro-poor growth marginally against the highly biased indirect job distribution embedded in the existing South African labor market. The composition of workers in the care sector- mostly women from low-income households- attributes to the pro-poor growth nature of the investment on social care in the U.S.

Poverty reduction follows naturally as the wage earnings contribute to the workers' household income. The depth of poverty pre-determines the extent to which the external margin of poverty reduces. Regardless, the investment attributes to the reduction of internal margin of poverty.

South Africa

Table 7 shows aggregated changes of income and distribution across non-poor, poor, and ultra-poor household groups. It is worthwhile to note that even with the targeted job distribution in favor of the poor and ultra-poor, the most of income growth goes to the non-poor as they harness most of highly paid skilled jobs and most of unskilled jobs from indirect effects. The biased benefit distribution highlights the highly skewed employment-income distribution to the non-poor. 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 ultra-poor 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 ultra-poor, 5.6 and 9.2 percent growth, compared to 1.3 incline for the non-poor. The scaling up the social care sector in the scale of one percent of GDP may not make a large difference in terms of overall income distribution. However, it should be reminded 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 non-poor households in that the income growth for the group remains similar. Meanwhile total income growth for the poor and ultra-poor households are less than half of the level in the social care expansion.

Table 7. Changes in Aggregate Income level by Household group (million R)

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

Infrastructure	Non-Poor	Poor	Ultra-Poor
Base (pre-intervention)	640,846	38,410	15,986
Increment	8,393	1,084	680
New	649,239	39,494	16,666
% Change			
Base (pre-intervention)	100	100	100
Increment	1.3	2.8	4.3
New	101.3	102.8	104.3
Income Distribution			
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' calculation.

Table 8 display the poverty reduction effects for participating household only. The income of participating households show the opposite trends: the poor and ultra poor households move farther 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 to 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 (Rand, mean values)

	Poverty Line (Rand) Equivalency Scale adjusted	Depth of Poverty Before	After Care	Infra-structure	Participation Rate (as of total households, %) Care	Infra-structure
Urban Formal African Poor	15,513	-480	6,240	10,974	3.0	1.3
Urban Formal African Ultra-Poor	18,770	-10,952	-4,232	502	29.2	12.0
Urban Formal Coloured Poor	16,458	-429	6,291	11,026	2.8	1.1
Urban Formal Coloured Ultra-Poor	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 Ultra-Poor	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 Ultra-Poor	18,595	-10,794	-4,074	661	26.6	10.9
Rural Comm. Coloured Poor	13,622	-203	6,517	11,252	1.2	0.5
Rural Comm. Coloured Ultra-Poor	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 Ultra Poor	17,375	-10,354	-3,634	1,101	25.5	10.5

Source: Antonopoulos and Kim (2008) and authors' calculation.

A closed system of the SAM enables us to examine the multiplier effects on macro indicators. In the case of social care expansion, the one percent spending on social care expansion produces an extra 0.8 percent GDP growth, as in table 9. A large spending on food, a part of care services in Friedman (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 one 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 exhibits 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 service sector), according

to the SAM. Non-poor 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 receipt 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 ultra poor. 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 (million R)

	Agriculture	Manufacturing	Services	GDP (value-added)
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' calculation.

Table 10. Multiplier effects on Tax Revenue (million R)

	Sales	Indirect	Direct	Total
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' calculation.

The United States

Table 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 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 dollars average within the industry (BLS 2009b). Even unskilled construction laborers earn over $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, their *ex-ante* median earnings ($3,120) are less than half of their mean earnings ($7,641), which suggest 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

	Social Care			Infrastructure		
Education	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
Income						
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

	Social Care			Infrastructure		
Education	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
Income						
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 for highly educated workers than for 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 infrastructure construction (77,482).

Workers from the poorest households (1st-4th) definitely receive the largest jump in their earnings: over 200 percent increase in all measures from both types of investment. Very low initial earnings of the group attributes to the jump. Earnings for workers from the middle income households (5th-8th) increase more than 50 percent and the infrastructure investment seems to be a slightly better investment for that group. Workers from the high income households (9th-10th) show a moderate gain in median earnings but a moderate loss in mean earnings. This result implies that earnings from the new jobs are below the earnings from their previous jobs. It may be indicative of 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, 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 elderly, chronically ill, and children under the school age is an effective employment generation policy. The labor intensive nature of care giving is attributable to large employment multipliers of the care sector. Direct job creation within the sector accounts for 75 to 80 percent of all jobs created within and across the sectors combined. We also found that the investment on care is pro-poor as 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 does not deter the pro-poor growth, in part because the initial income level of the poor household is so low that even the small wage earnings are enough to lift their ex-post income high in relative terms. On the other hand, the lower wage rates discourage non-poor 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 on the U.S. 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 care sector. However, one should note that number of jobs for the low-income households (1st-4th decile) under the care expansion is over 540,000, whereas less than 195,000 jobs go to the households in the case of infrastructure expansion. In other words, internal margin of poverty for the participating households may reduce more under the construction expansion, but the overall reduction of 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 the care. The insufficient coverage of the 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 to the future generation, according to Heckman (2011). Aging baby-boomers implicate higher demand for home-based health care in the U.S. The prevalence of HIV/AIDS, tuberculosis, and malaria in South Africa warrants the wider establishment of home and community based care system[xxii].

It should be reiterated that the methods used to compute aggregate job creation under the certain condition the economy is at right now, i.e., a large slack on labor supply and low-upward inflationary pressure, does not require us to account for general equilibrium price effects. The input-output analysis should be adequate for the task in our 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 of the key industries makes up for whatever loss there may be due to absence of the price adjustment in the model.

Distribution of jobs in South African study may seem incomplete as the unit of classification is still an aggregated group of household, whereas the U.S. 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 bifurcation of those

characteristics used in the statistical matching process across the whole population makes 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 (CGE) model with detailed industry classification that allows for supply bottlenecks and market failures in the sense of slack conditions and underemployment of resources in factor markets. Furthermore, ex-post program evaluation on the EPWP, provided that necessary datasets are made widely available, could contribute to refine the ex-ante methods in the paper.

References

Antonopoulos, Rania, Kijong Kim, Thomas Masterson, and Ajit Zacharias. 2010 "Investing in Care: A strategy for Effective and Equitable Job Creation." Working paper no.610. Levy Economics Institute of Bard College.

Antonopoulos, Rania.2010. Employment Guarantee Policies: A Gender Perspective", *Poverty Reduction and Gender Equality* series, Policy Brief #2, United Nations Development Programme

Antonopoulos, Rania. 2009. Promoting Gender Equality through Stimulus Packages and Public Job Creation. Levy Institute, Public Policy Brief No.101.

Antonopoulos, Rania. 2008. The Unpaid Care Work- Paid Work Connection, Working Paper No. 86, Policy Integration and Statistics Department, International Labour Office, Geneva.

Antonopoulos, Rania, and Kijong Kim. 2008. Impact of Employment Guarantee Program on Gender Equality and Pro-Poor Economic Development in South Africa: Scaling up the Expanded Public Works Program. Annandale-on-Hudson, NY: The Levy Economics Institute of Bard College and UNDP. http://www.levyinstitute.org/pubs/UNDP-Levy/EGS.html

Barnett, W. Steven, Jason T. Hustedt, Kenneth B. Robin, and Karen L. Schulman. 2004. *The State of Preschool: 2004 State Preschool Yearbook*. New Brunswick, N.J.: National Institute for Early Education Research.

Barnett, W. Steven, Cynthia Lamy, and Kwanghee Jung. December 2005. *The Effects of State Prekindergarten Programs on Young Children's School Readiness in Five States*. New Brunswick, N.J.: National Institute for Early Education Research.

Bergemann, Annette and Gerard J. van den Berg. 2006. "Active Labor Market Policy Effects for Women in Europe: A Survey." IZA Discussion Paper no. 2365, Institute for the Study of Labor.

Blau, David and Erdal Tekin. 2007. "The Determinants and Consequences of Childcare Subsidies for Single Mothers in the USA." *Journal of Population Economics* 20(4): 719-741.

Bureau of Labor Statistics. 2009a. *Occupational Employment and Wages,* May 2008. U.S. Bureau of Labor Statistics Office of Occupational Statistics and Employment Projections. Washington, DC. http://www.bls.gov/news.release/ocwage.toc.htm .

Bureau of Labor Statistics. 2009b. *Career Guide to Industries, 2010-2011 Edition*. U.S. Bureau of Labor Statistics Office of Occupational Statistics and Employment Projections. Washington, DC. http://www.bls.gov/oco/cg/ .

Casiro, O.G., McKenzie, M.E., McFayden, L., Shapiro, C., Seshia M.M.K., MacDonald, N., Moffat, M., and Cheang, M.S. 1993. "Earlier Discharge with Community-based Intervention for Low Birth Weight Infants: A Randomized Trial." *Pediatrics* 92(1): 128-134.

Dickens, William, Isabel Sawhill, and Jeffrey Tebbs. 2006. "The Effects of Investing in Early Education on Economic Growth." Brookings Institution Policy Brief no.153. The Brookings Institution, Washington D.C.

Epstein, Gerald and Erinc Yeldan. 2008. "Inflation Targeting, Employment Creation and Economic Development: assessing the impacts and policy alternatives." International Review of Applied Economics 22(2): 131-144.

Fields, A. I., et al. 1991. "Home Care Cost-effectiveness for Respiratory Technology–dependent Children." *American Journal of Diseases of Children* 145(7): 729-33.

Friedman, Irwin, Bhengu, L., Mothibe, N., Reynolds, N., and Mafuleka, A., (2007) *Scaling up the EPWP.* Health Systems Trust, November, Volume 1–4. Study commissioned by Development Bank of South Africa and EPWP.

Golin, Stacie Carolyn, Anne W. Mitchell, and Barbara Gault. 2004. The Price of School Readiness: A Tool for Estimating the Cost of Universal Preschool in the States. Institute for Women's Policy Research, Washington D.C.

Heckman, James J. 2011." The American Family in Black and White: A Post-Racial Strategy for Improving Skills to Promote Equality." IZA discussion paper 5495. Institute for the Study of Labor. Bonn, Germany.

Heckman, James J. and Dimitriy V. Masterov. 2007. "The Productivity Argument for Investing in Young Children." *Review of Agricultural Economics* 29(3): 446–93.

Heckman, James J., Seong Hyeok Moon, Rodrigo Pinto, Peter Savelyev, and Adam Yavitz. 2010. "A New Cost-Benefit and Rate of Return Analysis for the Perry Preschool Program: A Summary." Working paper no.16180. National Bureau of Economic Research, Cambridge, MA.

Iruka, I. U., and Carver, P. R. 2006. *Initial Results From the 2005 NHES Early Childhood Program Participation Survey* (NCES 2006-075). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

Kaboub, F. 2007. "Employment Guarantee Programs: A Survey of Theories and Policy Experiences." Working Paper No. 498, Annandale-on-Hudson, N.Y.: The Levy Economics Institute

Kakwani, Nanak, Shahid Khandker, and Hyun H. Son. 2004 "Pro-Poor Growth: Concepts and Measurement with Country Case Studies." Working paper no. 1. International Poverty Center, United Nations Development Program, Brazil.

Kim , Kijong. 2008. "Hypothetical Integration in a Social Accounting Matrix and Fixed-price Multiplier Analysis." Working paper no. 552, Levy Economics Institute of Bard College, N.Y.

Kimmel, Jean. 1995. "The Effectiveness of Child-Care Subsidies in Encouraging the Welfare-to-Work Transition of Low-Income Single Mothers." *The American Economic Review* 85(2): 271-275.

King, Miriam, Steven Ruggles, Trent Alexander, Donna Leicach, and Matthew Sobek. 2009. *Integrated Public Use Microdata Series, Current Population Survey: Version 2.0*. [Machine-readable database]. Minneapolis, MN: Minnesota Population Center [producer and distributor].

Lefebvre, Pierre and Philip Merrigan. 2008. "Child-Care Policy and the Labor Supply of Mothers with Young Children: A Natural Experiment from Canada." Journal of Labor Economics 26(3): 519-548.

MetLife. 2006. "The MetLife Caregiving Cost Study: Productivity Losses to U.S. Business." Metropolitan Life Insurance Company and National Alliance for Caregiving.

Pollin, Robert, Wicks-Lim, and Heidi Garrett-Peltier. 2009. "The Economic Benefits of Investing in Clean Energy: How the economic stimulus program and new legislation can boost U.S. economic growth and employment." Department of Economics and Political Economy Research Institute (PERI), University of Massachusetts, Amherst.

Powell, Lisa M. 1997. "The Impact of Child Care Costs on the Labor Supply of Married Mothers: Evidence from Canada." *The Canadian Journal of Economics* 30(3): 577-594.

Warner, M., Adriance, S., Barai, N., Hallas, J., Markeson, B., Morrissey, T. & Soref, W. 2004. *Economic Development Strategies to Promote Quality Child Care*, Cornell University. Ithaca, New York.

Warner, M.E. & Z. Liu 2006. "The Importance of Child Care in Economic Development: A Comparative Analysis of Regional Economic Linkage." *Economic Development Quarterly* 20(1): 97-103.

Warner, M. E., 2007. Child Care and Economic Development: Markets, Households and Public Policy.: *International Journal of Economic Development* 9(3): 111-121.

Warner, M.E. 2009 a. *Recession, Stimulus and the Child Care Sector: Understanding Economic Dynamics, Calculating Impact.* Manuscript. Cornell University.

Warner, M.E. 2009 b. *Child Care Multipliers: Stimulus for the States*. Manuscript. Cornell University.

Appendix

Table A1. Sectoral Input Compositions - summary (% of total)

	Education	Health	EPWP
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
Total	**100.0**	**100.0**	**100.0**

Note: The original 25 industry-level data are aggregated into 5 sector-level 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: Author's 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 Non-Poor	0	2677	0	5468	21,066	9,020	19,316	7,846
Urban Formal African Poor	8064	28	11203	86	2,000	95	3,541	123
Urban Formal African Ultra Poor	37108	2	51552	8	282	7	857	11
Urban Formal Colored Non-Poor	0	1380	0	2393	10,056	4,649	10,655	3,434
Urban Formal Colored Poor	1172	4	1628	8	412	14	665	12
Urban Formal Colored Ultra Poor	4036	0	5607	1	59	0	75	2
Urban Formal White	0	4853	0	6518	6,872	16,351	6,562	9,353
Urban Informal African Non-Poor	0	139	0	188	6,957	470	5,004	270
Urban Informal African Poor	5638	6	7833	21	1,267	19	1,568	30
Urban Informal African Ultra Poor	15623	0	21704	2	181	1	516	3
Rural Commercial	0	149	0	325	9,488	503	3,927	467

African Non-Poor								
Rural Commercial African Poor	5882	6	8172	15	1,162	19	1,255	21
Rural Commercial African Ultra Poor	31476	1	43728	4	403	2	672	5
Rural Commercial Colored Non-Poor	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 Ultra Poor	724	0	1006	0	40	0	26	0
Rural Commercial White	0	368	0	309	972	1,240	276	443
Ex-homeland African Non-Poor	0	276	0	928	4,738	929	5,487	1,332
Ex-homeland African Poor	19432	16	26996	56	1,687	55	2,612	80
Ex-homeland African Ultra Poor	98817	4	137282	16	577	13	1,662	22
Total	**228,184**	**9,928**	**317,007**	**16,386**	**69,875**	**33,455**	**66,053**	**23,511**

Source: Author's calculations

---

[i] See World Bank. 2008. *Rising Food and Fuel Prices: Addressing the Risks to Future Generations.* Washington, DC: World Bank, Human Development Network (HDN), Poverty Reduction, and Economic Management (PREM). 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, M. 2009. "Bailing Out the World's Poorest," *Challenge* 52(2): 55–80, and http://www.voxeu.org/index.php?q=node/3520; also see World Bank. 2008. *Global Economic Prospects*. Washington, DC: World Bank.

[ii] Buvinic, M. 2009. "The Global Financial Crisis: Assessing Vulnerability for Women and Children, Identifying Policy Responses." Commission on the Status of Women, Fifty-third Session, 2–13 March, New York.

[iii] See the following contributions to Rodgers, G., and C. Kuptsch (eds.). 2008. *Pursuing Decent Work Goals: Priorities for Research*. Geneva: International Labour Organisation, International Institute for Labour Studies: Ocampo, J.A. 2008. "The Links Between Economic and Social Policies: A Conceptual Framework"; Kalula, E. 2008. "The Decent Work Agenda: An African Perspective on Research Needs and Priorities"; and Ghosh, J. 2008. "New research questions in the Decent Work Agenda, a view from Asia." See also International Labour Office. 2010. *Global Employment Trends.* Geneva: ILO.

[iv] Statistics South Africa, Quarterly Labour Force Survey (QLFS), various issues 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

[v] For a comprehensive history of such initiatives see Kaboub (2007) and Antonopoulos (2009). As a 2007-2009 crisis mitigation intervention several countries introduced or expanded previously smaller scale programs, including China.

[vi] 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 reference includes Barnett et.al (2004, 2005). Heckman et al.(2010) provide a new summary on the cost-benefit analysis of the Perry Preschool prog ram.

[vii] The cost effectiveness is documented in medical literature. See (Casiro et al. 1993 and Field et al. 1991, for example. See MetLife (2006) on the potential gain on workers' productivity from the paid care relief.

[viii] For a comprehensive discussion on the intersections of gender inequality, paid and unpaid work and employment guarantee programs see Antonopoulos (2010)

[ix] 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. Nor do we endogenize the labor supply response of newly hired workers in the social care whose family members are recipients of the care.

[x] See Antonopoulos et al. (2010) for a summary of the literature.

[xi] See Appendix D of Antonopoulos and Kim (2008) for more on the job allocation formula.

[xii] See table A1 in the appendix for the sectoral input composition of education, health, and EPWP social care sector.

[xiii] 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 re-classified them by industry classification 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, the share of wage for male unskilled workers to total expenditure is 19 percent in the EPWP water project, whereas the share is only 12 percent in the construction sector. Moreover, unskilled job distribution in the existing structure is more biased toward non-poor workers that in the targeting scheme developed in the paper.

[xiv] 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, Wicks-Lim, and Garret-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.

[xv] Independent variables for the industry and occupation multinomial Logits are census division, metropolitan status, age, marital status, sex, educational attainment, and race.

[xvi] Independent variables for the employment probit were census division, metropolitan status, age, age squared, marital status, sex, educational attainment, and race.

[xvii] A three-stage Heckit model is 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, dummies for age category of youngest child and the number of children were used in the imputation procedure.

[xviii] A small exception to this convention is 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.

[xix] See table A2 in the appendix for a detailed distribution of jobs by 20 different household types and gender-skill levels.

[xx] 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.

[xxi] It is not clear whether low skill requirements of care work attracts unskilled workers from low income households or 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.

[xxii] Hence, increasing life expectancy will have called for home-based care for the elderly in South Africa, as well.