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Measuring the Effects of Social Protection Programs on Job Creation: An Application in Angola

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MEASURING THE EFFECTS OF SOCIAL PROTECTION PROGRAMS ON JOB CREATION: AN APPLICATION IN ANGOLA

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1. Introduction

This document assesses the effects of the World Bank Group's Strengthening the National Protection System Project in Angola—a cash transfer program designed to alleviate the effects of tax increases and provide support during the COVID-19 pandemic. The project has two main components: (1) a cash transfer program (known as Kwenda) to poor households (US$260 million plus government financing of US$100 million)[2] and (2) the creation and implementation of an institution that provides a permanent safety net system in the country (US$50 million).

This document explores the direct and indirect labor market outcomes of the cash transfer policy—particularly the increase in jobs. Since most of the cash transfers have not yet been disbursed, this document performs an ex ante evaluation of the policy via simulation modelling; the project's full impact will not be known for several years.

Direct jobs are those explicitly targeted by the interventions—in this case, the benefited household members. Indirect jobs are *affected by* an intervention but not explicitly targeted by it. Their impact can emerge through three types of channels: forward factor usage,[3] backward supply chain,[4] and consumption spillover.[5]

This evaluation backs up its assumptions based on theoretical developments with empirical evidence, which will support the theory of change. The paper uses secondary sources of information and cost evaluations to estimate the impact on direct and indirect jobs (Table 1). Using a model for new agricultural investments, three simulations illustrate that the project will create 61,000–152,000 new jobs, depending on the assumptions used. Using a model that estimates the increase in demand for food and Angola's production elasticity, it is estimated that the project will create 21,000 new demand-

[1] This report is part of the World Bank IDA19 Policy Commitment to better understand how to measure indirect jobs impacts of development interventions and policies. It is an exploratory exercise on the suitability of estimation methodologies. The results from this report are not official assessments of the performance of the interventions or policies being analyzed and should not be quoted as such.

[2] From the US$260 million, US$15 million was allocated for systems (registration, payments, and grievance).

[3] Forward factor usage jobs outcomes occur when a change in the available supply, quality, or user cost of a productive factor or condition causes a change in either (a) the supply of labor by workers who utilize or rely on the factor or condition or (b) the demand for labor by producers who utilize or rely on the factor or condition.

[4] Backward supply chain jobs impacts arise due to changes in the demand for locally produced inputs by entities directly affected by the intervention and enterprises that use the good or service treated (that is, those experiencing 'forward factor usage' effects).

[5] Consumption spillover jobs impacts are due to changes in the demand for goods and services from the people gaining or losing income from direct jobs, forward factor user jobs, and backward supply chain jobs impacts. Annex I provides a diagram of jobs impact.

driven indirect jobs. Overall, the estimation shows increases in the number of direct and indirect jobs due to the transfers of 58–422 jobs created per million dollars invested.[6]

Table 1. Summary of Results

	New jobs (FTE)	FTE per million US$
Increase investment: Direct and indirect jobs		
Simulation 1	62,000	172
Simulation 2	152,000	422
Simulation 3	61,000	169
Increase demand		
Indirect jobs	21,037	58

Note: FTE = full-time equivalent.

The rest of the document is organized as follows. Section 2 provides an overview of Angola's labor market and the project. Section 3 describes the theory of change associated with an increase in investment. Section 4 describes the paper's theoretical framework. Section 5 reports the results of the investment simulations. Section 6 analyzes the impact of an increase in demand and indirect jobs caused by Kwenda, and Section 7 discusses the results and concludes.

2. Project Overview

Angola is a low-middle-income country in Central Africa, with a population of over 30 million and a gross domestic product (GDP) per capita of US$1,776 (World Bank data). It has a low level of human capital; it ranks 149 out of 182 countries in the Human Development Index. Although Angola has made significant advancements in expanding financial inclusion, and over 29 percent of adults have some type of bank account, financial inclusion remains low. According to the Global Financial Inclusion (FINDEX) survey, only 14 percent of the population receives their wages in bank accounts. Only 2.8 percent of the population borrowed from a financial institution during the last year, while 20 percent borrowed from friends or family.

Angola's labor market presents important challenges. Its workforce of 13.2 million has an unemployment rate of 7.7 percent (29 percent for those between ages 15 and 20 years). While oil rents represent over 25 percent of the GDP, more than 45 percent of the population works in agricultural jobs. Over 30 percent of its population currently lives under the poverty line, and over 80 percent of workers have informal jobs (Statista, 2021). These jobs—as either self-employed or wage workers—lack legal recognition, regulation, and protection (Chen 2005). The COVID-19 crisis deepened the lack of protection, and many countries struggle to help informal workers (Gerard, Imbert, and Orkin 2020). The lack of better, formal jobs is also detrimental to the economy, as informal work is associated

[6] On a broader scope, between 2008–2018 the economy grew by US$12.5 billion (from US$88.5 billion to US$101 billion), and the economy created 4 million jobs. This is equivalent to 320 jobs per million dollars produced (not invested) and would fall inside the interval of the current estimation of 58–422 jobs created per million dollars.

with lower productivity, less (or no) tax contributions, and other negative activities involving illegal wholesalers, credit suppliers, money changers, and illegal transporters (Benjamin et al. 2014)

Kwenda was originally created to help alleviate the negative impact of a fuel subsidy reform, but with delays in the subsidy reform and the onset of COVID-19, the government established Kwenda as an anti-poverty program through a Presidential Decree. The program transfers Kz 8,500 (US$16) to families each trimester.

3. Jobs Impact—Investment Increase

This section reviews the project subcomponents and analyzes its potential impact on indirect jobs. The US$260 million program targets the lowest-income population groups. The project's *theory of change* is multi-factorial (Table 2). While cash transfers are not usually intended to affect the labor supply, they can in principle impact labor markets. Previous studies have theorized that cash transfers will reduce labor supply, and they have been empirically shown to do so under certain conditions (Moffitt 2002). However, the presence of market failures, particularly in the capital market, can also theoretically generate the opposite effect and increase the labor supply (Barrett and Carter 2013); this has also been shown empirically (Daidone et al. 2019; Gertler, Martinez, and Rubio-Codina 2012). Cash transfers may also increase the demand for goods, which in turn boosts the demand for labor, as reviewed in the next section.

Table 2. Theory of Change—Cash Transfer

Constraint	Intervention	Direct recipient/ beneficiary of support	Intermediate outcome	Direct jobs outcomes	Indirect jobs outcomes
Inefficient credit markets	Increase capital	Households	Investment in self-owned firms	Increase self-employment	Increase hired workers
No insurance	Reduce risk/increase capital	Households	Investment in more productive assets	Increase self-employment	Increase hired workers

Individuals in low-income countries face market failures, incomplete markets, uncertainty, and risks that they tackle using different strategies. Cash transfers can address an essential aspect of those uncertainties and failures by modifying household behavior. Multiple financial market failures (MFMF) have been theorized to reinforce a poverty trap (Barrett and Carter 2013). Two failures encompass most of the problems: a lack of insurance markets and a lack of credit markets (Barrett and Carter 2013). The latter prevents individuals from borrowing against future earnings to invest or smooth their consumption. Therefore, when faced with a negative shock, families need assets that they can sell or consume to survive. This means individuals underinvest to ensure they have liquidity during a shock. The former means that individuals cannot protect themselves against negative shocks. Therefore they underinvest in productive assets, diversify into inefficient investments that are

vulnerable to countercyclical shocks, and save in assets that will help them survive economic downturns (Barrett and Carter 2013; Daidone et al. 2019). Both types of market failures point in the same direction, which reinforces their effect. Lastly, economic models usually consider consumption optimization to be independent from production/investment optimization (Benjamin 1992). Yet the lack of credit and insurance markets bundles these two decisions together, as investment assets may have to be used to smooth consumption (Daidone et al. 2019; Osborne 2006). Doing so has tremendous consequences, including the long-term loss of efficiency of investments and lower labor productivity.

Theoretical intertemporal models of optimization that include these market failures reveal valuable insights into individuals' behavior and conclude that (a) initial endowments define future outcomes, (b) risk is important, and (c) shocks have long-term consequences (Barrett and Carter 2013). Previous research that analyzes poverty traps has assessed the behavior of individuals facing MFMF and identified more behavioral responses, including (a) to avoid a poverty trap, individuals destabilize consumption instead of assets,[7] (b) small asset transfers have multiplier effects that increase income in the long run, and (c) social protection schemes that function as an insurance mechanism increase private investment (Barrett and Carter 2013).

In an economic environment such as Angola's, characterized by MFMF, extended poverty, and inefficient investments, cash transfer schemes inject money into households and can be associated with reduction in market failures and promise a new flow of income. The transfers therefore reduce the effect of these market failures, which provides an insurance mechanism at least insofar as payments are uncorrelated with shocks and increasing capital is available—thus generating a positive cycle of efficient investment.

Robust empirical evidence from the developing world demonstrates that cash transfers increase investment. For example, Daidone et al. (2019) show that cash transfers in sub-Saharan Africa are associated with increases in investment. Additionally, randomized experiments have identified increases in investment caused by cash transfers in countries such as Mexico (Gertler, Martinez, and Rubio-Codina 2012) and Zambia (Daidone et al. 2019). In Mexico, families were found to invest 26 percent of the transfers (Gertler, Martinez, and Rubio-Codina 2012). Cash transfers have also been found to increase investment in livestock in Paraguay, South Africa, Mexico, and Malawi, among others (see Table 3) (Covarrubias, Davis, and Winters 2012; Neves, Hajdu, and Granlund 2020; Todd, Winters, and Hertz 2010; Veras Soares, Perez Ribas, and Issamu Hirata 2010).

Cash transfers have also been associated with increases in rural labor incomes, which are linked to a surge in investments and the growth in labor demand associated with these investments, as well as long-term increases in agricultural productivity (Gertler, Martinez, and Rubio-Codina 2012). In Ghana, a cash transfer program increased male rural labor, while reducing the hiring of external labor, which generated a positive net change in total labor usage (Daidone et al. 2019). However, not all empirical

[7] In this case, individuals reduce consumption to avoid consuming their assets, as that would lead them into a long-term poverty trap.

studies have found an increase in the quantity of labor utilized. Some papers have identified changes in agricultural productivity, but have been unable to detect differences in working time (Prifti, Daidone, and Davis 2019). This could be due to changes in labor productivity (investment in technology, better investments, renting tools or machinery, and so on) rather than increases in family working hours or hired labor (Prifti, Daidone, and Davis 2019).[8]

Overall, cash transfers have been found to be associated with and cause increases in investment and subsequent labor use by rural households, in line with theoretical developments. The consensus between the theoretical models and empirical estimations—regarding the effects of cash transfers and rural labor—provide a robust assumption to continue developing the ex ante estimation for rural households. However, cash transfers have shown mixed or no effects on urban labor and investment. While in Ethiopia they have been found to decrease non-farm business participation, they exhibit no effect in Kenya in the short run. Haushofer and Shapiro (2016) conducted a randomized controlled trial (RCT) which found that cash transfers had no effect on labor after nine months, but did affect investment. After three years, they found that increases in consumption persisted and identified changes in labor (Haushofer and Shapiro 2018). The authors detected a 6 percent reduction in wage labor as the primary source of income and a similar increase in non-agricultural business (+5 percent) as primary income. This result may indicate that cash transfers—and probably investments in productive assets—could be promoting long-term switches from dependent labor to independent business. In Brazil, however, the cash transfers of the Bolsa de Familia program have been associated with an increase in private sector jobs (Gerard, Naritomi, and Silva 2021). As there is no theoretical or empirical consensus on the directionality of the effect of cash transfers in urban areas, this document will focus mainly on rural jobs. In addition, approximately two-thirds of Kwenda beneficiaries are expected to be in rural areas (see Annex II).

While the literature that analyzes cash transfers has advanced tremendously in recent years using causal methods, few studies have analyzed the long-term effects of these policies (18 months and 3 years Mexico, 3 years in Kenya) (Haushofer and Shapiro 2018; Parker and Skoufias 2000; Todd, Winters, and Hertz 2010). The available empirical results indicate that cash transfers have no impact on the labor market (Mexico) or that the impact lasts only as long as the investments (Kenya). Theoretically, the labor market results should last as long as the investments last, and some of the empirical evidence points in that direction (Haushofer and Shapiro 2018). The next section simulates the Kwenda targeting system and estimates its ex ante impact on direct and indirect labor in rural areas.

[8] Overall, there is a clear channel through which cash transfers tend to alleviate the impact of failures in the capital and insurance markets, thus increasing productive investments in the rural sector. Once the relationship among cash transfers, investment in rural productive assets, and an increase in labor is established, a national cash transfer program in Angola is expected to have a similar impact.

Table 3. Cash Transfer Effects in Different Countries

Country	Program	Effect	Source
Zambia	CGP - Child Grant Program	18 percent increase in the share of households purchasing crop inputs; 10 percent increase in those purchasing seeds.	Daidone et al. 2019
		Input purchases increased by around 31 Zimbabwean Dollars (increase in the intensity).	
		Increase in the share of households owning hammers (4.4 percent), shovels (3.1 percent), and ploughs (3.6 percent).	
		14.7 percent decrease in participation in agricultural wage labor (13.9 fewer days worked in agricultural labor compared to previous year).	
		Increase of 26.3 days worked compared to previous year in family farm; 17 percent increase in non-farm business.	
Lesotho	CGP - Child Grants Program	7.4 percent increase in the share of households purchasing seeds.	
		5.9 percent decrease in child labor participation in farm families.	
Ghana	LEAP - Livelihood Empowerment Against Poverty Programme	Reduction in the hiring of labor (−3.4 days per season)	
		Increase of 7.7 days per season worked by men.	
Kenya	CT-OVC - Cash Transfer for Orphans and Vulnerable Children Programme	Decrease in the expenditure on seeds (−104.8 Kenyan shillings per acre)	
		12 percent decrease in children working in family farming.	
Ethiopia	SCTPP - Tigray Social Cash Transfer Pilot Programme	Decrease in share of households using improved seeds (−4.7 percent).	
		Increase in share of households using fertilizer (5.8 percent).	
		4.2 percent decrease in non-farm business participation.	
Malawi	SCT - Social Cash Transfer Program	Increase in expenditure on organic fertilizer (MK 157.58).	
		12 percent decrease in casual agricultural labor.	
Zimbabwe	HSCT - Harmonized Social Cash Transfer Program	2.9 percent reduction in pesticide use.	
		5 percent reduction in the number of days worked on farm from the previous year.	

Country	Program	Effect	Source
Brazil	*Bolsa Familia*	Increased local formal employment. Two years after the reform, the number of formal private sector jobs increased by 2 percent; 1.7 percent increase in total payroll.	Gerard, Naritomi, and Silva 2021
Kenya	RCT - 9 months	Increased investment in assets and livestock. Increased expenditure in non-durables. No increase or changes in own labor. They measure hired labor as investment (which increases), but there is no desegregated measure of hired labor.	Haushofer and Shapiro 2016
Kenya	RCT - 3 years	Increased consumption and assets probably due to increase in productive assets (livestock). The Annex III illustrates a reduction in the number of individuals who have a labor wage as their primary source income, and there is a similar increase in non-agricultural business as primary income. There is also an increase in own farm revenue.	Haushofer and Shapiro 2018
Mexico	*Oportunidades* (short-term effects, October 1998–November 1999)	Increase of 17.1 percent in the probability of owning draft animals and 5.1 percent increase in the probability of owning production animals.	Gertler, Martinez, and Rubio-Codina 2012
		Increase of 21.4 percent in the value of draft animals owned by treatment households. Increase of 16.6 percent in the value of production animals owned.	
		For households without baseline agricultural assets: increase of 24.3 percent in the probability of acquiring draft animals, 12.4 percent increase in the probability of acquiring production animals, and 15.3 percent increase in the use of land for agricultural purposes.	
		Expansion of assets (estimates conditional on owning assets at baseline): increase of 14 percent in the value of draft animals and 16.3 percent increase in the value of production animals.	
	Oportunidades (long-term effects, October 1998–November 2003)	18 months. Increase in draft animal ownership and the value of draft animals.	
Brazil	*Bolsa Familia*	Effect on the probability of being an entrepreneur—unrelated to agriculture.	Ribas 2020
Yemen	Food assistance intervention implemented by World Food Programme	Positive effect on the acquisition of livestock; 15 percent increase in units of livestock owned. Ownership of large tools increased by 0.06 units. Ownership of small tools increased by 0.36 units	Schwab 2019
Pakistan	BISP - Benazir Income Support Program	In the short term (2 years), children (ages 5–14 years) in the treated group increased their	Churchill et al. 2021

Country	Program	Effect	Source
		working hours (+10 hours weekly). Girls in the treated groups increased labor participation by 13 percent. In the medium term (5 years), children in the treated group were 2.5 percent less likely to participate in the labor market and work 31 fewer hours (weekly).	
Lesotho	CGP - Child Grant Program	Decrease in family labor supply in paid activities outside the farm: −3.5 hours per week or 27 percent of the average time dedicated to paid work in the whole sample.	Prifti, Daidone, and Davis 2019
Kenya	CT-OVC - Cash Transfer for Orphans and Vulnerable Children Program	Smaller households show a 15.4 percent increase in ownership of small livestock and a 0.7 increase in the total number of livestock. Female-headed households show an increase of 6 percent in ownership of small livestock.	Asfaw et al. 2014
		13 percent increase in wage labor participation for individuals who live farther from local markets.	
		9 percent decrease in wage labor participation for men.	
		Reduction of 20 days per year for all types of wage labor.	
		12 percent reduction in child labor on farms, concentrated among boys.	
Paraguay	*Tekopora* (pilot)	Treated household invested 45–50 percent more in agricultural production and had a 6 percent higher probability of acquiring livestock.	Veras Soares, Perez Ribas, and Issamu Hirata 2010
South Africa	CSG - Child Support Grant	0.23 percent higher probability of owning a plough for unit of CSGRY (CSG receipt years, a year's worth of CSG received for one child; equivalent to 2.3 percent for a household that received CSG for 10 years for one child).	Neves, Hajdu, and Granlund 2020
		4.8 percent higher likelihood of poultry ownership after 10 years' worth of CSG for one child.	
Mexico	*Oportunidades*	24 percent increase in the probability of owning livestock.	Todd, Winters, and Hertz 2010
Malawi	SCT - Malawi Social Cash Transfer	16–32 percent increase in the ownership of agricultural assets (16 percent for hoes, 32 percent for axes, and 30 percent for sickles). 52 percent and 59 percent increase in the ownership of goats and chickens. 1.5 percent increase in the ownership of cattle.	Covarrubias, Davis, and Winters 2012

Country	Program	Effect	Source
		61 percent decrease in participation in low-skilled agricultural wage activities.	
		7 percent decrease in child domestic work outside the household.	

4. Theoretical Framework

The theoretical model of this paper is one in which households maximize consumption and investment, but there are no capital or insurance markets. Therefore, consumption is bounded above by production and assets ($C_{it} \leq x_{ti}$). Following previous theoretical developments, individuals maximize the following utility function, assuming they do not save in the form of cash or non-productive assets.[9]

$$U = Max\ E \sum_{t=0}^{\infty} \delta^t U(C_{it})$$

Subject to

$$x_{ti} = F(A_{it}, L_{it}) - (1-\tau)A_{it} - \emptyset_{it}A_{it} - \theta_t A_{it}$$

$$C_{it} \leq x_{ti}$$

$$A_{it+1} = x_{ti-}C_{it}$$

x_{ti} = consumable wealth
A_{it} = stock of productive assets (including cash devoted to production?)
C_{it} = consumption
$F(A_{it}, L_{it})$ = production function, monotonically increasing in L and A (this could be a Cobb-Douglas production function)
θ_t = negative aggregate shock due to drought, earthquake, economic shock, and so on.
$\emptyset_{it}$ = negative individual shock such as sickness, weather, theft, and so on.
τ = depreciation rate
δ^t = discount factor
L_{it} = a labor function

In this scenario, cash transfers temporarily increase Angolan households' consumable wealth. As families plan to smooth consumption, they invest a portion of the amount received into A_{it}. An

[9] In countries with moderate/high inflation and low use of the financial sector, like Angola (inflation 15–20 percent, only 29 percent of adults have some type of bank account), families tend not to hold cash or deposit their money in bank accounts. Therefore, families tend to buy assets that are productive, have low depreciation, and have less risk of losing value or being stolen.

increase in the stock of productive assets ($A'_{it} > A_{it}$), and a Cobb-Douglas production function, will therefore increase the productivity of labor $F'_L\ (A'_{it}, L_{it}) > F'_L\ (A_{it}, L_{it})$. Thus, there will be a new and higher equilibrium level, with higher-level labor provided. Solving for the production function equation, $F(A_{it}, L_{it})$ for L, and an optimal level of production $x_{it}{}^*$

$$L_{it} = F^{-1}(A_{it},\ x_{it}{}^*(A_{it}, L_i)\ )$$

The change in labor caused by a change in assets can be described as

$$\Delta L_i = \frac{\partial L}{\partial F^{-1}} * \frac{\partial F^{-1}}{\partial A}\Delta A_i + \frac{\partial L}{\partial F^{-1}} * \frac{\partial F^{-1}}{\partial x}\frac{\partial x}{\partial A}\Delta A_i$$

$$\Delta L_i = \left[\frac{\partial L}{\partial F^{-1}} * \frac{\partial F^{-1}}{\partial A} + \frac{\partial L}{\partial F^{-1}} * \frac{\partial F^{-1}}{\partial x}\frac{\partial x}{\partial A}\right]\Delta A_i$$

$$Change\ In\ Labor\ Demand = \sum_i \Delta L_i = \sum \left[\frac{\partial L}{\partial F^{-1}} * \frac{\partial F^{-1}}{\partial A} + \frac{\partial L}{\partial F^{-1}} * \frac{\partial F^{-1}}{\partial x}\frac{\partial x}{\partial A}\right]\Delta A_i$$

With a Cobb-Douglas production function inside the brackets, the first component is negative and the second is positive. For example, for an on-farm production function, with a Cobb-Douglas functional form $X = L_i^{\alpha} A_i^{\alpha-1}$, the solution of the Cobb-Douglas equation, with an optimal x* is

$$\frac{dL}{dA} = \alpha \frac{A^{\frac{\alpha-1}{\alpha}}}{x^{*\frac{1+\alpha}{\alpha}}}\frac{\partial x^*}{\partial A}$$

For a more general case, when there is a fixed ratio between labor and capital, the equation can be simplified. The next equation is the optimal increase in labor due to the increase in production, caused by an increase in capital.

$$Change\ In\ Labor\ Demand = \sum_i \Delta L_i = \sum \left[\frac{\partial L}{\partial F^{-1}} * \frac{\partial F^{-1}}{\partial x}\frac{\partial x}{\partial A}\right]\Delta A_i$$

The result inside the brackets is positive, as the inverse of the production function on labor $\frac{\partial L}{\partial F^{-1}}$ is positive, the derivate of the inverse of the production function on the product $\frac{\partial F^{-1}}{\partial x}$ is positive, and the derivate of the product ∂x and capital ∂A is positive. These equations will be used to estimate changes in labor due to changes in assets.

Box 1: Initial Influence of Kwenda

While there is no statistical evidence of Kwenda's impact on investment, labor, or indirect labor, there is anecdotal evidence regarding what households are doing with the cash transfers. The program was originally

developed to compensate for the increases in gasoline prices; however, households use the transfers for several purposes. Initial interviews suggest the payments are being used to pay for food, health, household construction, and investment in business and agricultural fields.

The Angolan government has recorded interviews with Kwenda recipients. One beneficiary recounted, "I received the Kwenda's money, bought 15 kilos of beans that I put in the field to grow. Next month I will start harvesting the beans" (Kwenda 2021, Review Video, Fundo de Apoio Social).

Another recipient says: "the first money I put into the field (implying that it bought seeds and planted them). When I receive the other money, I have plans on what I am going to do; I am going to buy zinc sheets or I will buy a chair for my house. I also bought a telephone that has helped me communicate with the family in Luanda" (Kwenda 2021, Review Video, Fundo de Apoio Social).

Another Kwenda recipient describes investing in durables and non-durables rather than productive investments: "When the Kwenda arrived, with the money I received, I hired people to work for 6 hours helping me build my house, the rest of the money I used for food and inputs to build my house" (Kwenda 2021, Review Video, Fundo de Apoio Social).

The television channel TPA recorded similar experiences. A male beneficiary mentions: "With the first money from Kwenda I did an agricultural project, improving my water pond. I bought cement and I worked opening the pond" (TPA, Tele Journal, January 14, 2022).

Another person mentions "I used money to invest in adobo and potatoes, that I harvested the same year." This person has harvested almost 5 tons of potatoes and she says that with the profits she will pay her children's studies (TPA, Tele Journal, January 14, 2022).

While these interviews do not provide statistical evidence, they offer anecdotal support for the theory that households will utilize part of the Kwenda money for productive investments. At least one individual used the money to hire labor to help them build houses or plant fields. Together with the theoretical models, the correlations between income and agricultural investments and evidence from other countries suggest that part of the cash transfers in Angola will be directed towards productive investments, particularly in agriculture.

5. Increase Investment Simulations

The economic situation of Angola's rural population and the cash transfer program meet all the requirements that seem to generate labor market effects. For instance, citizens generally lack formal credit and insurance, and capital and insurance markets are missing; finally, investment levels are low, and poverty, informality, and unemployment are high. This section describes three simulations, which take the investment increase approach, using coefficients estimated from other countries. These simulations cannot distinguish whether the jobs created are direct or indirect. The next section describes a fourth simulation that focuses on the indirect job increase caused by a boost in demand for products.

Simulation 1: Applying the Results of the Ghana Study

Empirical examples from other countries illustrate that a proportion of cash transfers is directed to investments and additional agricultural labor. This simulation therefore assumes that the proportion of transfers directed to agricultural investments and that rural labor input increased in a similar

proportion to the Ghana case (Daidone et al. 2019). Ghana is the best available study to draw from, as the context is comparable to Angola in terms of income per capita[10] yet they differ in the share of labor in agriculture (28 percent versus 50 percent).

The cash transfers in Ghana were 8–15 cedis (depending on household size) bimonthly. To standardize the results for each country we use the per capita income of the lowest income quartile, which was 82 cedis per month in 2010.[11] This policy, which translates to providing one-fifth of the per capita income of the lowest income quartile bimonthly, generated a net increase of 3.7 days of extra work.[12]

Although we do not have information regarding the proportion of the cash transfers that were invested in Ghana, we denote this effect as the next equation:

$$\Delta A = I(Cash\ Transfer)$$ Investment function

Solving for Ghana:

$$Change\ In\ Labor\ Demand = \sum_i 3.7 = \sum \left[\frac{\partial L}{\partial F^{-1}} * \frac{\partial F^{-1}}{\partial A} + \frac{\partial L}{\partial F^{-1}} * \frac{\partial F^{-1}}{\partial x}\frac{\partial x}{\partial A}\right] \Delta A_i$$

$$3.7 = \left[\frac{\partial L}{\partial F^{-1}} * \frac{\partial F^{-1}}{\partial A} + \frac{\partial L}{\partial F^{-1}} * \frac{\partial F^{-1}}{\partial x}\frac{\partial x}{\partial A}\right] I(Annualized\ Cash\ Transfer)$$

$$3.7 = \left[\frac{\partial L}{\partial F^{-1}} * \frac{\partial F^{-1}}{\partial A} + \frac{\partial L}{\partial F^{-1}} * \frac{\partial F^{-1}}{\partial x}\frac{\partial x}{\partial A}\right] I(\frac{6}{5} Per - capita\ Income)$$

$$3.7 = \left[\frac{\partial L}{\partial F^{-1}} * \frac{\partial F^{-1}}{\partial A} + \frac{\partial L}{\partial F^{-1}} * \frac{\partial F^{-1}}{\partial x}\frac{\partial x}{\partial A}\right] I(\frac{6}{5} Per - capita\ Income)$$

This equation simplifies to the next, and we can solve for α:

$$3.7 = [\alpha] (\frac{6}{5} Per - capita\ Income)$$

[10] US$2,300 versus US$1,890 per person.

[11] Analyzing the income of the lowest income quartile in Ghana, the income per capita, per month was 82 cedis, or 989 cedis per year. This is the equivalent of 1,153 cedis in 2012, from the Ghana Living Standard Survey 2012 (Ghana Statistical Service 2014). In Angola, the average income of the lowest quartile was Kz 5,737 per person in 2018. Using the inflation index, this would be equivalent to Kz 10,657.

[12] The policy generated an increase of 7.7 days of males work in farming but decreased the hiring of labor by 3–4 days, leaving a net 3.7 day effect.

Using the same proportions, the impact of days in Angola (cash transfer of Kz 34,000 per year and income of the lowest quartile of Kz 11,896 per month)[13] should have an effect of 9.8 workdays per household or approximately 62,000 full-time jobs in rural areas, assuming 250 workdays per year. This simulation assumes that the change in labor due to the increase in capital is the same in both countries, and that the propensity to invest is also the same, meaning that ΔA given a certain cash transfer is the same in both countries.

Simulation 2: Agricultural Production Input Shares

A second methodology can be applied using data from Angola. Using the assumptions from the empirical literature, we can expect the cash transfers to increase investments in livestock, agricultural products, and crop production. Using the cost shares of agricultural production from Evenson and Pingali (2009) for Angola, we know that labor is approximately 30 percent of the input cost of livestock and 50 percent of the input cost for crops (Evenson and Pingali 2009). If we assume that the optimal mixture of labor and assets for agricultural production should maintain the current ratio of labor and assets for an optimal investment, we can define the following relations:

$$Lifestock: \frac{3}{7} = L_{lifestock}/A_{lifestock}$$

$$Crops: 1 = A_{crops}/L_{crops}$$

$$\Delta L = [x]\Delta A$$

$$L_{lifestock} = \frac{7}{3}A_{lifestock}$$

$$L_{crops} = A_{crops}$$

$$Change\ In\ Labor\ Demand = \sum_i \Delta L_{iCrops} + \sum_i \Delta L_{iLifestock}$$

$$Change\ In\ Labor\ Demand = \sum_i \Delta A_{crops} + \sum_i \Delta \frac{7}{3} A_{lifestock}$$

As an upper-bound estimation, we can assume that 25 percent of the transfer will be translated into agricultural investments, as occurred in Mexico (Gertler, Martinez, and Rubio-Codina 2012), divided equally between crops and livestock; we can then estimate its impact on labor. Then to estimate the total change in labor, we need to add the increase in labor due to crops and the increase in labor due

[13] While the minimum wage in 2018, was of Kz 15,003, the average monthly income per capita was Kz 15,454 (a difference of only US$31 per month, or US$372 per year).

to livestock. With these equations, and assuming that 25 percent of the cash transfer is ΔA, we can solve the equations.

Total value = Kz 54,400,000,000, then ΔA = 7,320,848,000, which would generate an increase in labor of crops ΔL_{crops}= 7,320,848,000 and an increase in labor for livestock, $\Delta L_{lifestock}$ = 3,137,506,285. Total increase in labor valued ΔL = Kz 10,458,354,285.71. Using 2018 prices, the average income of the lowest income quartile was 5,737. The increase in investment in rural areas would generate the equivalent of 152,000 full-time jobs.

Simulation 3: Agricultural Production Input Shares: Conservative Scenario

Following Simulation 2, we assume a more conservative estimate, in which only a 10 percent of the cash transfer would be translated into agricultural investments in crops and livestock; we can then estimate its impact on labor. Using 2018 prices, the per capita income of the lowest income quartile was of 5,737. Therefore, the increase in investment in rural areas would generate the equivalent of 61,000 full-time jobs.

Table 4. Simulation of Impact

	Increase investment	Total jobs (FTE)	Jobs per million dollars
Simulation 1	Similar as Ghana	62,000	172
Simulation 2	25% increase Investment	152,000	422
Simulation 3	10% increase Investment	61,000	169

The three simulations generate a wide range of estimated impacts. The first, based on a middle point, and comprehensive evaluation in Ghana, estimates the net impacts in Angola. The results from Ghana consider the new days of work created, as well as the reduction in off-farm work. Simulations 2 and 3 provide impacts that only consider the new jobs created. The results from Mexico provide an upper bound, while a 10 percent investment of the cash transfer would seem to provide a lower-bound estimate.

The program's total expenditure is US$360 million (World Bank investment of US$260 million + government investment of US$100 million). Table 4 reports the number of jobs created per million dollars invested (169–422).[14] From a theoretical point of view, these jobs should last at least as long as the agricultural investments. Therefore, while for cattle the effect should last for a few years, the effect caused by investments in crops should last at least a year.

[14] Given that the mean yearly minimum wage is only US$360 and given the cost of US$360 million of Kwenda, with a direct labor program, it would be possible to directly hire approximately one million individuals for a year for the same cost.

6. Increase in Demand

The household transfers from Kwenda could have a second impact due to increasing the demand for products and services. This would in turn affect households' production function because they would need to raise the demand for labor to increase their supply of products and services (increasing $F(A_{it}, L_{it})$). Prior research has demonstrated that cash transfers can generate a general increase in demand of local products, and in some cases an increase in prices (Creti 2010). This effect benefits local producers that increase their production in the short term, generating jobs (Bauer, Sandstrom, and Audi 2014).

An increase in consumption caused by the cash transfers must be correlated with an increase in production, and therefore in local jobs if the goods are not imported. Table 5 describes the theory of change associated with the increase in demand and the rise in production and employment.

Table 5. Theory of Change—Cash Transfer and Increased Demand

Constraint	Intervention	Direct recipient/ beneficiary of support	Intermediate outcome	Indirect jobs outcomes
Low income	Cash transfer increases demand for products and services	Low-income households	Increased supply/production	Increase employment to increase supply

While there is no systematic information on how families are spending the cash transfers in Angola, examples from other countries could indicate how low-income families could react. Evidence from Ghana demonstrates that families have spent one-third of the transfers on food (Karlan, Lowe, and Darko Osei 2021). Other examples point out that families increase their expenditures on non-durable goods such as food, temptation goods, medical services, and education, but this increase, although important, represents a smaller proportion of the cash transfer.[15]

Using the assumption that the demand for food directly translates into local food production, we can estimate the impact of this increased demand on jobs. Table 6 presents the steps used to estimate the increase in the demand for labor caused by the increase in food consumption of one-third of the transfer as in Ghana (Karlan, Lowe, and Darko Osei 2021). US$120 million is equivalent to a 0.68 percent increase in food consumption in Angola. Using the labor elasticity of 0.23 (World Bank 2017), this would generate a 0.157 percent increase in the labor demand, or 21,037 indirect jobs.

[15] The RCT in Kenya presented an increase in the consumption of non-durables, from US$153 PPP to US$193 PPP after a transfer of US$704 (Haushofer and Shapiro 2016). This represents an increase of 22 percent of non-durables, using 5 percent of the cash transfer.

Table 6. Cash Transfer and Indirect Labor Demand

Constraint	Cash transfer	Food consumption increase/total food consumption	Labor elasticity	Labor force	Increase food consumption	Increase in labor/total
Low income	US$360 million	US$120 million / 17.600 million	0.13	13,415,460	0.68%	0.157%/21,037

7. Discussion

Cash transfers have been used during the COVID-19 crisis to help alleviate the economic hardships suffered by families all over the world. However, the full effects of such programs are not always understood; nor are they dimensioned in their full magnitude.

This ex ante analysis of the impacts of a World Bank-supported cash transfer program in Angola reviewed the empirical evidence and theoretical arguments that could explain the resulting increase in labor demand.

First, using a theoretical model of agricultural investments, three simulations are performed using empirical coefficients obtained from other countries. The results demonstrate that the Kwenda cash transfer should generate 61,000–152,000 new direct and indirect FTE jobs due to the increase in investment, conditional on the assumptions made.

Second, assuming an increase in the demand for food, the transfers should increase indirect FTE jobs by around 22,000. This result is conditional on the assumption of how much food the country produces and consumes and the production/labor elasticity.

Overall, the results suggest that the Kwenda cash transfer program will eventually generate 58–422 FTE jobs per million dollars invested, with a central estimation of 161 FTE jobs per million dollars. However, it is not clear how many of these jobs will be direct versus indirect. Therefore, future *ex post* studies should review the final effects of Kwenda and analyze the program's total impact on the labor market.

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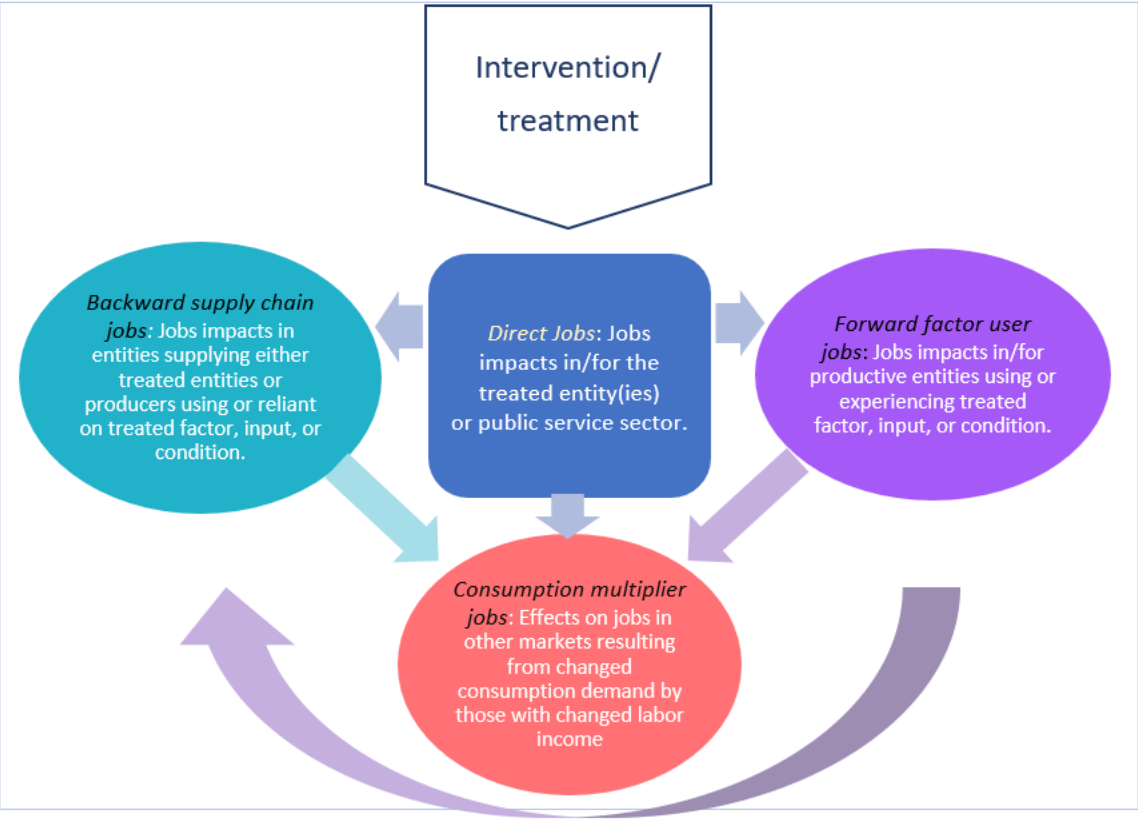
Annex I: Diagram of Jobs Impact



Note: Not all nodes of impact are relevant to all interventions.

Annex II: Household Survey and Kwenda

The simulations reported here are based on the Expenses and Labor Income Survey (IDREA due to its acronym in Portuguese) administered to 11,158 households in Angola in 2018–2019. The World Bank poverty group uses this survey to simulate the expansion and extension of the Kwenda program, and this section builds on the work they have done. In this section, this survey is used to simulate the recipient distribution of the Kwenda cash transfer program. First, the program beneficiaries are selected by municipality and later by district (*barrio*) according to their poverty level. Table 7 compares the demographic characteristics of Angola's population versus the initial results of the Kwenda cash transfer simulation of possible beneficiaries. While rural residents comprise 39 percent of the country's population, they represent two-thirds of the program beneficiaries. Therefore, the rest of the simulation focuses on how the program affected rural beneficiaries.

Table 7. Kwenda Simulation

Country	Total population	Kwenda recipients (percentage of subpopulation)
Rural population	39 percent	21 percent
Urban population	61 percent	11 percent
Total	100 percent	32 percent

Nearly half (44 percent) of the rural population has one or more farm animals, and 11 percent has some type of crops. The size of the investment in animals and crops has certain correlations. There is a positive correlation between per capita household income and per capita number of farm animals and per capita crop sales. Table 8 reports the ordinary least squares regression results using municipality dummy variables, the number of farm animals per household member, and the value of crops sold per household. Polynomial level 2 and logarithmic functional forms of income are used in the regressions. The results illustrate an upward relationship between family income and the number of animals and the value of the crops for both types of regressions. These patterns are illustrated in the predictive estimates presented in Figure 1. The Kwenda threshold is identified in both graphs, showing that a positive income–animal ownership correlation is expected for low-income rural families.

Table 2. Per Capital Animals and Crops

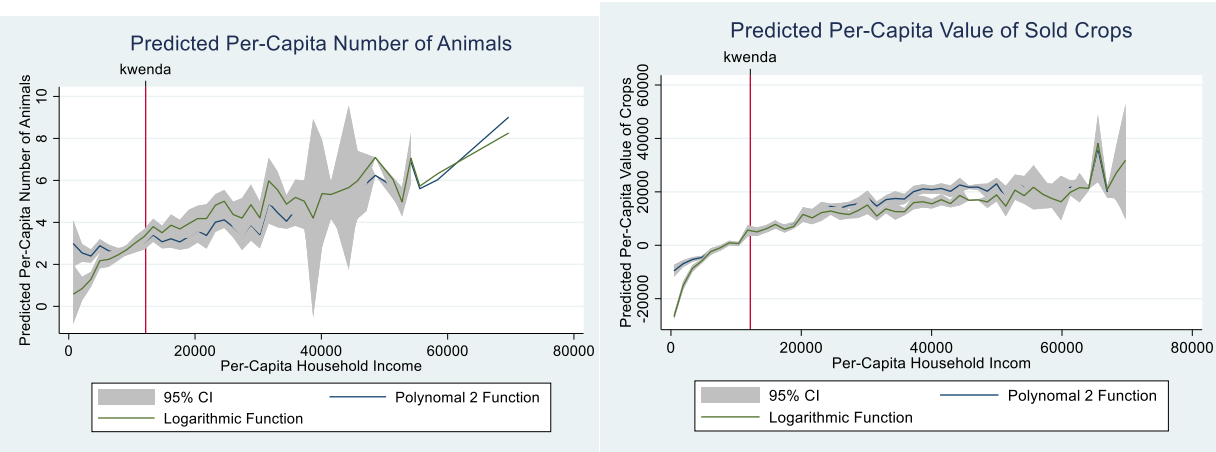
VARIABLES	(1) Animals per capita	(2) Animals per capita	(3) Crop sales	(4) Crop sales
per_animals				
Household Income Per Capita	6.28e-05***		1.254***	
Household Income Per Capita^2	1.02e-10		-1.19e-05**	
Log (Household Income Per-Capita)		1.790***		10,466***
Municipality Dummy	YES	YES	YES	YES
Constant	0.658	-15.42***	-10,528	-95,526**
Represented Population	344,356	344,356	45,062	45,062

	(1)	(2)	(3)	(4)
VARIABLES	Animals per capita	Animals per capita	Crop sales	Crop sales
Observations	552	552	73	73
R-squared	0.324	0.297	0.665	0.657

Note: Standard errors in parentheses. Regressions at the household level.
*** p<0.01, ** p<0.05, * p<0.1

Although not a causal relationship, the results using the IDREA data set illustrate a positive relationship between per capita family income and per capita number of animals, and per capita family income and per capita value of crops sold.

Figure 1. Predicted Per Capita Animals (left) and Crops (right)



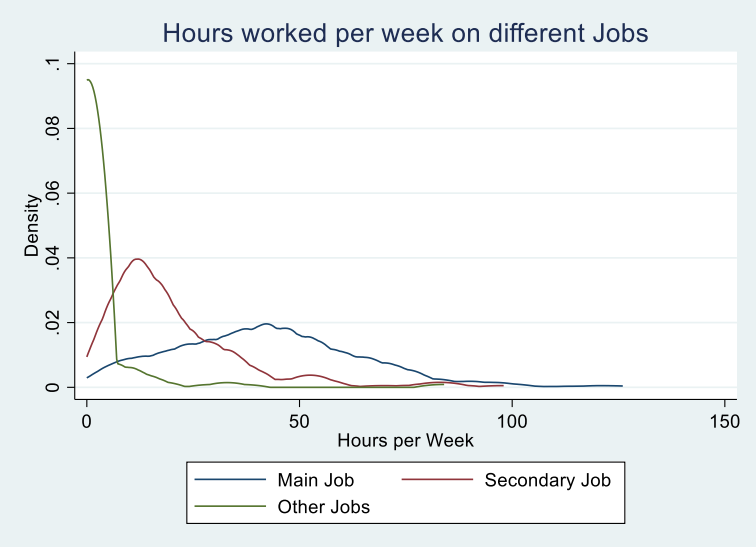
Annex III: Increased Investment and Indirect Jobs

The simulations using the production model cannot determine whether the jobs created are direct or indirect. One way to roughly estimate the number of indirect jobs (if the survey data has the necessary information) is to take the percent of a household farm's labor demand that is accounted for by hired workers.

While taking care of livestock is a low-intensity agricultural job, crop cultivation (seeding, planting, and harvesting) may require households to subcontract labor or have a reciprocal work arrangement. Agricultural societies have developed different arrangements of reciprocal help and community work (Bennett 1968), and Angola is no exception. *Ondjambi* is a system of community job sharing or help, in which agricultural jobs are shared (Moinheiro 2011; Robson and Roque 2001) and tasks are performed by farmers from different households, with the expectation of future work/help.

Using the household survey results, it is possible to estimate which households have provided free labor to other families, and which ones would need to subcontract labor or ask for help. This information allows us to estimate the impact on indirect jobs. The IDREA survey shows that 3 percent of rural household heads provided some type of unpaid labor to family or friends during the previous week. Analyzing the hours spent on other jobs (Figure 2) illustrates the distribution of hours devoted to additional jobs that are not the main or secondary jobs. We can assume that this is hired seasonal and low-intensity labor. To estimate the lower bound of indirect jobs, we know that based on the total number of hours worked, 0.25 percent of these hours currently refer to other jobs. Therefore, following the same pattern of behavior, we could assume that at least 0.25 percent of the new hours worked will be indirect jobs, generating a total of 53 indirect jobs. Since this number is a very small lower-bound estimate, we disregard this methodology as being of little use.

Figure 2. Hours Worked per Week in Different Jobs



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