

Estimation of Rates of Return of Social Protection Instruments in Cambodia:

A Case for Non-Contributory Social Transfers

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**Estimation of Rates of Return of Social Protection Instruments in Cambodia:
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Acronyms and Abbreviations

ADB	Asian Development Bank
ALMP	Active Labour Market Policies
ASEAN	Association of South East Asia Nations
CARD	Council for Agricultural and Rural Development
CAS	Cambodia Anthropometrics Survey
CBHI	Community Based Health Insurance
CCT	Conditional Cash Transfer
CDHS	Cambodia Demographic and Health Survey
CMDG	Cambodia Millennium Development Goal
CDRI	Cambodian Development Research Institute
CFW	Cash for Work
CSES	Cambodia Socio-Economic Survey
CT	Cash Transfer
ECOSOCC	Economic, Social and Cultural Council
EFAP	Emergency Food Assistance Programme
FDI	Foreign Direct Investment
FFW	Food for Work
GDP	Gross Domestic Product
GIZ	German International Cooperation
HEF	Health Equity Fund
HIP	Health Insurance Programme for Garment Workers
IDA	International Development Association
IDPoor	Identification of Poor Households Programme
ILO	International Labour Organization
IMF	International Monetary Fund
KHR	Cambodian Riel
MAFF	Ministry of Agriculture, Forestry and Fisheries,
MEF	Ministry of Economy and Finance
MGSog	Maastricht Graduate School of Governance
MoEYS	Ministry of Education, Youth and Sports
MoH	Ministry of Health
MoI	Ministry of Interior
MoLVT	Ministry of Labour and Vocational Training
MoP	Ministry of Planning
MoRD	Ministry of Rural Development
MoSVY	Ministry of Social Affairs, Veterans and Youth Rehabilitation
MoWA	Ministry of Women's Affairs
MoWRAM	Ministry of Water Resources and Meteorology
MPWT	Ministry of Public Works and Transport
NDMC	National Disaster Management Committee
NFV	National Fund for Veterans
NGO	Non-Governmental Organization

NIS	National Institute of Statistics
NSDP	National Strategic Development Plan
NSPS	National Social Protection Strategy for the Poor and Vulnerable
NSSF	National Social Security Fund
NSSF-C	National Social Security Fund for Civil Servants
ODA	Official Development Assistance
OOP	Out-Of-Pocket Expenditure
PAC	Policy, Advocacy and Communication Section, UNICEF, Cambodia
PWP	Public Works Programmes
RGC	Royal Government of Cambodia
RILGP	Rural Investment and Local Governance Project
RoR	Rate of Return
RS	Rectangular Strategy
SNEC	Supreme National Economic Council
SPCU	Social Protection Coordination Unit
SPER	Social Protection Expenditure and Performance Review
SPI	Social Protection Instruments
SSN	Social Safety Nets
TVET	Technical and Vocational Education and Training Programme
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
URC	University Research Co.
USD	United States Dollar
VT	Vocational Training
WFP	World Food Programme

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ABSTRACT

Cambodia has achieved rapid economic development and poverty reduction over the last years. Total GDP grew between 1993 and 2010 at an average rate of 7.3% per year. Poverty has decreased from 47% to 30.1% between 1993 and 2007. However, most of its population is still living in vulnerable conditions due to malnutrition, lack of basic infrastructure, low quality of health care, low levels of human capital, vulnerable employment and the risk of natural disasters. The share of the poorest quintile in national consumption decreased from 8.3% in 1993 to 6.6% in 2007. The Royal Government of Cambodia launched in 2011 the National Social Protection Strategy for the Poor and Vulnerable (NSPS) in order to contribute to the rehabilitation and stability of the economy, but also to enhance human capital.

This study provides empirical evidence for the implementation of the NSPS making the case for a basic package of non-contributory social protection provisions targeted at poor persons in rural areas covering various life-cycle risks. The instruments include cash transfers for children, social pensions, scholarships for lower secondary education, and public works programmes. A microsimulation model is designed using data from the Cambodian Socio Economic Survey 2004 and 2009. The model estimates the potential effects, benefits and returns of the implementation of social protection in Cambodia.

Direct (distributional) effects on poverty and inequality, and behavioural (income) effects on human capital accumulation (school attendance), malnourishment (children underweight) and labour participation are estimated. The return of human capital accumulation on household disposable income (approximated by household consumption) is aggregated to quantify a rate of return (RoR) of social protection investments as the relation between the net benefit in terms of total household consumption and the cost of social protection over 20 periods. Additional effects such as behavioural (non-income) effects, spillovers and regional multipliers, institutional change and social cohesion are also discussed but not included in the model. The same applies to financial aspects (e.g. taxation), administrative issues (e.g. inefficiency) and potential targeting errors.

The study shows that social protection investments may promote equitable economic growth in Cambodia, by enhancing human development and helping to solve human capital constraints, but also fostering economic development at the household level. The cost of the investment decreases from 1.6% of GDP to 0.8% of GDP over 20 periods (years). Poverty and inequality are immediately reduced after the implementation of social protection. The poverty headcount decreases by 6 percentage points during the first period (year), and population's average education level is 0.5% and 1.5% higher after 6 and 20 periods (years), respectively. In addition a positive RoR is achieved after 12 periods (years), and an RoR of between 12% and 15% is reached after 20 periods (years). However, the effects, benefits and returns of social protection can be higher if it is implemented together with complementary policies such as improving health and education coverage and quality, enhancing sanitation conditions and infrastructure, fostering economic productivity and the formal labour market, and promoting industrialization, innovation and technical change.

EXECUTIVE SUMMARY

Cambodia is a country in Southeast Asia with a total population of 13.4 million people and land area of 181,035 km² (75 persons per km²). Eighty percent of the population lives in rural areas, and 51% are women. Children (0-14) represent 33.7% of Cambodians, while the elderly (65+) account for 4.3% (NIS, 2009). The average age of the population is 26 years (CSES 2009). Cambodia is still a “low income country” with a per capita GDP, at current prices, of USD 830 (KHR 3,355) in 2010 (NIS, 2011b). The country has achieved rapid economic growth and poverty reduction over the last years. However, most of its population is still living in vulnerable conditions.

After years of conflict, Cambodia reached political stability during the 1990s. Since then the country has fostered socio-economic development. Between 1993 and 2010, total GDP grew at an average rate at constant prices (2000) of 7.3% per year. Poverty, measured by average household consumption per capita, declined from 47.0% in 1993 to 30.1% in 2007, which represented an average annual decrease of 3.1% per year. Even more, preliminary calculations (using a different methodology) show that poverty has decreased from 62.0% to 30.1% between 2004 and 2009 (Box 1). However, inequality has not been addressed in the same way yet. The share of the poorest quintile in national consumption decreased from 8.5% in 1993 to 6.6% in 2007 (new estimations for 2009 show a relation of 8.0% (RGC, 2012)), and the Gini coefficient of per capita consumption increased from 0.38 in 1993 to 0.40 in 2004 and to 0.43 in 2007 (NIS, 2010: 18).

Net enrolment in primary education increased from 87% in 2001 to 95% in 2009, while the ratio for lower secondary enrolment has improved from 19% to 32%. Overall, the literacy rate of the population (between 15 and 64 years old) increased from 69.7% to 79.6% between 1998 and 2008 (NIS, 2010b). Access to education also shows important improvements towards the achievement of the Cambodian Millennium Development Goals (CMDG), but access to lower secondary education remains a challenge. Infant and under-five mortality rates reduced significantly since 1998. Under-five mortality decreased from 124 per 1,000 live births in 1998 to 83 in 2005 and 54 in 2010. However, maternal mortality rates increased from 437 per 100,000 live births in 1997 to 461 in 2008 (new estimations for 2009 show a value of 206 (RGC, 2012)). The prevalence of underweight among under-five children has not changed between 2005 and 2010, after its decrease from 38% in 2000 to 28% in 2005.

Despite important socio-economic improvements, vulnerability is still high for most Cambodians. People are exposed to vulnerable employment, natural disasters, malnutrition, lack of basic infrastructure, low quality of health care and low levels of human capital. While achieving an average economic growth rate of 7% seems feasible in the near future given that social and political stability is maintained and foreign investors stay in the country, the aforementioned risks may limit long-term socio-economic opportunities. This may also constrain the opportunities for Cambodia within the current plans of a more integrated ASEAN community in 2015 resulting in a greater flow of services and (skilled) human

capital. In this sense, improving social protection is not just important for the short term, but a mechanism to guarantee future development and to sustain economic growth.

In 2011 the Royal Government of Cambodia (RGC) launched the National Social Protection Strategy for the Poor and Vulnerable (NSPS) in order to “contribute not only to the rehabilitation and stability of the economy in the near future, but also to the enhancement of human capital indicators, including those on education, health and livelihoods development, towards the longer-term achievement of the CDMG in 2015” (RGC, 2011b). Social protection is seen as a mechanism to protect people against different kinds of risk, and to bring the poor out of poverty. The key risks identified in Cambodia are: i) emergencies and crises, ii) human development constraints, iii) seasonal unemployment and income insecurity, and, iv) health shocks. The NSPS considers as social protection different instruments “to protect individuals, households and communities against the financial, economic and social consequences of various risks, shocks and impoverishing situations and to bring them out of poverty” (RGC, 2011: 3).

The NSPS recognizes four vulnerable groups: i) infants and children, ii) girls and women at reproductive age, iii) households vulnerable to food insecurity and unemployment, and, iv) special vulnerable groups (i.e. ethnic minorities, elderly, children and youth at-risk, orphans, veterans, homeless people, people with disabilities, victims of violence and people living with HIV (RGC, 2011b). One of the main elements of the NSPS is the Social Safety Net (SSN) programme, which includes public work programmes (PWP), social transfers and targeted subsidies. Currently, social protection mechanisms are being implemented by the government and a broad range of international organizations and local NGOs. However, a nation-wide social protection instrument (SPI) is lacking. The available programs, their design, coverage and quality of services vary across regions and implementing agency (RGC, 2011; Hennicot, 2012a). The Council for Agricultural and Rural Development (CARD) has the mandate to coordinate implementation and monitoring and evaluation of the NSPS with the aim to create a comprehensive and multisectoral social protection strategy.

In order to generate evidence to support the design and implementation of social protection instruments (SPI), this study estimates rates of return (RoR) of non-contributory social protection investments. RoR are defined as the relation between the net benefit and the costs of an investment. The study concentrates on social protection instruments to reduce vulnerability of children and the elderly, human capital constraints and seasonal unemployment, all areas which are prioritized under the NSPS. It analyses non-contributory social transfers and their role in socio-economic development using ex-ante microsimulation based on different policy options and data from the Cambodia Socio-Economic Survey (CSES) 2004 and 2009 collected by the National Institute of Statistics (NIS) of the Ministry of Planning (MoP).

Social protection and socio-economic development

Social protection is the set of public and private interventions aimed at preventing, reducing and eliminating economic and social vulnerabilities to poverty and deprivation (UNICEF,

2012:14). Social protection covers a broad array of instruments and includes social insurance systems, labour market policies, and formal and informal social safety nets. It includes all measures providing in-kind and cash benefits (transfers) to cover against economic risks and vulnerability. Social protection mechanisms can be contributory and non-contributory. The first ones are insurance based (i.e. benefit entitlements depend on contributions made in the past), while the latter include social transfers financed by general government revenues.

Non-contributory social transfers have a direct (distributional) effect on household disposable income, and as such on income deprivation and inequality. However, changes in disposable income also affect household behaviour both through income and non-income effects. First, additional and/or secure income encourages households to invest in health, education, child wellbeing and livelihoods and productive activities. Improving health status, education and child wellbeing increases the level of human capital, while livelihoods and productive investments increase physical capital. The resulting enhancement of labour productivity in turn yields higher disposable income, creating a virtuous circle of economic development at the micro level.

Second, changes in disposable income affect labour decisions. A source of secure income may discourage labour if other activities become more valuable (e.g. education, leisure). Hence, social transfers may lead to a reallocation of resources within the household. Foregone income by children attending school instead of working, or elderly retiring, may be compensated by working-age household members. Social transfers may also generate the opportunity to take up work (e.g. covering transportation costs and reducing financial constraints) or move to another kind of work as the person may afford a longer search period. In addition, social transfers are likely to be spent locally, thereby generating local and regional economic multipliers. Enhancing local demand may create incentives for third party investments in the region (i.e. spillover effects). Finally, social transfers enhance social cohesion and affect the institutional framework by reducing inequalities (i.e. institutional effects).

Potential effects on economic growth can be derived from increasing productive capacity through higher labour productivity and investment, and by promoting consumption and fostering local markets. An additional effect is related to institutional and structural changes and public provision of goods and services, which are ultimate and intermediate sources of development. However, productive capacity (economic growth) is necessary to sustain domestic financing of social transfers. This framework is consistent with a broad range of literature on the effects of social transfers in developing countries.

The cost of social protection has to be analysed in order to identify its net benefit. In the case of Cambodia, an ex-ante costing study of the NSPS (i.e. Hennicot, 2012b) estimates the cost of different social protection instruments, using 2012 as starting year. The NSPS may cost between 3.7% and 6.7% of GDP in 2012, excluding health care (Hennicot, 2012b). Basic social protection costs, if compared with GDP, appear to be affordable even for low income countries. However, it does demand an important share of public expenditure. Affordability

depends on the available fiscal space, political will and policy priorities. The capacity to finance social protection investments requires different strategies to create fiscal space. Possible pathways include resource re-allocation, foreign aid, increasing tax/contribution rates and/or tax/contribution base, government borrowing and higher economic growth. Social protection affordability, in the end, remains an issue of political choice about the best way to allocate resources (Andrews et al, 2012: 26). In any case, as argued in this report, social protection has to be seen as an investment in human development and economic performance.

Model and results

In order to estimate rates of return (RoR) of investment in social protection in Cambodia, four social protection instruments (SPI) are simulated. Cash transfers, social pensions, scholarships and public works have been selected due to their priority under the NSPS, data availability, modelling feasibility and policy decision relevance. These SPIs cover against vulnerability, human capital constraints and seasonal unemployment.

A microsimulation model is built in order to generate quantitative estimations of potential rates of return. The model is limited to selected links based on policy objectives and data availability. SPI are simulated as unconditional cash transfers using household consumption as a proxy for disposable income. In this sense, the model analyses income effects of social transfers on income distribution and household behaviour. First, the model estimates benefits in terms of poverty reduction and inequality decline (i.e. distributional effects) measured by changes in household consumption (i.e. direct effect). Second, behavioural (income) effects of SPI are estimated to identify benefits with respect to education (school attendance), health (nutrition), and labour decisions (labour participation and labour supply) using linear and probabilistic equations. Finally, the estimated benefits are compared to the costs of SPI, based on assumptions from previous costing studies, to calculate RoR. The current model does not include financing issues. In other words, social protection is assumed to be financed from external sources.

The model is limited to micro data available from the Cambodia Socio-Economic Survey (CSES) 2004 and 2009. The selected social protection instruments are limited to non-contributory cash transfers. Insurance-based social protection as well as publicly provided services (e.g. health care) would require additional information that is currently not available. Since the CSES does not provide economic information at the commune level, spillover and regional multipliers are not studied. Finally, macroeconomic information is used to interpret results but a link between micro and macro simulations cannot be made because relationships between economic sectors cannot be observed. In this sense the link to the macro level, to estimate RoR, is based on aggregate household information assuming fixed structural conditions.

Social transfers are simulated as an exogenous shock based on different policy options. Direct cash transfers are simulated using three different scenarios for poor children up to 6 years old. Transfers are set at 60% of the rural food poverty line (60% of KHR 84,519 per capita per month in 2009) payable on a monthly base. Social pensions comprise two scenarios for poor

persons 65 years and older. Transfers are proposed at 100% of the rural food poverty line paid each month. Scholarships are simulated for poor children in rural areas (excluding Phnom Penh) between 5 and 18 years old. Three scenarios are defined based on different levels of education (primary, lower secondary and upper secondary education). Transfers are set at USD 50 per year (equivalent to 20% of the rural food poverty line per year), based on the information provided by the Ministry of Education Youth and Sport (MoEYS). The administrative cost of cash transfers, social pensions and scholarships is assumed at 10% of transfers. Finally, the model assumes perfect targeting.

Cash transfers through public work programmes are simulated for poor households in rural areas (excluding Phnom Penh). The transfer (wage) is set at USD 2.3 per working-day for a total of 80 days per year. It is assumed that only one person per household is participating and that around 10% of eligible households participate. Non-wage costs are set at 50% of total cost. These assumptions are in line with a recent costing study of the NSPS (i.e. Hennicot, 2012b). In addition, a joint scenario is simulated including one option for each SPI. For all simulations income from transfers is assumed to directly increase consumption.

Based on the CSES 2009, cash transfers are estimated to cost between 1.0% and 1.1% of GDP (including administrative costs at 10% of benefits). The number of beneficiaries ranges between 642 thousand and 736 thousand children depending on the targeting criteria. The total costs are likely to decrease over time if poverty decreases, economic expansion is sustained and fertility rates continue to decline (Hennicot, 2012b). The costs for social pensions are considerably lower (0.4% of GDP) and cover between 146 thousand (poor persons 65+ years old) and 137 thousand persons (poor persons 65+ years old in rural areas). The costs for social pensions may increase over time in the context of an ageing population, but they may decrease following a reduction of poverty. Scholarships cost between 0.01% and 0.4% of GDP, depending on the respective scenario, and may decrease over time if poverty reduction continues and economic growth is maintained. Finally, the total costs of public work programmes (PWP) are estimated at 0.2% of GDP. Similar to the other programs, the costs of PWP may decrease over time in the case of a further reduction of poverty.

Poverty and inequality

Cash transfers to poor children are estimated to reduce the poverty headcount by between 3.6 and 4.0 percentage points in absolute terms (i.e. a relative reduction of 12.1% to 13.7%). Poverty gap and poverty severity are reduced by between 11.2% and 13.1%, and 19.4% and 22.1% respectively. Finally, the Gini coefficient is estimated to decrease by between 3.3% and 3.7% (from 0.329 to 0.317 and 0.318 respectively). Social pensions to poor persons 65 years and older can potentially reduce the poverty headcount by 1.6 percentage points. The effect on the poverty gap and severity is a decline of 1.5% and 1.7%, respectively. The Gini coefficient of consumption per capita declines by around 1.0%. Public works reduce the poverty headcount, gap and severity by 2.0%, 0.9% and 1.6%, respectively, and inequality by 0.4%. Finally, scholarships also reduce poverty and inequality especially if they are focused on children attending primary education. However, the main objective of scholarships is to promote school attendance. These effects are discussed later, and they show that scholarships

for lower secondary education have a higher effect than for primary education, while the effect of scholarships for upper secondary is not significant. Direct cash transfers to poor children up to the age of six achieve the largest results in terms of poverty and inequality reduction, irrespective of the selected scenario.

Finally, a joint policy option is simulated providing social protection over the individual life-cycle. This scenario covers early childhood and old age vulnerability, working-age seasonal unemployment, as well as promoting school attendance (i.e. human capital constraints). The total costs for this combined package amount to KHR 686 billion (around USD 166 million) equivalent to 1.6% of GDP, per year. Transfers represent 88% of total cost. By providing the complete package, poverty can be reduced by 5.9 percentage points, while the poverty gap and severity decrease by 14.4% and 24.2% respectively. Inequality declines by 4.9%.

Household consumption and returns on education

Household consumption plays a double role in the modelling framework. First it is used as an explanatory variable to analyse behavioural income effects. Second, returns to human capital investments in terms of household consumption are estimated to approximate micro level economic effects. Returns to human capital investments in wage terms are estimated only for those individuals working in the formal sector (i.e. those who receive a monthly wage).

On average, an additional year of education is associated with a 4.1% higher wage for those working in the formal sector after controlling for selection bias. The return in urban areas is 6.3% in comparison with 3.3% in rural areas. Gender differences are not significant in rural areas, but in urban areas returns for women are 12% lower than for men. Overall, returns to education in terms of higher wages seem to be low in Cambodia in comparison with international evidence. As a consequence, incentives to invest in education are weak. Two possible factors may explain this result. First, school achievement is not an indicator for the quality of education, which is likely to be low in low income countries. Second, returns to investment in human capital are expected to be lower in the context of generally low productivity economic conditions. Increasing overall productivity and technological change may produce higher returns in the future. However, access to quality education is needed to generate equal opportunities, especially in rural areas.

Because of high levels of informality in Cambodia, the estimation of returns in wage terms applies only for a limited percentage of the population. The model is therefore extended to analyse the effect of schooling on household consumption as a proxy of income. On average, an additional year of education, measured by the maximum level of education in the household, is associated with a 4.4% higher household consumption at the national level. The return from an additional year of education on household consumption is 1.6% (urban) and 1.8% (rural) for poor households and 2.6% (rural) and 4.2% (urban) for non-poor households. The effect for poor households is similar in urban and rural areas, but more differentiated for non-poor households with a lower return for rural households. These results are likely to reflect the participation in economic sectors with lower levels of productivity in the case of

poor and rural households (e.g. lower returns associated with agriculture and informal activities).

Education (school attendance)

Household consumption is positively related to school attendance in Cambodia. The analysis includes all individuals between 6 and 25 years old if they have not completed upper secondary education (primary education includes grades 1 to 6, lower secondary education 7 to 9, and upper secondary education 10 to 12). At the national level a 10% increase in the level of consumption is related with a 0.2 percentage point higher probability of attending school. This effect is substantially higher for rural areas and poor households. A 10% increase in household consumption per capita (i.e. USD 3.4 per month for a median poor rural household) is associated with a 2.0 and 2.7 percentage point higher probability for individuals aged 6 to 25 year to attend school in a poor and a poor rural household respectively.

Further analysis by education level shows that in the case of poor rural individuals the effect is higher for lower secondary than for primary education, with a 10% increase in consumption level associated respectively with a 5.6 and 2.2 percentage point higher probability of attending school, while it is not significant for upper secondary education. For non-poor households (urban and rural) a possible effect is only measured for secondary education, while there are no significant effects for poor urban households.

Results suggest that, by increasing household disposable income, social transfers are likely to affect educational investments, and in turn generate positive effects on human development. In the case of poor rural households, social transfers may have a stronger effect on lower secondary school attendance than at the primary level. However, there is no significant effect for upper secondary education which may be explained by low expectations of future returns (this can also explain the lack of a significant effect for poor urban individuals). In this sense, complementary policies to increase education quality and to enhance future labour opportunities are necessary to create incentives for school attendance, promote human development and increase the returns to social protection investments.

Nutrition

Child malnutrition remains one of the main developmental challenges in Cambodia. It is at the same time a direct cause and effect of poverty. Improving child nutrition has a direct effect on reducing child mortality and improving future economic returns. At the national level, on average, a 10% increase in household consumption per capita is related to a 0.4 percentage point lower probability of children being underweight. However, the link between household consumption and underweight status is not significant for poor households. This suggests that other factors are more relevant in explaining the potential causes of malnutrition in Cambodia.

In poor households, having a proper toilet facility (as a proxy for sanitation conditions) is associated with a 6 to 8 percentage point lower probability of children being underweight. A higher level of education (estimated by the maximum level in the household) is also related to

a lower probability of being malnourished. The link is significant at the national level, while the mother's education is significant in the case of poor children in urban areas. Furthermore, the age of the mother is negatively correlated with the probability of children being underweight.

The results suggest that malnutrition is not only determined by household economic conditions. In the case of poor children, the education level of the mother and sanitation conditions (approximated by toilet facility) have a higher effect on the probability of being malnourished. This indicates the need for complementary policies to address the nutrition objectives. Social transfers, by increasing household income, may generate positive effects on nutrition if they are implemented together with other policies (e.g. improving access to water and sanitation, or preventive health care measures, such as training in child feeding practices).

Labour

The effect of social cash transfers on labour decisions is studied using different regression models, with household consumption as a proxy for household disposable income. For working age adults (18 - 64 years), a 10% increase in household consumption reduces the probability of unpaid work both for poor individuals in urban (by 10 percentage points) and rural (8.9 percentage points) areas, and for non-poor persons in urban (2.8 percentage points) and rural (1.4 percentage points) areas. The effect on paid work is not significant at the national level, but it is positive for poor individuals in rural areas (5.9 percentage points increase). In this sense, social protection is likely to generate labour mobility from unpaid to paid activities in Cambodia, as the transfers help poor households to overcome financial constraints to labour market participation, such as transportation and search costs.

With respect to labour supply (measured by the number of working hours), an increase in household consumption does not affect the behaviour of the urban poor. However, it does reduce labour supply in the case of poor rural individuals, which may be related to a change from unpaid to paid activities. Further estimations show that a 10% increase in household consumption boosts labour supply by 1.2% for all individuals between 18 and 64 years old with consumption under USD 100 per person per month. It seems that social protection, rather than discouraging, seems to foster labour especially in the case of poor persons. Finally, it is shown that social protection, by increasing household disposable income encourages formal labour. A 10% increase in household consumption raises the probability of paid work by 22 percentage points for the 18-30 years old. However, this last effect depends on the capacity of the economy to increase labour opportunities in the formal sector.

Long-term benefits

In order to estimate benefits of social protection over time, a dynamic model is simulated. The model includes three modules: demography, human capital accumulation and household consumption based on the effects from the static microsimulation models. Other variables and changes in economic and structural conditions are assumed to have the same effects on the base line without social protection and the joint policy scenario, and therefore cancel out. The simulation is done for a 20 year horizon and provides estimates for a comparative analysis between a base line and the joint policy scenario. The joint policy scenario includes: i) cash

transfers for poor children up to 6 years old in rural areas, limited up to two children per household, ii) social pensions for poor persons over 64 years old, iii) scholarships for poor children in rural areas attending lower secondary education, and iv) a public works programme (PWP) covering 10% of poor households in rural areas.

Over time, the education level of the population is slightly higher if social protection investments are introduced. For example in periods 5 and 20 from now, the average education level (years of schooling) is estimated to be 0.02 and 0.14 years higher under the SPI scenario (0.4% and 1.5% higher, respectively). It is important to note that these benefits do not occur immediately. In this sense, a long-term horizon for SPI is important in order to achieve benefits for human capital accumulation. Furthermore, if the quality of education and its economic returns are raised the effect may become higher due to additional incentives to invest in education.

Total household consumption has an average growth rate of 0.04 percentage points per year higher if SPI are implemented over the estimated period of 20 years. In period 1 the change in total household consumption is only due to the SPI transfers. Later on the increase also occurs as a result of higher human capital. Furthermore, poverty and inequality decrease faster thanks to SPI. The poverty headcount is 4.8 (2.6) percentage points lower in period 5 (period 20) under the SPI scenario; while the Gini coefficient for consumption is 0.014 (0.010) points lower with SPI in the same period. The size of these benefits decrease over time because fewer people receive the transfers each period as they are targeted to the poor. These results show that social protection investments do generate both social and economic returns in Cambodia.

Rates of Return

Rates of return (RoR) on economic development are estimated in terms of household consumption. RoR of SPI measured by total household consumption increase with time from -11.6% in period 1 to -10.1% by period 5, and to between 11.9% and 14.7% by period 20, depending on the discount rate used. RoR become positive after period 12. It means that the net benefit (difference on total household consumption between policy and base line scenario) exceeds the cost of the investment (including administrative costs). Investments in social protection in Cambodia may generate an economic return (approximated by the increase in household consumption) of around 5% over 15 periods and between 12% and 15% over 20 periods.

The estimations show that investments in social protection in Cambodia may generate positive effects on human development by reducing poverty and inequality immediately, but also on economic performance in the mid and long term. As such, SPI are a necessary social and economic investment for the future development of Cambodia.

Final Remarks

All SPI are simulated as cash transfers and assumed to have the same effect on households. However, behavioural (income) effects may be different according to specific design

characteristics. Household decisions on how income from transfers is spent may differ for the type of transfers (e.g. social pension versus a scholarship), the transfer recipient (e.g. if the transfer is given to the mother) and the intra-household resource allocation. Furthermore, the model does not account for effects of different financing options. For example, if social protection investments are to be financed by an increase in tax rates, this would have an impact on the estimated results, both in the short and the long-term. On the other hand, non-income (behavioural), health improvements (e.g. nutrition), spillover, regional multiplier and institutional effects are not included in the present model. Therefore, the presented returns may be underestimated.

Implementing social protection as part of a multisectoral strategy will eventually yield higher returns. The improvement of sanitation conditions, infrastructure and access to and quality of public services (e.g. health and education) will foster human capital accumulation. Enhancing the overall economic productivity, strengthening the formal labour market, and promoting industrialization, innovation and technical change will increase the returns on human capital in the future, thereby stimulating higher investments in education. In the same way, SPI should be designed in order to promote positive behavioural (non-income) effects. Besides, regular monitoring and evaluation during the implementation of the NSPS is vital to guarantee that the expected effects (e.g. school attendance, best feeding and health care practices, livelihood generation) are being achieved. Finally social protection by helping to solve human capital constraints generates the conditions needed for further economic development.

The study shows that investments in social protection in Cambodia may generate both social and economic benefits and recover the cost of investments in the long term. The estimated investments of the proposed SPI amount to 1.6% of GDP in period 1 and then decrease to 0.8% of GDP in period 20. This amount of resources seems affordable for Cambodia, and political will has been established in the NSPS. However, it is necessary to guarantee resources for SPI investments over time, as most of the benefits occur in the long-term. Additionally to the benefits studied, it is important to note that social protection also contributes to social cohesion and helps building peace, values that can hardly be translated into a monetary value.

It is important for the Royal Government of Cambodia to generate data and a research agenda to study aspects of the implementation of the NSPS not covered in this study as for example: i) financing aspects through the tax system, contributory schemes and a comparison with alternative public investments; ii) behavioural (non-income) effects; iii) health sector (i.e. HEF and CBHI); iv) macro analysis using a social accounting matrix; and v) regional multipliers by collecting economic data at the commune level.

INTRODUCTION

Cambodia has achieved rapid economic growth and poverty reduction over the last years. However, most of its population is still living in vulnerable conditions due to malnutrition, lack of basic infrastructure, low quality of health care, low levels of human capital, vulnerable employment and the risk of natural disasters. In particular, low human capital and productivity, and lack of infrastructure are impediments to future socio-economic development. In order to address these issues the Royal Government of Cambodia (RGC) has launched a comprehensive plan under the Rectangular Strategy for Growth, Employment, Equity and Efficiency. This strategy served as the basis for the National Strategic Development Plan (NSDP) and the National Social Protection Strategy for the Poor and Vulnerable (NSPS).

The NSPS aims to contribute to the stability of the economy and to enhance human capital. Social protection is seen as a mechanism to protect people against different kinds of risk, and to bring the poor out of poverty. Some of the risks identified under the NSPS are: i) emergencies and crises, ii) human development constraints, iii) seasonal unemployment and income insecurity, and iv) health shocks. Emergencies and crises are related with the impact of external shocks and the vulnerability to natural disasters as floods and droughts. Human development constraints are present in the form of malnutrition, food insecurity (especially during lean season, natural disasters and economic shocks), illiteracy and school enrolment, repetition and dropout. Income insecurity is caused by vulnerable employment (unpaid and self-employed workers), which affected up to 82.5% of workers in 2010. Due to mainly low productivity activities, wages do not compensate for higher education. Finally, health shocks may trap people in vicious poverty cycles (RGC, 2011b).

In order to generate evidence to support the design and implementation of social protection instruments (SPI), this study estimates rates of return (RoR) of social protection investments. RoR are defined as the relation between the net benefit and the costs of an investment. In other words, it is the ratio of the net present value of benefits to the net present value of costs of a social protection investment. In the case of social protection (i.e. social transfers) different sets of benefits have to be considered. Distributional effects are those affecting household disposable income and consumption, and directly impact poverty and inequality. Other benefits include household (e.g. human capital investments and labour and productive investment decisions) and spillover effects (e.g. the effect of higher labour productivity and household consumption on local firms/businesses). This study concentrates on social protection instruments to reduce vulnerability of children and the elderly, human capital constraints and seasonal unemployment, all areas which are prioritized under the NSPS.

The study focuses on non-contributory social transfers and their role in socio-economic development. Social transfers reduce income poverty and inequality, but they also affect households' decisions by increasing consumption and the resources available to invest in health, education, livelihoods and productive activities. Improving health status, education and livelihoods increases the level of human capital and therefore labour productivity, and

results in higher disposable income, creating a virtuous circle. Furthermore, changes in disposable income also affect labour decisions (labour supply). A source of secure income may discourage labour supply if other activities become more valuable (e.g. education). Social transfers may also allow covering transportation costs and reducing financial constraints. They may create opportunities to move to another kind of work as the person may afford a longer search period. Finally, social transfers may enhance social cohesion and affect the institutional framework by reducing inequalities. The effect on economic growth can be seen throughout higher productive capacity generated by increasing labour productivity and investment, but also by raising levels of consumption and its effects on local markets.

The study applies ex-ante microsimulation based on different policy scenarios, using data from the Cambodia Socio-Economic Survey (CSES) 2004 and 2009 collected by the National Institute of Statistics (NIS) of the Ministry of Planning (MoP). Diverse quantitative techniques are integrated to generate a comprehensive analysis of the potential benefits of social transfers in Cambodia. First, static microsimulation is used to analyse the cost-effectiveness of different social protection instruments (SPI). Second, probabilistic models (labour supply, school attendance and health status) are estimated. Third, returns on human capital at the household level are estimated using CSES 2004 and 2009. Finally, a dynamic microsimulation is used to estimate human capital accumulation and total household consumption. The study analyses four social protection instruments: cash transfers, scholarships, public works and social pensions. These instruments have been selected due to their relevance for the NSPS, data availability and modelling feasibility, and have been discussed with the Social Protection Coordination Unit (SPCU), the Council for Agricultural and Rural Development (CARD)¹, and development partners during meetings and workshops of the Social Protection Research Exchange Initiative in Cambodia.

The rest of the report is organized as follows. Section I briefly introduces the socio-economic context in Cambodia. Section II presents an analytical framework to identify the links between social protection, socio-economic development and economic growth. This section also includes a limited survey of empirical evidence about the effects of social transfers in developing countries. Section III presents the data and the microsimulation model (static and dynamic). Finally, section V concludes.

¹ Since June 2010 CARD has the role of coordinating the implementation of the NSPS.

I. CAMBODIA: BACKGROUND INFORMATION

1.1. Socio-economic Characteristics

Cambodia is a country in Southeast Asia with a total population of 13.4 million people (NIS, 2009) and an area of 181,035 km² (75 persons per km²). The country is divided into 23 provinces and 1 municipality (Phnom Penh), with 1,407 communes and 13,910 villages (RGC, 2012). According to the General Population Census of 2008, 80% of the population lives in rural areas, and 51% are women at the national level. Children (0-14) represent 33.7% of Cambodians, while the elderly (65+) account for 4.3% (NIS, 2009). The average age of the population is 26 years (CSES 2009). Cambodia is still a “low income country” with a per capita GDP, at current prices, of USD 830 (KHR 3,355) in 2010 (NIS, 2011b). The Cambodian Human Development Index is 0.523 in 2011² (lower medium human development), ranking 139 of 187 countries (UNDP, 2011).

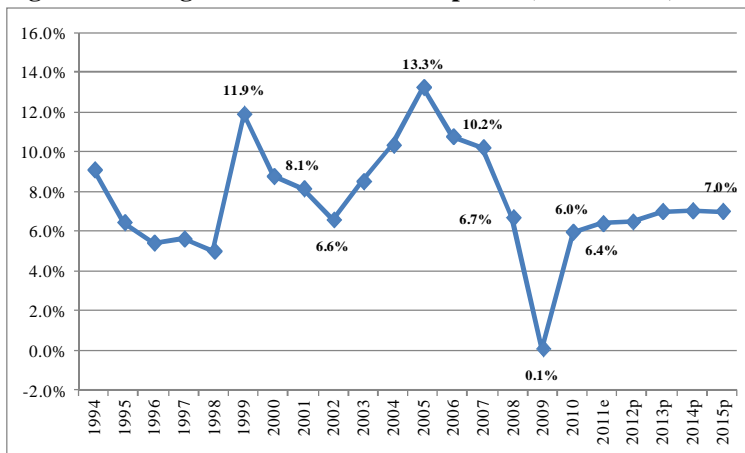
The Human Development Index (HDI) for Cambodia is lower than for its neighbours. The HDI is 0.682 for Thailand, 0.793 for Vietnam and 0.524 for Lao PDR in 2011. This is also the case if comparing life expectancy at birth which is 75.2 years in Vietnam, 74.1 in Thailand, 67.5 in Lao PDR and 63.1 years in Cambodia. Furthermore, comparable poverty measures (i.e. population living below \$1.25 PPP per day) is 10.8% in Thailand (2009), 13.1% in Vietnam (2008) and 30.1% in Cambodia (2007)³. In addition, under-five mortality rate (per 1,000 live births) is 14 in Thailand, 24 in Vietnam, 59 in Lao PDR and 88 in Cambodia, in 2009. Finally, Cambodia has the lowest GNI per capita (PPP terms at constant 2005 international \$) with 1,848 in 2011, followed by Lao PDR (2,242), Vietnam (2,805) and Thailand (7,694). However, Cambodia shows the highest annual growth rate between 2000 and 2011 (6.0%) in comparison with Vietnam (5.3%), Lao PDR (5.2%) and Thailand (3.1%). (UNDP, 2012).

After years of conflict, Cambodia reached political stability during the 1990s. Since then the country has fostered socio-economic development. Per capita GDP grew at an annual average rate of 5.3% between 1993 and 2010, increasing from USD 229 (KHR 629 thousand) to USD 830 (KHR 3,355 thousand) in current prices (NIS, 2011b; SNEC, 2011). Between 1993 and 2010, total GDP grew at an average rate at constant prices (2000) of 7.3% per year. Between 2004 and 2007, the economy grew with over 10% per year (Figure 1).

² In 2011, life expectancy at birth is 63.1 years, mean years of schooling are 5.8, expected years of schooling 9.8, and GNI per capita in USD constant 2005 PPP is 1,848 (UNDP, 2011).

³ New estimations from the Cambodian Commune Database (CDB) shows a poverty head count of 25.8% in 2009 (RGC, 2012). However, this figure cannot be compared with those estimated from the CSES (based on consumption) (Box 1).

Figure 1: GDP growth rate at constant prices (1994 – 2015)



(e) Expected; (p) Projected

Source: NIS (2011b) and SNEC (2011)

Cambodia does not regularly collect labour market information. A study of the National Institute of Statistics (NIS) supported by the International Labour Organization (ILO) provides some information and trends, based on census data for 1998 and 2008. The labour force, in Cambodia, includes all individuals aged 15 or older. It has been increasing at an average rate of 3.3% per year since 1998, accounting for around 7 million people in 2008. Labour force participation⁴, however, only increased from 77% to 78.3% (81% for men and 76% for women) over the same period. Among working persons, 34.5% have not completed primary education. Only 13.7% have completed lower secondary education (NIS, 2010b).

In 2008, 72.5% of employment was generated in agriculture, forestry and fishery, followed by services and sales (19.3%), and industry (8.6%). However, the distribution is different for the youth (15 to 24 years old) with 68.6%, 15.9% and 15.5%, respectively. The Census of 2008 estimates an unemployment rate of 1.6%. Unemployment among women is 1.8% while for men it is 1.5%. Youth unemployment accounts for 3.3% in comparison with the rate of adults at 1.1%. The low level of unemployment is not surprising as “in the absence of unemployment benefits or family savings, those without employment are often under pressure to accept whatever job is available for the sake of survival” (NIS; 2010: 23). 82.5% of those who work are unpaid or self-employed (i.e. vulnerable employment). Finally, the percentage of working children (5 to 17 years old) increased from 8.3% in 1998 to 9.7% in 2008 (NIS, 2010b).

Table 1 presents labour participation rates by age group, region (urban and rural) and poverty condition in 2009, based on the Cambodian Socio Economic Survey (CSES). 29.6% of those over 5 years old do not work, 22.1% work without payment, and 48.2% have paid work. In 2009, 73% of unpaid workers were farmers, 10% work on “elementary occupations” (e.g. street sales, cleaning services, messengers, collecting garbage, simple agricultural activities,

⁴ Individuals aged 15 years old or older who are actually working, as percentage of all individuals aged 15 years old or older (labour force).

pedalling or hand-guiding vehicles) and 10% on services and sales.⁵ Unpaid work is higher in rural areas and for poor individuals. Child work (i.e. workers under 18 years old) is concentrated in unpaid activities and it is more frequent in rural areas.

Tables 36 and 37 (Annex 2) show that labour participation is higher for men than women at any age group and region, except for persons under 18 in urban areas. In 2009, agriculture, forestry and fishery employed 7 out of 10 workers in rural areas, but only 1 out of 4 in urban regions (excluding Phnom Penh). The percentage of workers in transportation, and hotels and restaurants increased from 5.1% and 1.0% to 7.0% and 6.6% in urban areas (excluding Phnom Penh) between 2004 and 2009, respectively. Finally, 67.2% of labour in Phnom Penh is concentrated in wholesale, manufacturing, public service (including defence) and other services.

Labour productivity (value added per employee) increased from KHR 2.4 million (USD 631) in 1998 to KHR 4.2 million (USD 1,032) in 2008. The average growth rate was 5.7% per year in KHR, and 4.9% in USD. The sector with the highest growth rate of labour productivity is mining and quarrying (19.4%), followed by finance and other services (8.6%), transport and communication (5.8%), construction (3.7%), manufacturing (3.1%), agriculture (1.7%), and trade (1.0%), while the sectors hotels and restaurants (-1.0%) and, electricity, gas and water (-3.9%) saw a decline. Labour productivity in agriculture, forestry and fishery is around one third of the average national level, and 0.06 times the productivity in mining and quarrying. Labour productivity in Cambodia is less than half of that in Vietnam (NIS, 2010b).

Poverty, measured by average household consumption per capita, declined from 47.0% in 1993 to 30.1% in 2007, which represented an average annual decrease of 3.1% per year. Based on the revised methodology (see Box 1), poverty has decreased from 62.0% to 30.1% between 2004 and 2009⁶. The elasticity of poverty to economic growth is an estimated -0.37 to -0.59 depending on the indicator used for economic growth.⁷ These estimates are lower than the elasticity for East Asia and Pacific countries, which was estimated at -1.00 (Besley and Burgess, 2003: 8). A possible explanation is that inequality, which is one of the factors explaining differences in the elasticity of economic growth on poverty reduction, has not been addressed yet in Cambodia. The share of the poorest quintile in national consumption decreased from 8.5% in 1993 to 6.6% in 2007 (new estimates for 2009 show a relation of 8.0% (RGC, 2012)). Besides, the Gini coefficient of per capita consumption increased from 0.38 in 1993 to 0.40 in 2004 and to 0.43 in 2007 (NIS, 2010: 18).

Monthly consumption per capita increased from USD 30 (KHR 121 thousand) in 2004 to USD 68 (KHR 282 thousand) in 2009, with an average growth rate of 10.8% per year in real terms. However, the relation between the richest and poorest quintile (decile) remains at 5.1

⁵ Own calculations based on CSES 2009.

⁶ Under the old methodology, the poverty rate declined to 14.6% in 2009.

⁷ Between 1993 and 2007, total GDP grew at an average rate of 8.5%, while per capita GDP grew at 7.0%, household final consumption expenditure at 6.8% and per capita household final consumption per capita at 5.3%.

(7.7) times, and between Phnom Penh and other rural areas at two times (Tables 40 and 41 in Annex 2). Food and non-alcoholic beverages account for 39% (52%) of total consumption in Phnom Penh (rural areas), followed by housing (31% in Phnom Penh, and 15% in rural areas). In Phnom Penh (rural areas) households spend 7% (4%) on transportation and 6% (9%) on miscellaneous items, while health and education accounts for 3% (9%) and 5% (1%) of total household consumption in Phnom Penh (rural areas), respectively (NIS, 2010a). For 65% of the households, the main source of income is self employment. It provides 68% of total income in rural areas and 60% in urban regions. Salaries account for 32% and transfers for 3% of total household income. In 2009, the average monthly income per capita is USD 94 (KHR 384 thousand). The relation between the richest (USD 119 or KHR 488 thousand) and poorest (USD 5 or KHR 19 thousand) quintile is 25.7 (NIS, 2010a).

Table 1: Labour participation by age group and poverty condition (2009)

Age group	Poor			Non poor			Total		
	No work	Unpaid work	Paid work	No work	Unpaid work	Paid work	No work	Unpaid work	Paid work
National									
Between 5 and 14	61.6	32.0	6.4	72.1	24.6	3.3	68.6	27.1	4.3
Between 15 and 17	24.9	48.9	26.2	38.4	42.8	18.8	34.4	44.6	21.0
Between 18 and 30	10.6	31.3	58.1	17.5	27.0	55.5	15.9	28.0	56.1
Between 31 and 45	6.6	7.9	85.5	7.5	6.7	85.8	7.3	7.0	85.7
Between 46 and 64	13.1	5.2	81.7	14.8	4.9	80.3	14.5	5.0	80.5
Over 64	46.3	3.1	50.6	44.0	4.6	51.4	44.4	4.3	51.3
Total	28.6	26.8	44.6	30.0	20.5	49.5	29.6	22.1	48.2
Urban									
Between 5 and 14	70.8	20.6	8.6	92.8	6.1	1.1	90.2	7.9	2.0
Between 15 and 17	40.1	26.9	33.0	62.2	25.1	12.8	60.0	25.3	14.8
Between 18 and 30	13.8	27.0	59.2	30.3	17.1	52.6	29.0	17.9	53.1
Between 31 and 45	10.8	5.4	83.8	13.4	5.6	81.0	13.2	5.6	81.2
Between 46 and 64	28.7	2.1	69.2	24.1	4.1	71.8	24.3	4.0	71.7
Over 64	67.5	14.8	17.7	58.2	3.6	38.2	58.7	4.2	37.0
Total	34.5	18.9	46.6	40.8	11.0	48.2	40.3	11.6	48.1
Rural									
Between 5 and 14	61.0	32.7	6.3	66.2	29.9	3.9	64.2	31.0	4.8
Between 15 and 17	23.9	50.3	25.8	31.0	48.3	20.7	28.6	49.0	22.4
Between 18 and 30	10.4	31.6	58.0	12.6	30.9	56.6	12.0	31.1	57.0
Between 31 and 45	6.3	8.1	85.6	5.1	7.2	87.7	5.4	7.5	87.1
Between 46 and 64	11.9	5.5	82.7	10.8	5.3	83.9	11.1	5.3	83.6
Over 64	44.5	2.0	53.5	37.9	5.0	57.1	39.4	4.3	56.3
Total	28.2	27.4	44.5	26.0	24.0	50.0	26.7	25.0	48.3

Source: Own calculations based on CSES 2009

Box 1: Poverty measures in Cambodia

Poverty in Cambodia is measured using living standard surveys. The Socio Economic Survey of Cambodia (SESC) was conducted in 1993/4 and 1996, followed by the Cambodian Socio Economic Survey (CSES), which was carried out in 1997, 1999, 2004, 2008 and 2009 (data for 2010 and 2011 were collected, but poverty estimations were not available while writing this report). Since 2004, the CSES has been improved and standardized in order to make future comparisons more reliable. Sample sizes for CSES 2004 and 2009 included around 12,000 households, while the others had smaller samples with around 3,600 households. Poverty lines are defined at the level of daily per capita consumption for food and non-food items in current prices for three regions (i.e. Phnom Penh, other urban and other rural) (NIS, 2010a).

The food poverty line is based on a basket containing 2,100 Kcal per capita per day. A minimum cost of “essential” or “basic” non-food goods and services is added to obtain the total poverty line. Poverty lines were estimated in 1997 for the base line poverty estimations (1993/94), after which they have been adjusted by inflation. In 2011 a team of analysts developed an “updated” methodology; however it is still under discussion by the Government of Cambodia. Due to methodological differences only measures for 2004 and 2009 are fully comparable. However, it is clear that poverty has been decreasing rapidly, especially between 2004 and 2009 as the poverty headcount ratio was reduced by more than 50%.

	1993/4	2004		2007	2009 ⁽³⁾	
		Original	Updated ⁽³⁾		Original	Updated
Food poverty line (KHR per day in Phnom Penh prices)	1,185 ⁽¹⁾	1,782 ^(1,2)	2,284 ⁽³⁾	2,447 ⁽²⁾	3,395 ⁽³⁾	3,681 ⁽³⁾
Total poverty line (KHR per day in Phnom Penh prices)	1,578 ⁽¹⁾	2,351 ^(1,2)	3,749 ⁽³⁾	3,092 ⁽²⁾	4,185 ⁽³⁾	5,716 ⁽³⁾
Food poverty (headcount index)	20.0% ⁽¹⁾	19.7% ^(1,2,3,4) 14.2% ^(1*) 19.7% ^(2**)	22.8% ^(3,4)	18.0% ⁽²⁾	7.4% ^(3,4)	7.0% ^(3,4)
Total poverty (headcount index)	39.0% ⁽¹⁾ 47.0% ^(5**)	34.7% ^(1,2,3,4) 28.0% ^(1*) 34.8% ^(2**)	62.0% ^(3,4)	30.1% ⁽²⁾	14.6% ^(3,4)	30.1% ^(3,4)
Gini coefficient (consumption per capita)	0.347 ⁽¹⁾	0.396 ^(1,2,4) 0.403 ^(1*) 0.393 ^(2**)	0.327 ⁽⁴⁾	0.431 ⁽²⁾	0.354 ⁽⁴⁾	0.327 ^(3,4)

Sources: (1) RGC (2006); (2) World Bank (2009); (3) Analysis team from National Institute of Statistics (NIS), General Directorate of Planning, Economic, Social and Cultural Council (ECOSOCC) and the World bank (Preliminary estimations); (4) Own calculation using CSES 2004 and 2009 based on available consumption aggregates and poverty lines from (3). (5) RGC (2011a).

(*) 1993/4 comparable subsample; (**) 2007 comparable subsample.

In addition, the RGC started in 2005 the ID-Poor project with support of GIZ. This project aims to identify poor household and has been progressively expanded. It is expected to cover the whole country by the end of 2012. The programme includes two categories to differentiate between the extreme poor (ID-Poor 1) and poor (ID-Poor 2). Based on ID-Poor, it is estimated that 3.6 million persons (26.7%) are living in poverty (Hennicot, 2012b).

Table 2 provides an overview of the main socio-economic indicators based on the objectives included in the various national strategic documents. Net enrolment in primary education increased from 87% in 2001 to 95% in 2009, while the ratio for lower secondary enrolment has improved from 19% to 32%. Overall, the literacy rate of the population (between 15 and 64 years old) increased from 69.7% to 79.6% between 1998 and 2008 (NIS, 2010b). While access to education shows important improvements towards the achievement of the CMDG, access to lower secondary education remains a challenge. Unfortunately, no information is available on the quality of education (Table 2). The average years of education increased from 4.8 (5.9) in 2004 to 5.6 (6.5) in 2009 for persons over 5 years old (working age, respectively). However, school attendance decreased from 93.3% (67.0%) in 2004 to 89.2% (59.6%) in 2009 for children between 12 and 14 (15 and 17) years old (Tables 34 and 35 in Annex 2).

Infant and under-five mortality rates reduced significantly since 1998. Under-five mortality decreased from 124 per 1,000 live births in 1998 to 83 in 2005 and 54 in 2010. However, maternal mortality rates increased from 437 per 100,000 live births in 1997 to 461 in 2008 (new estimates for 2009 show a value of 206 (RGC, 2012)). The prevalence of underweight among under-five children has not changed between 2005 and 2010, after its decrease from 38% in 2000 to 28% in 2005. Finally, increased access to “improved sanitation” is reported from 56% in 1998 to 82% in 2008 for urban areas, and from 6% to 23% for rural areas (Table 2).

The health status of the population has been improving over the last decade, especially with regards to children. The RGC has introduced several reforms in order to improve access and quality of health care. However service quality is still an issue in Cambodia. Management capacity, low salaries and inadequate skills should be addressed. Currently, health sector financing comes from several sources. Total health expenditures are estimated at around 7.2% of GDP (USD 859 million) in 2010. Government expenditures account for 17.8% (USD 153 million) of the total, while Out-of-Pocket payments (OOP) are estimated at 54.1% (USD 465 million or USD 33.5 per person). The difference (28.1%, USD 241 million) is covered by ODA and NGO funding. OOP is concentrated in private facilities (54%), followed by public centres (33%), and payments abroad (11%) (Hennicot, 2012a).

Around 95% of households own a house. Living standards with respect to housing and utilities are still low. Access to electricity increased from 12.7% in 2004 to 25.6% in 2009. Wooden planks are the most prevalent types of floors, especially in rural areas where 84.1% of households report to have wooden floors compared to 19% in urban areas. 61.1% of households do not have access to safe toilet facilities. Private businesses are widespread. Three out of five households own a business in Phnom Penh, compared to one out of four in rural areas. 90.3% of rural household are engaged in forestry and hunting activities, and 83% have access to a land plot and own livestock. With respect to durable goods, 68% of household own a bicycle, while only 16.3% have an electric kitchen or gas stove, and as few as 4.2% have a refrigerator (Tables 38 and 39 in Annex 2).

Table 2: Socio-economic overview in the context of national strategic documents

Area	NSDP	CMDG	Current Situation
Poverty alleviation	<p>Decrease poverty headcount (national poverty line) to 19.5% in 2015</p> <p>Decrease poverty headcount (food poverty line) to 10% in 2015</p>	<p>Decrease poverty headcount (national poverty line) to 19.5% in 2015</p> <p>Decrease poverty headcount (food poverty line) to 10% in 2015</p> <p>Increase the share of poorest quintile in national consumption to 11% in 2015</p> <p>Decrease the proportion of working children (5 – 17 years old) to 8% in 2015</p>	<p>47.0% in 1993 30.1% in 2007 (CSES)</p> <p>24.0% in 1993 18.0% in 2007 (CSES)</p> <p>8.5% in 1993 6.6% in 2007 (CSES)</p> <p>16.7% in 2002</p>
Economic growth	Real GDP growth rate at average 7% per year		<p>6.7% in 2008 (SNEC) 0.1% in 2009 (SNEC) 6.0% in 2010 (SNEC) 6.4% in 2011 (SNEC, expected)</p>
Education	Net enrolment ratio in primary and lower secondary education (99% and 48% in 2013, respectively)	<p>Improve net enrolment ratio in primary and lower-secondary education to 100% in 2010 and 2015, respectively</p> <p>Improve the ratio of girls to boys in primary and lower-secondary education to 100% in 2010</p>	<p>Primary: 87.0% in 2001 (RGC) 94.8% in 2009 (RGC)</p> <p>Lower secondary: 18.9% in 2001 (RGC) 31.9% in 2009 (RGC)</p> <p>Gender parity index (2008): 0.99 (Primary) (RGC) 1.12 (Lower secondary) (RGC)</p>
Health	<p>Under-five mortality rate (70 per 1,000 live births in 2013)</p> <p>Infant mortality rate (55 per 1,000 live births in 2013)</p> <p>Maternal mortality rate (150 per 100,000 live births in 2013)</p>	<p>Reduce under-five mortality rate to 65 per 1,000 live births in 2015</p> <p>Reduce infant mortality rate to 50 per 1,000 live births in 2015</p> <p>Reduce maternal mortality ratio to 140 per 100,000 live births in 2015</p>	<p>124 per 1,000 in 1998 83 per 1,000 in 2005 (CDHS) 54 per 1,000 in 2010 (RGC, 2012)</p> <p>95 per 1,000 in 1998 66 per 1,000 in 2005 (CDHS) 60 per 1,000 in 2008 (Census) 45 per 1,000 in 2010 (RGC, 2012)</p> <p>437 per 100,000 in 1997 472 per 100,000 in 2005 (CDHS) 461 per 100,000 in 2008 (Census) 206 per 100,000 in 2010 (RGC, 2012)</p>
Nutrition		Decrease the prevalence of underweight (weight for age <2 SD) children under-five years of age to 22% in 2015	<p>38.4% in 2000 (CDHS) 36.7% in 2004 (CSES) 28.2% in 2005 (CDHS) 28.8% in 2008 (CAS) 29.6% in 2009 (CSES) 28.3% in 2010 (CDHS)</p>
Sanitation	Access to sanitation	Increase the proportion of urban and rural population with access to improved sanitation to 74% and 30%, respectively, in 2015	<p>Urban households: 56% in 1998 (Census) 82% in 2008 (Census)</p> <p>Rural households: 6% in 1998 (Census) 23% in 2008 (Census)</p>

Source: RGC (2009 and 2011a), NIS (2010a and 2011b), SNEC (2011) and CamNut (2012)

1.2. Government Strategies for Socio-economic Development

Despite important socio-economic improvements, the level of vulnerability is still high for most Cambodians. People are exposed to vulnerable employment, natural disasters, malnutrition, lack of basic infrastructure, low quality of health care and low levels of human capital. While achieving an average economic growth rate of 7% seems feasible if social and political stability is maintained and foreign investors stay in the country, the aforementioned risks may limit socio-economic opportunities in the long term. This may also constrain the opportunities for Cambodia within the current plans of a more integrated ASEAN community in 2015 resulting in a greater flow of services and (skilled) human capital. In this sense improving social protection is not just important to cover basic needs and bring people out of current deprivation, but also as a mechanism to guarantee future development and to sustain economic growth. In order to address the different socio-economic challenges for development in Cambodia, the Royal Government (RGC) has launched different strategic plans: i) The Rectangular Strategy for Growth, Employment, Equity and Efficiency, Phase II (RS), ii) The National Strategic Development Plan (NSDP), and iii) the National Social Protection Strategy for the Poor and Vulnerable (NSPS).

The Rectangular Strategy for Growth, Employment, Equity and Efficiency, Phase II (RS), was presented by the Prime Minister in September 2008, covering a five year period, at the beginning of the fourth legislature of the National Assembly. The RS is the Socioeconomic Policy Agenda of the RGC. It establishes as objectives the enhancement of good governance and the promotion of economic growth, in order to ensure sustainable development and poverty reduction. The fundamentals of the RS are to ensure: i) peace and political stability; ii) sustainable economic growth at around 7% per year; iii) equitable distribution of opportunities and the fruits of economic growth; and, iv) environmental sustainability. In relation with social protection the RS focuses on the creation of jobs and ensuring working conditions, and the creation of social safety nets. In addition, the RS includes as priorities: quality education, enhancing health services, gender policies, and population policy (RGC, 2008).

The National Strategic Development Plan 2009-2013 (NSDP) presents nine policy priorities based on the Rectangular Strategy: i) promotion of good governance; ii) enhancement of the context to implement the RS (including peace and political stability, regional and global integration, partnership in development); iii) enhancement of the agriculture sector; iv) rehabilitation and construction of physical infrastructure; v) private sector development and employment (including working conditions and safety nets); and, vi) capacity building and human resource development (including quality of education and health services). Targets of the NSDP are in line with the Cambodian Millennium Development Goals (CMDGs) (RGC, 2009). The CMDG are: i) eradicate extreme poverty and hunger; ii) achieve universal primary education; iii) promote gender equality and empower women; iv) reduce child mortality; v) improve maternal health; vi) combat HIV/AIDS, malaria and other diseases; vii) ensure environmental sustainability; viii) forge a global partnership for development; and, ix) demining and victim assistance. These nine goals include 25 targets (RGC, 2011a).

In 2011, the RGC launched the National Social Protection Strategy for the Poor and Vulnerable (NSPS) with the objective to “contribute not only to the rehabilitation and stability of the economy in the near future, but also to the enhancement of human capital indicators, including those on education, health and livelihoods development, towards the longer-term achievement of the Cambodian Millennium Development Goals (CDMGs) in 2015”, as mentioned by the Prime Minister in April 2011 (RGC, 2011b). Social protection is seen as a mechanism to protect people against different kinds of risk, and to bring the poor out of poverty. The key risks identified in Cambodia are: i) emergencies and crises, ii) human development constraints, iii) seasonal unemployment and income insecurity, and, iv) health shocks. Emergencies and crises are related with the impact of external shocks, and the vulnerability to natural disasters such as floods and droughts. Human development constraints are present in the form of malnutrition⁸, food insecurity (especially during lean season, natural disasters and economic shocks), illiteracy, repetition and dropout. Income insecurity is related with vulnerable employment (unpaid and self-employed workers), which affected up to 82.5% of workers in 2010. Due to low productivity activities, wages do not compensate for higher education. Finally, health shocks may trap people in vicious poverty cycles (RGC, 2011b).

The NSPS recognizes four vulnerable groups: i) infants and children (which represents more than one third of the population), ii) girls and women at reproductive age, iii) households vulnerable to food insecurity and unemployment, and, iv) special vulnerable groups, including ethnic minorities, elderly, children and youth at-risk, orphans, veterans, homeless people, people with disabilities, victims of violence and people living with HIV (RGC, 2011b). The NSPS considers as social protection different instruments “to protect individuals, households and communities against the financial, economic and social consequences of various risks, shocks and impoverishing situations and to bring them out of poverty” (RGC, 2011: 3).

Priority groups (e.g. children and elderly) differ with respect to their vulnerabilities. The main vulnerability of the elderly is related with income insecurity due to their reduced capacity to generate income. The currently low old-age dependency ratio can serve as an argument for the introduction of social pensions. The vulnerability of children is related with low access to quality education and health care services, food insecurity and malnutrition among others. While mortality rates have decreased and life expectancy at birth has increased (60.5 years for men, and 64.3 years for women), the general situation is still below international standards. This is mainly due to low sanitation conditions and low health care quality (Hennicot, 2012a).

One of the main elements of the NPSP is the Social Safety Net (SSN) programme, which includes public work programmes (PWP)⁹, social transfers¹⁰ and targeted subsidies¹¹, and which is to be financed out of general revenues (taxation and/or official development

⁸ “Malnutrition is caused by inadequate infant and young child feeding practices, high levels of infectious disease and inability to access and afford nutritious food” (RGC, 2011: 22).

⁹ Infrastructure programs with a component of food/cash for work.

¹⁰ Including conditional and unconditional transfers, both in cash or in-kind.

¹¹ To facilitate access to public facilities, health services, education and housing among others.

assistance (ODA)) (RGC, 2011b: 17). The SSN have as objectives to promote access and utilization of social services and then to promote human development, but also to support engagement in economic activities. In this sense the final objective is to promote socio and economic development. The NSPS also includes labour market policies, social insurance and complementary social welfare services (RGC, 2011b). The vision of the NSPS includes targeted transfers to the poor as well as contributory social protection schemes. The goal is to increasingly protect the poor and vulnerable against chronic poverty and hunger, shocks, destitution and social exclusion and benefit from investments in their human capital (RGC, 2011: 48). In order to achieve this goal, five objectives have been included in the NSPS (Table 3), which are related with vulnerable groups, seasonal unemployment and human capital constrains.

Table 3: NSPS objectives and social protection instruments (SPI)

Objective	Potential Social Protection Instruments
1. The poor and vulnerable receive support to meet their basic needs, including food, sanitation, water and shelter, etc., in times of emergency and crisis.	<ul style="list-style-type: none"> - Food and other in-kind transfers, - Cash transfers, and - Cash/food for work schemes.
2. Poor and vulnerable children and mothers benefit from social safety nets to reduce poverty and food insecurity and enhance the development of human capital by improving nutrition, maternal and child health, promoting education and eliminating child labour, especially its worst forms.	<ul style="list-style-type: none"> - Food and other in-kind transfers, - Cash transfers, and - School feeding / take home rations.
3. The working-age poor and vulnerable benefit from work opportunities to secure income, food and livelihoods, while contributing to the creation of sustainable physical and social infrastructure assets.	<ul style="list-style-type: none"> - Labour intensive PWP, and - Cash/food for work schemes.
4. The poor and vulnerable have effective access to affordable quality health care and financial protection in case of illness.	<ul style="list-style-type: none"> - Health Equity Fund (HEF), and - Community Based Health Insurance (CBHI).
5. Special vulnerable groups, including orphans, the elderly, single women with children, people living with HIV, patients of TB and other chronic illnesses, etc., receive income in-kind and psychosocial support and adequate social care.	<ul style="list-style-type: none"> - Food and other in-kind transfers, - Cash transfers, and - Social pensions.

Source: RGC (2011b: 53-54).

Social protection in Cambodia can be identified by sector-schemes, which include government interventions and programmes of international organizations and local NGOs. The Council for Agricultural and Rural Development (CARD) has the mandate to coordinate the development, implementation and monitoring and evaluation of the NSPS. The concerned line Ministries include Social Affairs, Veterans and Youth Rehabilitation (MoSVY), Health (MoH), Education, Youth and Sports (MoEYS), Women’s Affairs (MoWA) and Labour and Vocational Training (MoLVT). Some Ministries already attempt to combine infrastructure with food security and income generation activities, through public works programmes (PWP). These Ministries are MoEYS, Agriculture, Forestry and Fisheries (MAFF), Public Works and Transport (MPWT), Rural Development, and Water Resources and Meteorology

(MoWRAM). Finally, the Ministry of Economy and Finance (MEF) and the Ministry of Interior (MoI) support decentralization processes; and the Ministry of Planning (MoP) for identifying and targeting the poor, through the Identification of Poor Households Programme (IDPoor).

Despite the participation of a large range of Ministries and the presence of numerous of international organizations, Cambodia does not have any social protection instrument (SPI), which is implemented nationwide. The available programs, their design, coverage and quality of services vary across regions and programmes (RGC, 2011; Hennicot, 2012a). However, some areas of intervention have generated positive results and there are current efforts to scale them up: i) food and nutrition (e.g. food distribution, school feeding and food for work programmes), ii) health (e.g. Health Equity Funds (HEF) and Community Based Health Insurances (CBHI)), iii) education and training (e.g. scholarships and training programmes), iv) social welfare and work conditions, and, v) labour market interventions (RGC, 2011b). The RGC has introduced several laws¹² related to social protection, and the Constitution also stipulates the role of the State in protecting citizens and providing social protection. Table 4 provides a general overview of the different social protection instruments that have been implemented in Cambodia.

¹² Labour Law (1998), Social Security Law (2002), The Law on the Common Status of Civil Servants (1994), National Disability Law (2009), Insurance Law (2000), The Law on Suppression of Kidnapping, Trafficking, and Exploitation of Human Persons (1994), among others.

Table 4: Current Social Protection Instruments

Social Protection Scheme / Instrument	Benefits	Coverage	Expenditure / Financing
National Social Security Fund for Civil Servants (NSSF-C) <i>Since 2008</i>	Retirement, invalidity and survivor pensions; maternity leave; sick leave; sickness cash benefits; employment injury benefits; and, health care.	Civil servants: 175,025 Pensioner: 36,079 Dependents: 464,180 Total: 675,284 (4.9%)	~ USD 22.7 million (2009) / MoSVY
National Fund for Veterans (NFV) <i>Since 2010</i>	Sickness cash benefits, maternity, marriage allowance, work-injury, retirement, invalidity and death benefits.	Member of the Armed Force, National Policy Force and War Veterans Pensioners: ~ 199,000 (1.4%)	~ UD 19.2 million (2010) / MoSVY
National Social Security Fund (NSSF) <i>Since 2002</i>	Medical care, nursing cash allowance, disability allowance, death benefits, survival benefits and rehabilitation benefits. Planned: Social health insurance and pensions.	Employment insurance fund: 480,446 insured persons in 2010 (~ 3.5%)	Total: ~ USD 1.3 million (2010) / Employers and Government subsidy. <i>Benefits: ~ USD 0.6 million</i> <i>Administration: ~ USD 0.5 million</i>
Social Health Protection	User fee exemptions for the poor (since 1996) Health vouchers (since 2011) Health Equity Funds (HEF) (since 2003): costs of users, reimbursement of transportation and food during hospitalization Community Based Health Insurance (CBHI) (since 1998): user fees. Social Health Insurance for Formal Sector Workers. Pilot: Health Insurance Programme for Garment Workers (HIP) (since 2009)	1,630,552 patients in 2010 To pregnant women (9 districts in 3 provinces out of 24) 3.2 million persons in 2010 (~ 700,000 patients) ~ 170,000 persons in 2010 ~ 5,000 workers from 12 factories.	USD 4.6 million (2010) USD 1.2 million (Benefits: 35.7%) (2010)

Social Protection Scheme / Instrument	Benefits	Coverage	Expenditure / Financing
Social Assistance and Safety Net	Social welfare services (poor, elderly, child, people with disabilities), social security (veterans).		USD 63.9 million (Salaries: 76%) (2010) / MoSVY
	Emergency relief operations (EFAP)	18,684 children in 2009	USD 40 million / MEF (ADB)
	Emergency AID		NDMC
	Scholarships for lower secondary education	463,433 pupils in 2009/10	USD 40-50 per person per year / MoEYS (Donors)
	School feeding (since 2001, with WFP)		USD 8.95 million (2010)
	Public Works: - RILGP 2003 – 2010 - EFAP: - Food for work (FFW) - Cash for work (CFW)	146,259 working days (~ 4,900 households) 396,636 working days	USD 17.4 million (2010) / IDA USD 2.5 per day / MEF, Rural Development, MoWRAM, ADB
Active Labour Market Policies (ALMP)	Vocational Training (VT): Technical Education and Vocational Training Programme (TVET)	38 training sites	~ USD 2.1 million (2010) / MoLVT and ADB

Source: Hennicot (2012a).

II. SOCIAL PROTECTION AND SOCIO-ECONOMIC DEVELOPMENT

Social protection is the set of public and private interventions aimed at preventing, reducing and eliminating economic and social vulnerabilities to poverty and deprivation (UNICEF, 2012:14). Social protection covers a broad array of instruments and includes social insurance systems, labour market policies, and formal and informal social safety nets.¹³ It includes all measures providing in-kind and cash benefits (transfers) in case of: i) non or insufficient work related income due to sickness, disability, maternity, employment injury, unemployment, old age, or death of a family member; ii) lack of access to health care; iii) insufficient family support, especially for children and adult dependants; and, iv) poverty and social exclusion (ILO, 2010: 13). Social protection programs help households maintain access to food, energy, education and health. They support families, individuals and communities to better manage risks by helping to prevent, mitigate and cope with adverse events. The objectives of social protection are to reduce poverty and vulnerability, reduce inequality of living standards and opportunities, enhance consumption smoothing capacities of individuals and households, enable households to manage risks and redistribute income between groups and/or over the life cycle (Gassmann, 2011:2).

Social protection mechanisms can be contributory and non-contributory. The first ones are insurance based, while the second group includes social transfers financed by the public budget. Contributory social security provides guarantees and risk-pooling mechanisms that cannot be achieved by individualized systems. However, coverage levels and adequacy of benefits depend on different factors such as the degree of formalized employment and demographic trends. On the other hand, non-contributory social protection has proven to be an effective mechanism to alleviate poverty and to reduce coverage gaps by guaranteeing some level of protection (Cichon et al, 2011).

The Cambodian NSPS promotes social protection with the double objective of protecting people against vulnerabilities and poverty and as an investment for future economic capacity. Given the focus on vulnerable people and the level of informality in Cambodia, the first stage for the implementation of the NSPS concentrates on non-contributory instruments, assumed to be financed mainly by external sources (i.e. ODA). For these reasons and due to data availability issues, the effects of taxation and user fees as well as contributory schemes are not analysed in this study. Furthermore, informal social transfers are not considered because this analysis concentrates on the implementation of the NSPS. However, future research in these areas is recommended for the sustainability of the NSPS.

Socio-economic development is related to the satisfaction of people's needs and wishes, and to the capabilities people have to achieve the life they value. In this sense, socio-economic development can be seen as the sustainable process of interaction between social and cultural,

¹³ Note that there is no single definition of social protection. The ILO definition further includes the provision of health care (ILO 2010:13), while, for example, the World Bank treats labour market policies separately from social protection (Grosh et.al. 2008:5).

political, economic and environmental dynamics that generate and reproduce people's well-being. Final outcomes and their sustainability are what matters to understand development. There is agreement about the importance of dimensions like health, education, inequality, quality of housing, everyday activities (including decent work and leisure), livelihoods, personal and economic security, environmental conditions and the exercise of social, economic, cultural, political and civil rights. Effects at the household level (micro level) have cumulative effects at the aggregate level (macro level), which can be used to assess a country's socio-economic development level.

An important condition for socio-economic development is economic growth. It is necessary to create long-run production capacity, which is a condition for socio-economic development. However, it is not sufficient in the sense that if a society achieves high and sustainable economic growth but no improvements in people's well-being and its distribution, it cannot be considered as development from a meaningful perspective. Hence, socio-economic development should not be seen only from an economic growth perspective. The link between economic growth and socio-economic development depends on social and economic policies, as well as on the institutional framework and the levels of vulnerability, economic inequality and social exclusion.

Socio-economic development can be analysed from its proximate, intermediate and ultimate sources. Proximate sources of economic growth are those directly related with economic output as disembodied technological change (i.e. advances in technological knowledge that are not incorporated in any specific production factor), capital accumulation and labour productivity. Intermediate sources of development include: trends in national and international demand; economic, social and technological policies; and changes in the terms of trade. Finally, ultimate sources of development are related with geographic conditions, demographic trends, social attitudes and capabilities, political and social institutions and class and power relations, among others. It is important to note that the relations among these levels are not linear neither unidirectional. In this sense, while socio-economic outcomes are the objective of development, they also have effects on the different sources (Szirmai, 2011).

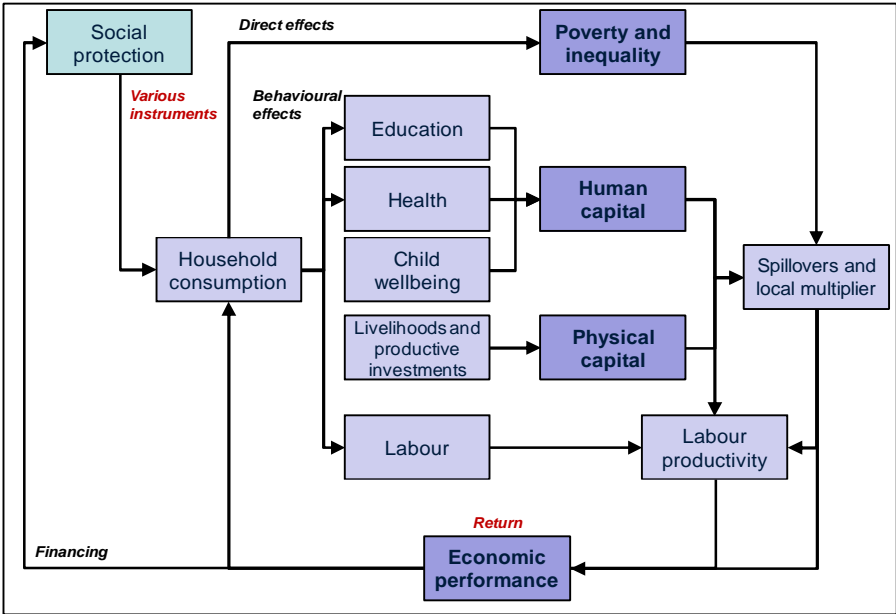
Figure 2 elaborates the analytical framework linking the effects of non-contributory social protection instruments with socio-economic development. Non-contributory social transfers directly affect household disposable income (i.e. distributional effect), and as such income deprivation and inequality. Furthermore there is a positive relation with consumption subject to the marginal propensity to consume. However, changes in disposable income also affect households' behaviour. First, additional and/or secure income encourages households to invest in health, education, child wellbeing and, livelihoods and productive activities. Improving health status, education and child wellbeing increase the level of human capital, while livelihoods and productive investments increase physical capital. Therefore labour productivity increase which return as higher disposable income, creating a virtuous circle of economic development at the micro level.

Second, changes in disposable income affect labour decisions (labour supply). A source of secure income may discourage labour supply if other activities become more valuable (e.g. education, leisure). Hence, social transfers may lead to a reallocation of resources within the household. Foregone income by children attending school instead of working, or elderly retiring may be compensated by working-age household members. In addition, social transfers may generate the opportunity to take up work (e.g. covering transportation costs and reducing financial constraints) or move to another kind of work as the person may afford a longer search period.

Social transfers are likely to be spent locally, thereby generating local and regional economic multiplier effects. Moreover, enhancing local demand may create incentives for third party investments in the region (i.e. spillover effects). Finally, social transfers enhanced social cohesion and affect the institutional framework by reducing inequalities.¹⁴

The effect on the proximate sources of economic growth can be derived by increasing productive capacity through higher labour productivity and investment, and by promoting consumption and fostering local markets. An additional effect is related to institutional and structural changes and public provision of goods and services, which are ultimate and intermediate sources of development. However, productive capacity (economic growth) is necessary for financing social transfers¹⁵, closing the circle in the figure. The whole set of links and dynamics is what at the end generates socio-economic development and contributes to poverty alleviation.

Figure 2: Social protection and socio-economic development



¹⁴ Social protection has proven to affect social cohesion and peace building, as well as empowerment, political participation and gender equality in Africa, Asia and Latin America (Arnold et al, 2011).

¹⁵ While social protection programmes in low-income countries are frequently financed by official development aid (ODA), they are financed by the general budget in mid-income countries. In the latter case, the effects of fiscal policies and contributions on economic performance must also be taken into account.

This framework is consistent with a broad range of literature on the effects of social transfers in developing countries.¹⁶ The remainder of this section briefly presents some empirical evidence about the role of non-contributory social protection on socio-economic development, exploring the links with human development and economic growth. Most of the presented evidence considers short-term impacts, while long-term effects are (yet) rarely studied in developing countries. At the same time the review provides insights into potential methodologies for the estimation of returns on social protection investments. Complementary interventions and design issues to strengthen the effects of social protection are mentioned where relevant, but their discussion is beyond the scope of this study. Additional research to support the specific design of social protection instruments is recommended for the implementation of the NSPS in Cambodia.

2.1. Direct Effects: Poverty and Inequality

Poverty alleviation is at the top of the development agenda, proof of that are the Millennium Development Goals. In addition, there is agreement about the importance of reducing inequalities from a development perspective. In this sense, the first and immediate effect of social transfers is to increase households' disposable income. Social transfers have proven to be an effective mechanism to reduce income deprivation and inequality (i.e. distributional effect). Table 5 presents achievements in different countries. However, the effect depends on the benefit design, level of benefits and target groups (e.g. Notten and Gassmann, 2008), but also on administrative capacity.

Table 5: International evidence of the effect of social transfers in poverty and inequality

Effect	Country	Source
Poverty reduction (headcount): 18.0%	Brazil (social pensions)	Barrientos (2005)
Poverty reduction (headcount): 12.5%	South Africa (social pensions)	Barrientos (2005)
Reduction on the poverty gap: 20%	Mexico (<i>Oportunidades</i> – CCT)	Fiszbein and Schady (2009), cited by Arnold et al (2011)
Reduction on the poverty gap: 47%	South Africa (Child Support Grant)	Samson et al (2004)
Reduction in incomes' Gini coefficient: 3 percentage points	South Africa (Cash Grants System)	EPRI (2011), cited by Arnold et al (2011)
Reduction in incomes' Gini coefficient: ~ 1 percentage point	Brazil (Social pensions and <i>Bolsa Familia</i> – CCT)	Soares et al (2007), cited by Arnold et al (2011)

¹⁶ Some recent surveys and literature reviews are Barrientos and Scott (2008), Barrientos and Niño-Zarazuela (2010), Barrientos et al (2010), Arnold et al (2011), ILO (2012), World Bank (2012) and UNICEF (2012).

The aim to guarantee social protection “is based on the straightforward idea that people who have access to a basic set of goods, services, and transfers are lifted out of poverty or vulnerability and can become more productive contributors to the economy” (Cichon et al, 2011: 5). In this sense, poverty reduction and inequality decline are also linked with economic performance at the micro and macro level. The first are discussed later on in this section, but the multiple and dynamics links between poverty, macro level productive capacity and social protection have to be considered as well. It is because the effects are highly heterogeneous across countries.

There is general agreement about the link between economic growth and poverty reduction. However, it has been estimated that changes in the mean income of the population explain only 26% of the variance of observed changes in poverty headcounts (Bourguignon, 2003: 5). A recent study, using a sample of 96 developing countries (including Cambodia) over the period 1998-2008, estimated an average economic growth elasticity of poverty reduction of -1.0 for developing countries (Perrota, 2010: 10). This means that a 1% increase of the mean income is related with a 1% reduction of poverty. However, the effect differs among countries. Another study estimates an elasticity of -1.0 for East Asia and Pacific countries, followed by Latin American countries (-0.73), South Asian countries (-0.59) and Sub-Sahara African countries (-0.49) (Besley and Burgess, 2003: 8).

The degree of inequality and the institutional framework are the main factors explaining this heterogeneity. The elasticity of economic growth on poverty reduction is lower for countries with higher inequality (Bourguignon, 2003 and 2004; Perrota, 2010). For example, reducing income inequality with one standard deviation may reduce poverty in Latin America by 45%, by 31% for countries in East Asia and Pacific and by 17% for countries in South Asia (Besley and Burgess, 2003: 11).

Bourguignon argues that the growth elasticity of poverty decreases with the level of development (more developed countries show a lower effect) and the degree of inequality (more egalitarian countries have a higher effect). Besides, the elasticity depends on the change of relative incomes (redistribution) over time. From a policy perspective, he concludes that permanent redistribution reduces poverty immediately (distribution effect), but also increases the growth elasticity of poverty reduction permanently. Even more, if a negative relation between inequality and economic growth is accepted, a kind of double dividend is produced in the event of growth acceleration (Bourguignon, 2003). Hence, through its distributional impact, social protection may reduce poverty and inequality, foster economic capacity and raise the effect of future economic growth on poverty reduction.

Bourguignon, using data for developing countries, shows that the same level of poverty reduction can be achieved in 10 years instead of 30 years if inequality is reduced from “very high” to “middle high”, just through economic growth at three percent per year (Bourguignon, 2004: 8). However, the possible effects depend both on the level of development and the degree of inequality. In order to reduce poverty, economic growth is more effective (in

relative terms) in low income and egalitarian countries, while redistribution is more successful in middle income and inegalitarian countries (Bourguignon, 2004: 10).

On the other hand, lower inequality also promotes higher economic growth. For example, under credit market imperfections, additional sources of income for poor households may promote human capital and productive investments without being exposed to higher rates of interests. Besides, reducing inequality may generate lower future expectations of redistribution, higher social cohesion, political stability and peace (Bourguignon, 2004). In this sense, redistribution has a positive effect on ultimate and intermediate sources of economic growth and development.

2.2. Behavioural Effects: Human Capital

Social protection may improve peoples' well-being and opportunities by promoting human capital through behavioural effects related to education, health and nutrition.¹⁷ Social transfers affect household decisions through income (i.e. the response to changes in disposable income) and non-income effects (i.e. the response to the way SPI are implemented or conditioned). Behavioural effects related to various dimensions of human capital are both an objective and a foundation for socio-economic development, eventually fostering economic performance. Human capital affects labour productivity and as such the proximate sources of economic growth. The different dimensions of human capital are closely interrelated. For example, nutrition has a direct effect on cognitive capacity and then on education achievements (e.g. Wisniewski, 2010).

The aim to generate positive non-income (behavioural) effects makes the case for conditional cash transfers (CCT).¹⁸ A CCT programme requires recipients to fulfil different conditions in order to receive the transfer. Furthermore conditionality may generate political will and public support from those not receiving a transfer (Schüring, 2010; Schüring and Gassmann, 2012). Usually, conditions include child school attendance and visits to health care facilities. However, there is evidence to argue that these kinds of effects are produced even without a formal condition through the income effect (e.g. Schady and Araujo (2006); Agüero, Carter and Woolard (2007)). In the case of CCT programs it is not evident to what extent the behavioural effect is due to the cash transfer (i.e. income effect) or due to non-income effects (e.g. the conditions attached), i.e. whether the same results would have been achieved without the condition. Eventually, the potential effects of CCT on health care utilization and schooling depend on the level of coverage, quality of service, elimination of potential access barriers, costs and administrative capacity.

This study, being an ex-ante evaluation of social transfers, concentrates on behavioural effects instigated by higher disposable income (i.e. income effect). Non-income effects are beyond the scope of this study, but future research about these additional effects is recommended in

¹⁷ However other forms of human capital as soft skills (e.g. personality and social traits, communication abilities, critical thinking, team work, leadership, entrepreneurship) should also be promoted.

¹⁸ For a comprehensive review of CCTs see Schüring (2010) and, Fiszbein and Schady (2009).

order to generate evidence that can support the specific design of SPI. It is important to note that excluding non-income effects from the analysis may actually underestimate the effects of social protection investments.

2.2.1. Health

There are several studies that provide evidence about the positive effects of different social transfers on food consumption and health status of the population (Table 6). The programs reviewed differ in design, scope and coverage. However the main determinants for a positive effect are size and periodicity of the transfer, the target group and complementary investments. Permanent and higher benefits generate stronger effects due to income security. Furthermore, targeting children at early ages is more likely to have sustainable effects. Finally, complementary programmes to guarantee access to quality food and health care determine the likelihood of a potential effect (Arnold et al, 2011).

Table 6: International evidence of the effect of social transfers on food consumption and health status

Effect	Country	Source
Food Consumption		
Improving food security: 7.8 million people	Ethiopia (Productive Safety Nets)	Devereux and Coll-black (2007), cited by Arnold et al (2011)
Percentage of transfer spent on food: ~ 75%	Malawi (CCT)	Vincent and Cull (2009), cited by Arnold et al (2011)
Increase in food consumption: 165%	Bolivia (<i>BONOSOL</i>)	Arnold et al (2011)
Change in food share: [1.9 , 4,3] percentage points higher.	Ecuador (<i>Bono de Desarrollo Humano</i> – CCT)	Schady and Rosero (2008)
Health and nutrition		
Increase in health visits: 18%	Mexico (<i>Oportunidades</i> – CCT)	Barrientos and Scott (2008)
Increase in children immunisation: 30%	Peru (<i>Juntos</i>)	Jones et al (2008), cited by Arnold et al (2011)
Increase in immunisation coverage: 45% to 98%	Bangladesh (Ultra Poor programme)	Arnold et al (2011)
Expected average gain in height: 3.5 cm	South Africa (Child Support Grant)	Agüero, Carter and Woolard (2007)
Increase in height (children, after 10 weeks): 0.12 mm	Bangladesh (Cash for work)	Mascie-Taylor et al (2010), cited by UNICEF (2012)
Reduction in malnutrition: 1.7 times greater than national trend	Nicaragua (RPS – CCT)	Maluccio and Flores (2004), cited by Arnold et al (2011)
Reduction in starvation: from 19% to 48%	Lesotho (Social pension)	Vincent and Cull (2009), cited by Arnold et al (2011)
Gain in children weight (children, after 10 weeks): 0.17 Kg	Bangladesh (Cash for work)	Mascie-Taylor et al (2010), cited by Arnold et al (2011)
Gain in newborns weight (urban areas): 0.58 Kg	Colombia (<i>Familias en Acción</i> – CCT)	Attanasio et al (2005), cited by UNICEF (2012)
Reduction on the incidence of illness (children): 12.5%	Malawi (Mchinji CT)	Miller et al 2008, cited by Arnold et al (2011)
Reduction on the incidence of diarrhoea: 10.5 percentage points (children under 24 months)	Colombia (<i>Familias en Acción</i> – CCT)	Attanasio et al (2005), cited by Arnold et al (2011)
Reduction on maternal mortality: 11%	Mexico (<i>Oportunidades</i> – CCT)	Adato and Bassett (2008), cited by Arnold et al (2011)

2.2.2. Education

In the case of education, international evidence is highly conclusive about a positive effect of social transfers on school attendance (Table 7). Social transfers increase the disposable income and, by reducing costs barriers, have a positive effect on school enrolment and attendance. Nevertheless, the size of the transfer has to be high enough to cover opportunity costs (e.g. income generated if working) and other school related costs such as school supplies, transport or clothing. The effect differs depending on the context. In a situation of low school enrolment, high rates of drop out or inequalities between boys and girls a higher effect is normally achieved. In addition, a positive effect may be generated if low rates of school attendance are due to financial constraints. The effect on educational achievements is less clear as it depends on coverage and quality of the education system (e.g. Ponce and Bedi, 2010). Finally, low quality education and low expectations of future labour opportunities reduces the perception of benefits for education investments, reducing any potential effect. If supply side factors are the predominant reason for low school enrolment and attendance, investments in building schools or increasing teacher salaries may generate even larger effects.

Table 7: International evidence of the effect of social transfers on education

Effect	Country	Source
Increase in school enrolment: 10%	Ecuador (<i>Bono de Desarrollo Humano</i> – CCT)	Schady and Araujo (2006)
Increase in school enrolment: 11 percentage points (girls between 11-14 years)	Pakistan (Pujab Programme)	Chaudhury (2008), cited by Arnold et al (2011)
Increase in school enrolment: 5 percentage points (children between 6-17 years)	Malawi (Social Cash Transfer Programme)	Handa and Stewart (2008), cited by Arnold et al (2011)
Increase in school enrolment: 30 percentage points (secondary school)	Cambodia	Arnold et al (2011)
Increase in certificated pass rate: 24 percentage points	Bangladesh (Female Secondary School Assistance Programme)	Arnold et al (2011)
Increase in the probability to complete high school: 4-8 percentage points	Colombia (<i>Familias en Acción</i> – CCT)	Alam et al (2011), cited by UNICEF (2012)
Reduction in one day absence incidence: 20%	Brazil (<i>Bolsa Familia</i> – CCT)	Veras et al (2007), cited by Arnold et al (2011)
Reduction in drop out incidence: 63%	Brazil (<i>Bolsa Familia</i> – CCT)	Veras et al (2007), cited by Arnold et al (2011)

It is important to note that a higher level of education generally has a positive effect on wages and household income (i.e. micro level economic effect). There is strong evidence of a

positive relation (Table 8);¹⁹ however, it shows differences among education level and economic sector. Schady (2000) estimated a return between 0.11 and 0.15 for male wage earners in the Philippines. It means that an additional year of education is related with an increase in income between 11% and 15%. However, the returns are different between education levels, but also depend on a country's development level, the structure of the labour market and economic productivity. In the case of tertiary education the effect is between 16% and 20%, in comparison with 6%-9% for primary education. In the case of household income, Jolliffe (2002) estimates a return of an additional year of education (households' maximum level of education) between 4% and 5%, but with clear differences between farm and off-farm incomes (household's median level of education).

Table 8: International evidence of the returns on education

Effect	Country	Source
Return to education for male wage earners: Mean: [0.110 , 0.148] Primary education: [0.062 , 0.094] Secondary education: [0.060 , 0.100] Tertiary education: [0.162 , 0.196]	Philippines	Schady, 2000
Return to education for households: Total income: [0.037 , 0.052] Farm income: [0.069 , 0.118] Off-farm income: [0.185 , 0.250]	Ghana	Jolliffe, 2002

2.3. Behavioural Effects: Child Well-being

Children represent the majority of the poor, being highly deprived in monetary and non-monetary dimensions of well-being (Minujin and Shailen, 2012). Children growing up in poor families are disadvantaged in many areas. For example, the chances that they get appropriate health care or obtain appropriate schooling are lower compared to children from non-poor families. Furthermore child deprivation in dimensions as nutrition has a direct effect on other dimensions (e.g. on education due to lower ability to learn), and then reduces the opportunities to overcome poverty in the future (UNICEF, 2000 and 2012). Child poverty and vulnerability affect the quality of life and reinforce intergenerational poverty transmission, but they also affect the quantity of life as child mortality rates are closely related with the level of poverty (Barrientos and DeJong, 2004 and 2006).

Child well-being is an important factor for the socio-economic development of a country as it determines the capacity of the future generations. It is a multidimensional concept including both monetary and non-monetary dimensions. The potential effects of social protection are crucial from a human rights perspective, but also for socio-economic development. The Convention on the Rights of the Child establishes the right to benefit from social protection and an adequate living standard for children's physical, mental, spiritual, moral and social development. Social protection increases child well-being (Table 9), promotes human development, breaks the intergenerational transmission of poverty, and increases future

¹⁹ Additional estimations can be found in Bennell (1998), Psacharopoulos and Patrinos (2002) and Schultz (2003).

capabilities and labour productivity (UNICEF, 2012). The definition of child well-being not only determines the policy objectives. It also influences the design of SPI and how its effectiveness is measured.

Social protection provides resources and incentives to invest in human capital (i.e. health, nutrition and education) especially for children and youths (Adato and Bassett, 2009) (Tables 6 and 7), and to reduce child labour (Table 11). However, the final effect of social transfers on children depends on how resources are allocated within a household. Children depend on the altruism of their caregivers for their well-being. In this sense the design must take into account specific social and cultural norms in order to promote the desirable effects. For example, orphans, street children and child-headed households must be considered under special conditions to guarantee their inclusion.

The potential effects of social transfers with respect to the reduction of child labour, increasing school attendance and improving nutritional status depend on the level of the benefit (i.e. amount of the transfer) and the provision and quality of local services (e.g. school, health facility, food markets, safe water, sanitation infrastructure). In this sense social protection programmes that aim to increase and guarantee child well-being must take into account its multidimensionality (including rights protection), and have to be implemented together with complementary policies, as part of a comprehensive human development strategy.

Table 9: International evidence of the effect of social transfers on child well-being

Effect	Country	Source
Child poverty reduction (headcount): 40%	Hungary (Family allowance)	Forster and Tóth (2001), cited by Barrientos and DeJong (2004 and 2006)
Child poverty reduction (headcount): 25%	Poland (Family allowance)	Forster and Tóth (2001), cited by Barrientos and DeJong (2004 and 2006)
Improvement in cognitive development (3-6 years old children in the poorest quintile): 0.25 standard deviations	Ecuador (<i>Bono de desarrollo humano – CCT</i>)	Paxson and Schady (2008), cited by UNICEF (2012)
Improvement in the number of registered under 5 children: 310% in 7 months.	Nepal (Child Grant Programme – CCT)	IRIN (2010), cited by UNICEF (2012)

2.4. Behavioural Effects: Livelihoods and Productive Investments

Livelihoods are defined as the capabilities, assets and activities for a means of living. This notion includes the different assets or endowments: human, social, natural, financial and physical capitals (DFID, n.d.). Secure sources of income protect productive assets that otherwise may have to be sold in case of emergencies (e.g. illness). Besides, it allows households to solve liquidity and credit constraints fostering livelihood diversification and productive investments. International evidence (Table 10) suggests that households receiving

social transfers spend part of it to improve productive activities. Individual multipliers have been found to be around 1.2 and 2.0. In this sense the effect of transfers on household income is higher than the amount received as a direct benefit, which means that the transfer allows households to increase their income generation activities.

Evaluation studies of social transfers in Bolivia, Mexico and Malawi show that households receiving cash transfer have higher levels of investment on agricultural production and livestock (Gertler et al (2005) and Martinez (2007), cited by Barrientos and Sabatés-Wheeler, 2009; Miller, 2011). These investments generate additional income for the households. In this sense social transfers reduce poverty, but also provide means to increase income generation activities and self-sufficiency providing opportunities to overcome poverty permanently.²⁰ The aspects of promotion and transformation (Devereux and Sabates-Wheelerr, 2004) are ideally part of any comprehensive social protection program. As such, success could be defined as a household graduating from social protection, i.e. it escaped poverty. However, graduation from SPI is still a largely neglected discussion.

Table 10: International evidence of the effect of social transfers on households' investments

Effect	Country	Source
Productive investments: Farming: 15% of households Livestock: 8% of households	Ethiopia (Productive Safety Nets Programme)	Devereux et al (2006), cited by Arnold et al (2011)
Increase in productive investment: ~ 100%	Zambia (Kalomo Social Cash Transfer)	Scheuring (2008), cited by Arnold et al (2011)
Increase in agriculture investments: [45% , 50%]	Paraguay (CCT)	Soares et al (2010), cited by Arnold et al (2011)
Increase of livestock investments: 6%	Paraguay (CCT)	Soares et al (2010), cited by Arnold et al (2011)
Household's income multiplier: [1.20 , 1.97]	Mexico (<i>Oportunidades</i> – CCT)	Sadoulet et al (2001) and Gertler et al (2005), cited by Barrientos and Sabatés- Wheeler (2009)
Household's consumption multiplier: ~ 2	Bolivia (<i>BONOSOL</i>)	Martinez (2007), cited by Barrientos and Sabatés- Wheeler (2009)

2.5. Behavioural Effects: Labour

Social protection has the potential to increase labour productivity through human capital accumulation. The effect on labour decisions can be analysed by productive investments (self-employment) but also by higher labour market participation and labour mobility between formal and informal activities and economic sectors. Despite the argument that higher and secure income may reduce labour supply due to a substitution effect, it is likely that in the

²⁰ This effects on livelihoods generates the idea of “graduation” from transfers (e.g. Sabates-Wheeler and Devereux, 2010)

case of poor households the cost of leisure is still too high. International evidence (Table 11) suggests that indeed social transfer may have a positive effect on labour supply, while reducing child work. Furthermore, there is also evidence pointing at an extension of unemployment (e.g. Gonzales-Rosada and Llerena, 2011). Negative effects may be generated if the transfer effectively compensates the cost of leisure. It is an important issue to be considered for the design of social transfers.

Table 11: International evidence of the effect of social transfers on labour decisions

Effect	Country	Source
Increase in labour market participation: 11%	South Africa (Social pension)	Samson et al (2004), cited by Arnold et al (2011)
Increase in labour market participation: 2.6 percentage points	Brazil (<i>Bolsa Familia</i> – CCT)	Oliveira et al (2007), cited by Arnold et al (2011)
Reduction in child work: 17%	Ecuador (<i>Bono de Desarrollo Humano</i> – CCT)	Schady and Araujo (2006)
Reduction in child work: 11% (paid work)	Cambodia	Filmer and Schady (2009), cited by Arnold et al (2011)
Reduction in child work: 26%	Brazil (Programme for Eradicating Child Labour)	Rawlings and Rubio (2003), cited by Arnold et al (2011)

2.6. Spillover Effects and Local Multipliers

The effect of social protection on the local economy can be seen by three mechanisms. First, spillover occurs when the actions of those receiving social transfers generates positive externalities on their neighbours. For example, demonstration effects have been found in Mexico, where non-beneficiary households have also increased health care utilisation and school attendance (Handa et al, 2001). Second, strategic complementarities occur when the beneficiaries of social transfers adapt to a new situation, and then improve the environment for others (e.g. higher local demand of goods and services may increase investments from local business). Finally, local or regional multipliers appear when the benefit of a collective action is higher than the one generated by an individual response (e.g. households use a proportion of the transfer to consume on the local market, then this action is replicated, generating an economic multiplier) (Barrientos and Sabatés-Wheeler, 2009: 5-6)

Evidence of local economies enhancement has been found in different countries. In Mexico an evaluation of the effect of cash transfers on non-eligible households shows that consumption was 12% higher in comparison with households in regions where cash transfers were not provided, after two years of implementation. Positive effects are also found for the ownership of assets (land and livestock) (Barrientos and Sabatés-Wheeler, 2009: 5-6). The effect of social transfers on the local economy depends on the type of transfers and on how households use it. In the case of households receiving cash transfer the marginal propensity to

consume locally²¹ has been estimated at 0.96 in Zimbabwe (Staunton, 2011) and between 0.75 and 0.96 in Mexico (Barrientos and Sabatés-Wheeler, 2009).

Regional multipliers of social transfers have been calculated using a social accounting matrix approach or a minimum requirements method. The results of some studies are presented in table 12. In the case of cash transfers as an exogenous shock to a region, it has the potential to generate an economic multiplier of 2.02-2.59. This means that each monetary unit injected in the region is expanded between two and two and a half times locally. It is important to note that in-kind transfers will have a lower effect as they can be consumed only once (multiplier of 1).²² Estimations for food aid multipliers provided values between 1.17-1.67 in Zimbabwe (Staunton, 2011). In-kind transfers can produce a multiplier if the household sells a part of the goods it is receiving.

However, in order to interpret a multiplier in terms of its effect on economic growth, the supply side must have the capacity to immediately react to a higher demand. Evidence from Malawi shows that local business increases their levels of sales because of the higher demand from beneficiaries of cash transfers (Miller, 2011). Similar effects on local businesses have been found in Brazil (Hanlon et al, 2010). Evidence about enhancing productive investment from beneficiaries and non-beneficiaries provides arguments for an expansion of production to satisfy higher demand. Even more, if the response is from previously unused capacity, the final effect on the local economy will be without changes in prices. This assumption is likely to be true in the case of poor regions, where social transfers are commonly targeted.

Table 12: International evidence of the multiplier effect of social transfers

Effect	Country	Source
Regional multiplier: [2.02 , 2.45]	Malawi	Davies and Davey (2007)
Regional multiplier: 2.59	Zimbabwe	Staunton (2011)
Regional multiplier: 2.24	Ecuador	Woller and Parsons (2002), cited by Davies and Davey (2007)

2.7. Benefits and Costs of Social Protection

This section provides an analytical framework for the links between non-contributory social protection (transfers), human development and economic performance. First, social protection has proven to be an effective mechanism to reduce poverty and inequality, and as such also contributes to social cohesion, peace building and institutional changes. Second, social protection provides incentives and resources to invest on health and education. In this sense human capital is accumulated, which is an objective for development but also a mean to increase economic capacity. Third, a focus on child wellbeing is of major importance from a comprehensive understanding of socio economic development, and social protection has proved to be an effective mechanism to promote nutrition and child care.

²¹ It is the share of income expended in the community or region.
²² The multiplier effect may be larger if food provided as in-kind transfer is procured locally.

Fourth, social transfers help households to protect their productive assets and to make productive investments solving liquidity and credit constraints. Fifth, social transfers increase household disposable income. International evidence suggests that in the case of poor households labour participation may be enhanced by covering transportation costs and solving liquidity constraints. Besides, households may reallocate resources increasing labour participation for those individuals on working age to compensate for a reduction on child labour. However, the amount of resources transferred has to be established carefully to avoid negative incentives. Sixth, social transfers are likely to be spent locally and then to produce regional multipliers and incentives for third party investments.

The potential benefits of social transfers can also be affected by conditions outside the strictly economic realm. While a positive effect on social cohesion, peace building and institutional change is expected as a result of lower inequality, both social and political will are necessary to sustain social protection investments. The implementation of formal SPI may crowd out informal social protection mechanisms at the commune or family level.²³ Local characteristics (e.g. cultural/religious norms and values) may affect the behaviour of both beneficiaries and non-beneficiaries. The effects at the individual level will depend on how decisions are taken into the household pointing at the importance of the intra-household distribution. The potential non-income effects of social transfers have to be taken into account when designing a SPI. In the context of the current study, these relations are not included as they are beyond the scope of the modelling framework. Further research in this area is recommended.

Finally, the cost of social protection has to be analysed in order to identify its net benefit. Financial affordability of social protection has been one of the main concerns during the last years. The introduction of a basic social protection package in low- and middle-income countries requires substantial funding. As a reference, cost studies for Asia and Africa provide evidence of the necessary resources to implement basic social protection. A universal basic pension (at 30% of per capita GDP with a maximum of PPP USD 1 per day) for old age (65+) people and persons with serious disabilities (in working age) can be introduced with 0.6%-1.5% of GDP. Child benefits (for children under 14 at 15% of per capita GDP with a maximum of PPP USD 1 per day) are estimated to cost between 1.2% and 3.6% of GDP. A minimum package of essential health care would require between 1.5% and 5.5% of GDP. Finally, income security (at 30% of per capita GDP with a maximum of PPP USD 1 per day) for a total of 100 days to vulnerable workers (assumed at 10% of working age population) could cost between 0.3% and 0.8% of GDP. In this sense, a basic system of social protection would require between 3.7% and 10.6% of GDP (ILO, 2008).

The costs as percentage of GDP will change given different demographic and socio-economic contexts and over time. The final costs also depend on policy design (including coverage) and administrative capacity. Actual total annual costs of existing social protection instruments

²³ Depending on the country context, this may be considered a positive result as it relieves the pressure on informal support networks.

vary between 0.4 and 1.4% of GDP in middle-income countries. For example, the Bolsa Familia program in Brazil (CCT for children) accounts for 0.36% of GDP in 2006, while the social pensions of South Africa cost 1.4% of GDP in 2000. The nationally financed universal social pension programs amount to 1.4% of GDP in Lesotho and an estimated 0.3% in Nepal (World Bank 2008, quoted in DFID, 2011).

In the case of Cambodia, an ex-ante costing study of the NSPS (i.e. Hennicot, 2012b) estimates the cost of cash transfers to the poor between 2.43% and 4.53% of GDP in 2012, and decreasing to between 0.66% and 1.48% of GDP in 2020. Social transfers for poor pregnant mothers represents 0.07% and 0.02% of GDP in 2012 and 2020, respectively; while the cost of transfers for poor children aged 0-2 (6-11) is estimated at 0.34% (0.54%) of GDP in 2012 and 0.10% (0.19%) of GDP in 2020. The cost of Public Work Programmes (PWP) targeted for poor households is estimated between 0.14% and 0.26% of GDP in 2012, and between 0.05% and 0.11% of GDP in 2020. Finally, the cost of old-age social pensions is projected between 0.08% and 0.50% of GDP in 2012 and 0.03% and 0.21% of GDP in 2020; while social pensions for disabled persons accounts for between 0.10% and 0.43% of GDP in 2012 and 0.03% and 0.25% of GDP in 2020. In this sense, the NSPS may cost between 3.7% and 6.7% of GDP in 2012, excluding health care (Hennicot, 2012b). It is important to note that costs will also change depending on the final design, delivery mechanisms and targeting methods.

Basic social protection costs, if compared with GDP appear to be affordable even for low income countries. However, it does demand an important share of public expenditure. In low-income countries total public spending is generally in the range of 15-20% of GDP (DIFD, 2011:71). Introducing, for example, a basic social pension for people 65 years and older would cost between 2 and 8% of current government expenditures (HelpAge, 2011:4). These additional costs come on top of existing spending. Official development aid (ODA) may be necessary at first stages in low-income countries, but it is clear that social protection has to be financed from national resources in order to be sustainable. Social protection investments are long-term and recurrent commitments.

Affordability depends on the available fiscal space, political will and policy priorities. The capacity to finance social protection investments requires different strategies to create fiscal space. Possible pathways include resource re-allocation, foreign aid, increasing tax/contribution rates and/or tax/contribution base, government borrowing and higher economic growth. Both, the ability to diversify and increase tax income and economic activity determine the size and sustainability of government revenues, and as such fiscal space (HelpAge, 2011: 4). Economic growth as such may be the easiest way to create fiscal space (Bachelet, 2011: 67). Social protection affordability, in the end, remains an issue of political choice about the best way to allocate resources (Andrews et al, 2012: 26). Especially in low-income countries, issues of financial sustainability weigh heavy given the small budgets, the great needs and the fierce competition between sectors. In any case, as argued in this section, social protection has the potential to generate socio-economic outcomes and to foster

economic growth, and as such it has to be considered as an investment in human development and economic performance.

III. THE MODEL: DIRECT AND BEHAVIOURAL INCOME EFFECTS

A rate of return (RoR) is the relation between the net benefits and the costs of an investment. In order to estimate RoR in Cambodia four social protection instruments (SPI) are simulated. Cash transfers, social pensions, scholarships and public works have been selected due to their priority under the NSPS, data availability, modelling feasibility and policy decision relevance. These SPIs cover against vulnerability, human capital constraints and seasonal unemployment. In this sense the study focuses on non-contributory social transfers, and their effects under different scenarios.

Another SPI prioritized in the NSPS are Health Equity Funds (HEF). They protect against catastrophic health risks with benefits accruing only in case of severe illness. A comprehensive picture of the NSPS must include the health sector and contributory schemes. It is therefore imperative to increase access and quality to health care and education, as well as to scale up benefits and coverage of contribution-based social security schemes and active labour market policies (ALMP). These sectors are not analysed in this study because of data constraints. Nevertheless, there is general agreement on their potential returns in Cambodia, while the proposed SPI are still under discussion. Future research on these issues is recommendable.

The study focuses on benefits at the individual and household level (i.e. direct distributional and behavioural income effects) using different regressions. Later, effects on economic performance at the micro level (approximated by household consumption) are studied. In addition, an extrapolation to the macro level productive capacity is estimated through human capital accumulation for the whole economy. Costs of the selected SPI are defined based on preliminary proposals and previous costing studies (e.g. Hennicot, 2012a and 2012b). In this sense the quantitative analysis is a scenario based ex-ante simulation for the implementation of some SPI from the NSPS. The model does not consider financing aspects. SPI are assumed to be financed from public or external resources.

Table 13 presents the selected policy options (targeting and transfer) based on current design proposals and costing studies for Cambodia (e.g. Hennicot, 2012b). Cash transfers are simulated under three scenarios for poor children up to 6 years old. Transfers are set at 60% of the rural food poverty line (KHR 84,519 monthly per capita in 2009) payable on a monthly base. Social pensions comprise two scenarios for persons 65 years and older with a monthly transfer at 100% of the rural food poverty line. Transfers are given to each member of the household 65 years and older, thereby guaranteeing a minimum living standard for the poor elderly population. This is fully in line with the objective of the Social Protection Floor (Cichon et al., 2011). Scholarships are simulated for poor children in rural areas (excluding Phnom Penh) between 5 and 18 years old. Scenarios (three in total) are defined for each education level. Transfers are set at USD 50 per year (equivalent to 20% of the rural food poverty line per year), based on the information provided by the Ministry of Education Youth and Sport (MoEYS). Transfers are understood as net amounts. The administrative costs of cash transfers, social pensions and scholarships are assumed to be 10% of the transfer value.

Due to the absence of relevant information, the model assumes perfect targeting, which is a rather unlikely scenario. However, the IDPoor programme (implemented by the MoP) used to identify poor households is permanently updated and may greatly increase the targeting effectiveness of future SPI.

Finally, a public work programme (PWP) is simulated for poor households in rural areas (excluding Phnom Penh). Transfer (wage) is set at USD 2.3 per working-day for a maximum of 80 days per person per year. It is assumed that only one person per household is included, and that around 10% of eligible households participate.²⁴ Non-wage costs are set at 50% of total cost. The assumptions follow a recent costing study of the NSPS (i.e. Hennicot, 2012b). The model does not include the effects of infrastructure creation and livelihood generation as part of PWP, as this is beyond the scope of the current modelling framework. Therefore, only income effects at the household level are taken into account.

Table 13: Policy options for the implementation of social protection instruments

Social Protection Instrument	NSPS Objectives	Scenarios	Target population	Benefit level
Cash transfer	Food security and emergency assistance; Food security, poverty reduction and human capital accumulation; Financial protection in case of illness; Protection of vulnerable groups	Scenario 1	Poor children 0-6 years old	KHR 50,711 per month (60% rural food poverty line)
		Scenario 2	Poor children 0-6 years old in rural areas	
		Scenario 3	Poor children 0-6 years old in rural areas, up to 2 per household	
Social pensions	Protection of vulnerable groups	Scenario 4	Poor persons 65+ years old	KHR 84,519 per month (100% rural food poverty line)
		Scenario 5	Poor persons 65+ in rural areas	
Scholarship	Food security, poverty reduction and human capital accumulation	Scenario 6	Poor children at primary education in rural areas	KHR 202,845 per year (20% rural food poverty line)
		Scenario 7	Poor children at lower secondary in rural areas	
		Scenario 8	Poor children at upper secondary in rural areas	
Public works	Work opportunities and income security	Scenario 9	Poor persons 18-64 years old in rural areas, up to 1 per household (80 days per year)	KHR 9,522 per day

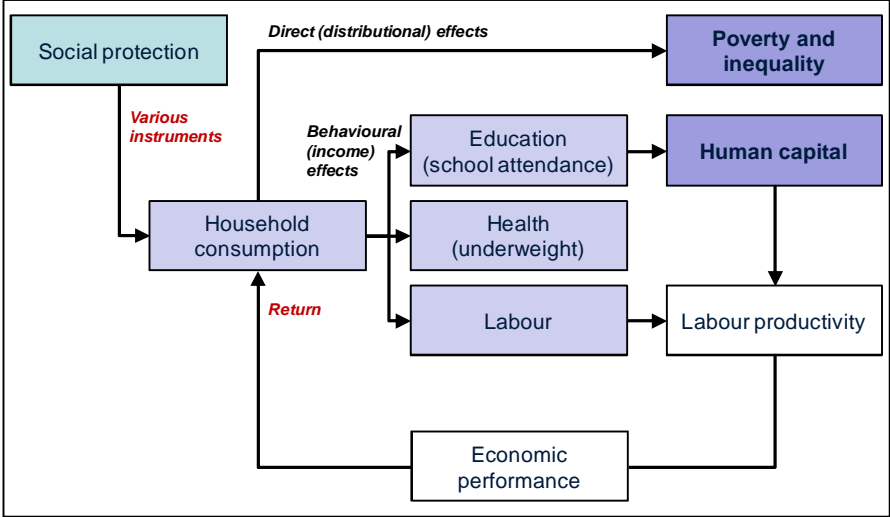
Note: Poverty lines are those from the proposed “updated” methodology for 2009. Rural food poverty line is KHR 84,519 per person per month. It is equivalent to 64%, 60% and 49% of the other rural, other urban and Phnom Penh total poverty lines, respectively (Box 1 and Table 41 (Annex 2)). Referential exchange rate USD 1 = KHR 4,140 in 2009 (SNEC, 2012).

A microsimulation model is built in order to generate quantitative estimations of potential rates of return. The model is based on the analytical framework presented in the previous section (Figure 2); however, it is limited to selected links based on policy objectives and data availability (Figure 3). In this sense, the figure only shows those links which will be simulated. First, the model estimates changes on poverty and inequality measured by changes

²⁴ The model assigns participation in the PWP randomly to 10% of eligible households.

in household consumption (i.e. distributional effect). Second, household effects (i.e. income effects) on education (school achievements), health (nutrition), and labour decisions (labour participation and labour supply) are calculated using linear and probabilistic equations. Later, human capital is approximated by education achievements. Finally, economic returns are estimated at the micro level based on the effects on household consumption.

Figure 3: Microsimulation model of SPI RoR



The data used for the analysis is from the Cambodia Socio-Economic Survey (CSES) 2004 and 2009 collected by the National Institute of Statistics (NIS) of the Ministry of Planning (MoP). CSES 2004 includes 59,832 individuals in 11,988 households, representing a population of 13.0 million people. In the case of 2009, the data base contains 57,105 individuals in 11,971 households, for a population of 14.0 million persons. Demographic statistics are presented in Annex 2. Probabilistic equations are estimated pooling both surveys in order to obtain average effects. The model is estimated for households because data on consumption is only available at this level. It is not possible to analyse intra-household distribution. However, some effects are estimated at the individual level (e.g. school attendance and labour participation) but using household consumption as independent variable. Furthermore, wages are available at the individual level only for those working in the formal sector. Weights are used to generate representative statistics. The microsimulation uses CSES 2009 as starting point. The objective of the model is not to generate socio-economic predictions, but to estimate and compare potential rates of returns of social protection investments in Cambodia among them and with a base scenario without any SPI.

The model is limited to micro data available from CSES. Social protection instruments are limited to non-contributory cash transfers. It is because insurance based social protection as well as public provided services (e.g. health care) needs additional information which is not available at this moment. Since the CSES does not contain sufficient information about income, household consumption is used as a proxy for income. Consumption is only available at the household level and hence it is not possible to analyse the intra household income distribution. Another limitation is that the CSES does not provide economic information at the commune level and, therefore, spillover and regional multipliers are not studied.

Macroeconomic information is used to interpret results but a link between micro and macro simulations cannot be done because the relations between economic sectors cannot be observed. The link to the macro level, in order to estimate RoR, is based on aggregate household information given certain assumptions. Finally, the model does not address financing issues, non-income (behavioural) effects nor possible multisectoral interventions. The model captures the effect of SPI by its own merits, but the impact can be different if other aspects are included. These possible additional effects are discussed later on. For these reasons, this study does not generate any projections but rather provides an analytical framework to estimate potential RoR in Cambodia given the current structural conditions.

3.1. Distributional Effects: Poverty and Inequality (Static microsimulation)

The distributional effects of social transfers have been studied in different countries using microsimulation models (e.g. Cogneau and Robilliard, 2000; Bezerra de Siqueira et al, 2000; Atkinson et al, 2002; Creedy et al, 2003; Cogneau et al, 2003; Annabi et al, 2005; Gassmann and Behrendt, 2006; Wong et al, 2008; Souza Ferreira et al, 2010; Llambi et al, 2011; Vandeninden, 2012). Microsimulation is a technique for the analysis of economic and social policies at the micro level (i.e. individuals, households and firms) when the focus is on distributional issues rather than on average or aggregate levels (Merz, 1993 and 1994). In order to identify and compare the effects on poverty and inequality (i.e. direct distributional effect) of different SPI in Cambodia a static microsimulation is estimated at the household level, using CSES 2009. Weights are aligned with official projections (i.e. NIS, 2011c) by post stratification differentiating between urban and rural households.

Social transfers are simulated as an exogenous shock based on different policy options (Table 13). In addition, a joint scenario is simulated covering one option for each SPI. Income from transfers is assumed to directly increase consumption. As it concerns new SPIs, and in the absence of any reference material for Cambodia, a marginal propensity of 1 to consume out of social transfers is assumed. This most probably overestimates the direct effects on consumption. Evidence from countries with existing social protection schemes shows that in the absence of social transfers, households would replace a part of the foregone income by other means (e.g. Gassmann (2011) for the Kyrgyz Republic). While this assumption limits the interpretation in terms of consumption patterns and its intra household distribution, it is important to note that this variable is used as a proxy for income and subsequently for the economic performance at the household level. The final distribution of the variables of interest is conditional on original characteristics. In order to calculate the effect on poverty and inequality, changes in the distribution of consumption are analysed and presented by regions (Phnom Penh, other urban and other rural).

Poverty is measured adjusting the family of Foster-Greer-Thorbecke (FGT) decomposable indices (Foster et al, 1984) using the proposed “updated” poverty lines for consumption (Box 1). The FGT indices allow to calculate the variation on poverty headcount, gap and severity, and to decompose the indices by region and demographic group (i.e. by age). Poverty gap and severity are estimated, in this study, as the average for the poor, which is different from the original FGT poverty indices. Inequality is measured by the Gini coefficient and the ratio

between poorest and richest deciles. The difference of these measures between the original and simulated distributions is the immediate benefit of SPI. These results are used for a cost-effectiveness analysis of the selected policy options.

Benefits of SPIs on poverty (P) and inequality (G) are related with the direct distributional effect of social transfers. The static benefit (B_p^s, B_G^s) is the percentage difference on poverty and inequality between the base line (P_t^0) and policy scenarios (P_t^1).

$$B_p^s = \left[\frac{(P_{t=1}^1 - P_{t=1}^0)}{P_{t=1}^0} \right] \times 100 \quad (\text{Equation 1})$$

$$B_G^s = \left[\frac{(G_{t=1}^1 - G_{t=1}^0)}{G_{t=1}^0} \right] \times 100 \quad (\text{Equation 2})$$

The effect of social transfers is estimated using CSES 2009. The analysis is done at the household level following policy scenarios established in table 13. Cash transfers are estimated to cost between 1.0% and 1.1% of GDP (including administrative costs at 10% of benefits) (Table 14). The number of beneficiaries accounts for between 642 thousand and 736 thousand children depending on the targeting criteria. Total costs are likely to decrease over time if poverty subsidies, economic expansion is sustained and fertility rates continue to decline (Hennicot, 2012b). Scenario 1 includes all poor children up to 6 years old, scenario 2 is targeted to rural areas and scenario 3 limits the benefit up to two children per household. The costs for social pensions (scenarios 4 and 5) are considerably lower (0.4% of GDP) and cover between 146 thousand (poor persons 65+ years old) or 137 thousand persons (poor persons 65+ years old in rural areas). The costs for social pensions may increase over time in the context of an ageing population, but they may decrease as a result of poverty reduction if pensions are targeted to the poor.

Scholarships are simulated for poor children in rural areas (excluding Phnom Penh) based on education level (Scenario 6 correspond to primary education, scenario 7 to lower secondary and scenario 8 to upper secondary education). The grade is defined as the total number of previous years of education (schooling) plus one for eligible persons between 6 and 18 years old if attending school. Subsequently, each person is assigned to a specific education level as follows: primary education if grade is between 1 and 6, lower secondary education if grade is between 7 and 9, and upper secondary education if grade is between 10 and 12. The total costs are between 0.01% and 0.4% of GDP and may decrease over time if poverty reduction continues and economic growth is maintained. However, costs may rise following demographic patterns and new incentives to attend school. Finally, the total costs of public work programmes (PWP) are estimated at 0.2% of GDP (scenario 9). The share of wages in total costs is assumed at 50% following Hennicot (2012b). The costs of PWP may decrease over time in case of continuous poverty reduction.

Table 14: Policy options cost and number of beneficiaries – Static microsimulation CSES 2009

		Transfer		Total Cost		Beneficiaries	
		KHR billion	% of GDP	KHR billion	% of GDP	Persons	Households
Cash transfer	Scenario 1	448	1.0	493	1.1	735,902	473,332
	Scenario 2	417	1.0	458	1.1	684,927	443,074
	Scenario 3	391	0.9	430	1.0	642,155	443,074
Social pension	Scenario 4	148	0.3	163	0.4	146,211	123,292
	Scenario 5	139	0.3	153	0.4	137,403	115,119
Scholarship	Scenario 6	149	0.4	164	0.4	734,393	424,237
	Scenario 7	25	0.1	28	0.1	123,406	107,408
	Scenario 8	2	0.0	3	0.0	11,916	11,916
Public works	Scenario 9	50	0.1	75	0.2	65,573	65,573

Note: Referential exchange rate USD 1 = KHR 4,140 in 2009 (SNEC, 2012).

Source: Own calculations based on static microsimulation using CSES 2009.

The combined package of cash transfers, social pensions and PWP is estimated to cost between 1.5% and 1.7% of GDP (between 7.5% and 8.3% of public expenditures) given 2009 conditions. It is equivalent to between KHR 658 billion and KHR 731 billion (around USD 159 million and USD 176 million) per year. Adding scholarships for poor children at any education level increases the total costs to a maximum of KHR 925 billion (around USD 223) per year, equivalent to 2.2% of GDP (10.5% of public expenditure and 18.9% of current spending) given 2009 conditions.

Table 15 presents the effects of SPI scenarios, by region, estimated following equations 1 and 2. The left-hand side presents absolute values of poverty headcount²⁵, poverty gap²⁶, poverty severity²⁷ and the Gini coefficient²⁸ for consumption per capita.²⁹ The relative changes (B_p^s, B_G^s) are presented in the right side panel. Cash transfers to poor children (Scenarios 1 to 3) may reduce the poverty headcount between 12.1% and 13.7%. Poverty gap and poverty severity are reduced between 11.2% and 13.1%, and 19.4% and 22.1%, respectively (Scenario 1). Finally Gini coefficient is expected to decrease between 3.3% and 3.7%.

Social pensions to poor persons 65 years old and older (Scenarios 4 and 5) can potentially reduce the poverty headcount between 5.3% and 5.6%. The reduction is higher in rural areas. The effect on the poverty gap and severity is a decline between 1.5% and 1.7%, respectively (Scenario 4). The Gini coefficient of consumption per capita declines by around 1.0% and the effect is higher in rural areas. In rural areas, public work programmes (scenario 9) reduce the poverty headcount, gap and severity by 2.0%, 0.9% and 1.6%, respectively, and inequality by

²⁵ Poverty headcount measures the proportion (percentage) of the population living below the poverty line.

²⁶ Poverty gap measures the extent to which poor individuals fall, on average, below the poverty line.

²⁷ Poverty severity is a weighted poverty gap, where poorest individuals received a higher weight. In this sense it captures distributional issues among the poor. A reduction on poverty severity means that the poorest have gained relatively more than the less poor. .

²⁸ The Gini coefficient is a measure of inequality. A value of 1 represents maximum inequality, while 0 means perfect equality among individuals.

²⁹ Differences on poverty and inequality figures between base line scenario and those presented in Box 1 and Table 39 in Annex 4 are due to post stratification.

0.4%. Finally, scholarships (scenarios 6 to 8) also reduce poverty and inequality especially if they are focused on children attending primary education. However, the main objective of scholarships is to promote school attendance. These effects are discussed later in this section, and it is shown that scholarship for lower secondary education has a higher effect than for primary education, while the effect of scholarships for upper secondary is not significantly different from zero (Table 22).

Table 15: SPI effects on poverty and inequality – Static microsimulation CSES 2009

	Phnom Penh	Other Urban	Other Rural	Total		Phnom Penh	Other Urban	Other Rural	Total
Poverty (headcount) %					Poverty variation (% , headcount)				
Base line	5.2	15.6	34.7	29.7					
Scenario 1	4.5	13.0	30.0	25.7	Scenario 1	-13.8	-16.7	-13.5	-13.7
Scenario 2	5.0	15.6	30.0	26.0	Scenario 2	-2.7	0.0	-13.5	-12.6
Scenario 3	5.0	15.6	30.2	26.1	Scenario 3	-2.7	0.0	-13.0	-12.1
Scenario 4	4.9	14.9	32.7	28.1	Scenario 4	-4.3	-4.5	-5.6	-5.6
Scenario 5	4.9	15.6	32.7	28.1	Scenario 5	-4.3	0.0	-5.6	-5.3
Scenario 6	5.2	15.6	33.1	28.4	Scenario 6	0.0	0.0	-4.7	-4.3
Scenario 7	5.2	15.6	34.3	29.4	Scenario 7	0.0	0.0	-1.1	-1.0
Scenario 8	5.2	15.6	34.7	29.7	Scenario 8	0.0	0.0	0.0	0.0
Scenario 9	5.2	15.6	34.0	29.1	Scenario 9	0.0	0.0	-2.1	-2.0
Poverty (gap) %					Poverty variation (% , gap)				
Base line	19.9	21.0	24.0	23.8					
Scenario 1	17.4	18.2	20.9	20.7	Scenario 1	-12.6	-13.4	-13.1	-13.1
Scenario 2	18.7	21.0	20.9	20.8	Scenario 2	-6.0	0.0	-13.1	-12.4
Scenario 3	18.8	21.0	21.2	21.1	Scenario 3	-5.4	0.0	-11.9	-11.2
Scenario 4	19.4	20.1	23.6	23.4	Scenario 4	-2.5	-4.1	-1.6	-1.7
Scenario 5	19.8	21.0	23.6	23.4	Scenario 5	-0.4	0.0	-1.6	-1.5
Scenario 6	19.9	21.0	22.8	22.6	Scenario 6	0.0	0.0	-5.2	-4.9
Scenario 7	19.9	21.0	23.9	23.7	Scenario 7	0.0	0.0	-0.5	-0.5
Scenario 8	19.9	21.0	24.0	23.7	Scenario 8	0.0	0.0	-0.1	-0.1
Scenario 9	19.9	21.0	23.8	23.6	Scenario 9	0.0	0.0	-0.9	-0.9
Poverty (severity)					Poverty variation (% , severity)				
Base line	0.058	0.063	0.083	0.081					
Scenario 1	0.044	0.049	0.065	0.063	Scenario 1	-24.9	-22.4	-22.1	-22.1
Scenario 2	0.051	0.063	0.065	0.064	Scenario 2	-11.8	0.0	-22.1	-21.0
Scenario 3	0.052	0.063	0.066	0.066	Scenario 3	-10.5	0.0	-20.3	-19.4
Scenario 4	0.057	0.060	0.081	0.079	Scenario 4	-1.3	-5.3	-2.7	-2.8
Scenario 5	0.058	0.063	0.081	0.079	Scenario 5	0.5	0.0	-2.7	-2.6
Scenario 6	0.058	0.063	0.076	0.075	Scenario 6	0.0	0.0	-8.7	-8.3
Scenario 7	0.058	0.063	0.082	0.081	Scenario 7	0.0	0.0	-0.8	-0.7
Scenario 8	0.058	0.063	0.083	0.081	Scenario 8	0.0	0.0	-0.1	-0.1
Scenario 9	0.058	0.063	0.081	0.080	Scenario 9	0.0	0.0	-1.7	-1.6
Inequality (Gini coefficient)					Inequality variation (% , Gini coefficient)				
Base line	0.317	0.343	0.284	0.329					
Scenario 1	0.316	0.338	0.269	0.317	Scenario 1	-0.4	-1.5	-5.3	-3.7
Scenario 2	0.317	0.343	0.269	0.318	Scenario 2	-0.1	0.0	-5.3	-3.5
Scenario 3	0.317	0.343	0.270	0.318	Scenario 3	-0.1	0.0	-5.0	-3.3
Scenario 4	0.317	0.341	0.280	0.325	Scenario 4	-0.1	-0.5	-1.5	-1.1
Scenario 5	0.317	0.343	0.280	0.326	Scenario 5	-0.1	0.0	-1.5	-1.0
Scenario 6	0.317	0.343	0.279	0.325	Scenario 6	0.0	0.0	-1.9	-1.3
Scenario 7	0.317	0.343	0.284	0.328	Scenario 7	0.0	0.0	-0.3	-0.2
Scenario 8	0.317	0.343	0.284	0.329	Scenario 8	0.0	0.0	0.0	0.0
Scenario 9	0.317	0.343	0.283	0.328	Scenario 9	0.0	0.0	-0.6	-0.4

Note: Poverty lines are those from the proposed “updated” methodology for 2009 (Box 1). Poverty gap (severity) is estimated as the average (squared) relative gap for the poor. Variation measures the relative change as percentage of the base line measure. Phnom Penh includes urban and rural areas.
Source: Own calculations based on static microsimulation using CSES 2009.

Table 16 presents the benefit (as relative difference) of SPI over its cost (as percentage of GDP). Figures indicate the relative reduction in poverty and inequality per 1% of GDP invested for each policy scenario. It is important to note that the purpose of this analysis is to compare among different policy options (scenarios), and not between policy objectives. Social pensions to poor individuals over 64 years old (Scenarios 4 and 5) are the most cost-effective SPI to reduce the poverty headcount in Cambodia (around 15% per GDP percentage point invested), followed by cash transfers (Scenarios 1 to 3) to poor children (between 11.9% and 12.1% per GDP percentage point invested). PWP (Scenario 9) reduces poverty headcount by 11.2% per GDP percentage point invested. Cash transfers to poor children are more cost-effective in reducing the poverty gap (between 11.3% and 11.6% per GDP percentage point invested) and severity (over 19% per GDP percentage point). This means that transfers focused on poor children reach the poorest among the poor in the country. Among scholarships (Scenarios 6 to 8) those for primary education are the most cost-effective to reduce poverty severity, lower secondary scholarship for poverty headcount and upper secondary for poverty gap. In terms of inequality decline, all the modelled SPI and policy options have a cost-effectiveness ratio between 2.3 and 3.3. It means that an investment of 1% of GDP on any of the modelled SPI may reduce inequality (measured by the Gini coefficient for consumption per capita) between 2.3% and 3.4%.

Table 16: SPI cost effectiveness analysis – Static microsimulation CSES 2009 (% , poverty/inequality reduction over total programme costs as percentage of GDP)

	Poverty (headcount)	Poverty (gap)	Poverty (severity)	Inequality (Gini)
Scenario 1	11.9	11.4	19.3	3.2
Scenario 2	11.8	11.6	19.7	3.3
Scenario 3	12.1	11.3	19.4	3.3
Scenario 4	14.7	4.6	7.5	2.9
Scenario 5	14.8	4.3	7.4	2.9
Scenario 6	11.2	12.8	21.4	3.3
Scenario 7	15.5	7.7	11.4	3.1
Scenario 8	5.4	18.7	14.8	3.0
Scenario 9	11.2	5.2	9.3	2.3

Source: Own calculations based on static microsimulation using CSES 2009.

Finally a joint policy option including scenarios 3, 5, 7 and 9 (= Scenario 10) benefits 561 thousand households, including 642 thousand children (Scenario 3), 137 thousand persons over 64 years old (Scenario 5), 123 thousand students at lower secondary (Scenario 7), and around 65 thousand individuals participating in PWP (Scenario 9). 73% of beneficiary households receive only one transfer (out of four SPI), 23% would receive two and 3% receive three benefits. This scenario provides social protection over the individual life-cycle, covering early childhood and old age vulnerability, working-age seasonal unemployment, as well as promoting school attendance (i.e. human capital constraints).

The total costs for this combined package amount to KHR 686 billion (around USD 166 million) equivalent to 1.6% of GDP, per year. Transfers represent 88% of total cost. Table 17 shows the effects of scenario 10 on poverty and inequality. Poverty is reduced by 20.0%, 14.4% and 24.2% for the headcount, gap and severity measures, respectively, while inequality declines by 4.9%. Effects are higher than those generated by any individually modelled SPI, but cost-effectiveness ratios are at the average level.

Table 17: Joint SPI effects on poverty and inequality – Static microsimulation CSES 2009

	Phnom Penh	Other Urban	Other Rural	Total		Phnom Penh	Other Urban	Other Rural	Total
Poverty (headcount)					Poverty (headcount)				
Base line	5.2	15.6	34.7	29.7	Variation (%)	-4.3	0.0	-21.5	-20.0
Scenario 10	4.9	15.6	27.2	23.8	Cost-effectiveness				12.6
Poverty (gap)					Poverty (gap)				
Base line	0.199	0.210	0.240	0.238	Variation (%)	-7.9	0.0	-15.2	-14.4
Scenario 10	0.183	0.210	0.204	0.204	Cost-effectiveness				9.0
Poverty (severity)					Poverty (severity)				
Base line	0.058	0.063	0.083	0.081	Variation (%)	-12.5	0.0	-25.4	-24.2
Scenario 10	0.051	0.063	0.062	0.062	Cost-effectiveness				15.2
Inequality (Gini consumption)					Inequality (Gini consumption)				
Base line	0.317	0.343	0.284	0.329	Variation (%)	-0.2	0.0	-7.3	-4.9
Scenario 10	0.317	0.343	0.264	0.313	Cost-effectiveness				3.1

Note: Poverty lines are those from the proposed “updated” methodology for 2009 (Box 1). Poverty gap (severity) is estimated as the average (square) relative gap for the poor. Variation measures the relative change as percentage of the base line measure. Cost-effectiveness indicators measure the relative decline in poverty/inequality (%) over total cost as percentage of GDP.

Source: Own calculations based on static microsimulation using CSES 2009.

Despite the important and immediate benefits of the different SPI and their cost effectiveness, the question remains whether such costs are affordable given that Cambodia runs a fiscal deficit of 6% of GDP (Table 34 in annex 1). Yet, the political commitment is there as evidenced by the NSPS. Furthermore, costs may change depending on the final SPI design and the actual administrative capacity. The RGC is committed to keep current spending below 11.5% of GDP in order to recover fiscal space reduced by the fiscal stimulus in 2009 (IMF, 2012). Tax revenues were below 11% of GDP between 2009 and 2011, offering the potential to increase the productivity of the tax system. In addition, expected economic growth rates of 7% and the current efforts to increase public spending efficiency create an opportunity to increase fiscal space over time. SPI investments may be linked to ODA financing in the beginning, and as such it is recommendable to implement SPI based on social and political priorities and to define a progressive scale-up strategy, based on regular monitoring and evaluation, to achieve financial sustainability and to guarantee positive social and economic impacts.

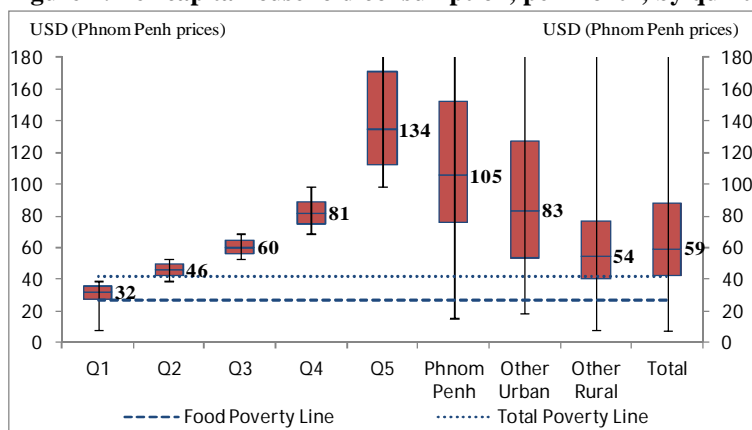
3.2. Household Consumption (CSES Micro Analysis)

Household consumption plays a triple role in the modelling framework. First, it is estimated as a function of households’ human capital level. Second, it is used as explanatory variable to analyse behavioural (income) effects due to changes in disposable income (using household consumption as a proxy) through social transfers. Third, returns of human capital investments

on household consumption will be included in the dynamic microsimulation to approximate micro level economic effects of SPI over time.

Figure 4 shows the distribution of household consumption per capita by quintiles and regions. Figures indicate median values, and 50% confidence intervals, of household consumption per capita per month. Upper ends are above USD 180 for the fifth quintile and for all regions. At the national level the median is USD 59. The ratio between the richest 20% (quintile 5) and the poorest 20% (quintile 1) is 4.2, and between Phnom Penh and other rural areas 1.9.

Figure 4: Per capita household consumption, per month, by quintile and region (2009)



Note: Household consumption and poverty lines follow the “updated” methodology (Box 1)
Source: Own calculations based on the CSES 2009

Jacob Mincer in his seminal work of 1974, states that the logarithm of wage is a linear function of schooling and quadratic for experience. However, this formulation assumes that the return on education is constant for all levels of education. New formulations have been developed relaxing this assumption and providing evidence about returns at different levels of education (e.g. Schady, 2000; Heckman et al, 2003). Following Schady (2000) a function to estimate the return of education can be defined as:

$$\ln(W_i) = \alpha + \gamma_1 E_i + \gamma_2 E_i^2 + \rho_E S_i + \lambda N_i + \pi_i \quad (\text{Equation 3})$$

where,

i refers to individuals,

W_i indicates wages,

E_i is the number of completed years of experience,

S_i refers to level of schooling (i.e. number of completed years of education) or dummy variables for the last year of education achieved,

N_i includes observable characteristics at the individual level (Table 42 in Annex 3), and

π_i is the error term, assumed to be normally distributed with mean zero,

$\alpha, \gamma_1, \gamma_2, \rho_E, \lambda$ are parameters to be estimated.

Returns of human capital on wages are estimated only for those individuals working in the formal sector (i.e. who receive a monthly wage). The logarithm of reported wages is used as dependent variables. Table 18 presents summary results for the regression of years of education (i.e. schooling) and wages. The model includes individuals between 15 and 64 years old. The total number of observations is 46,435 when pooling CSES 2004 and 2009³⁰, from which 13,490 have a formal work³¹.

A Heckman selection model is estimated in order to deal with selection bias (Table 18) due to the fact that we observe wages only for workers in the formal sector. We notice that OLS estimates are slightly higher than sample selection estimates because on average workers in the formal sector probably earn a higher wage. If we correct for sample selection, as we should given the low p-value of the correlation coefficient between the errors in the selection and in the main equations, we conclude that, on average, an additional year of education is related with a 4.1% higher wage for those persons working in the formal sector ($\rho_E = 0.041$) after controlling for the probability of working in the formal sector (i.e. receiving a monthly wage). The return in urban areas is 6.3% in comparison with 3.3% in rural areas. Gender differences are not significant in rural areas, while it stays around 12% for urban areas.

Returns on education are low in Cambodia, in comparison with international evidence (Table 8), a fact that produces low incentives to invest in education. The difference may be explained in two ways. First, school achievements do not reflect the quality of education, which is likely to be low in low-income countries. Second, returns on human capital are expected to be lower in the context of generally low economic productivity conditions. Increasing overall productivity and technological change may produce higher returns in the future. However, access to quality education is needed to generate equal opportunities, especially in rural areas.

In order to allow for different returns per year of education the model is adjusted by including appropriate dummies (Table 19). Coefficients should be interpreted as the percentage change in wages related with the number of years of education in comparison with no education (i.e. schooling equal to zero). There is not a significant return until a person achieves 4 years of education (i.e. half the primary education) in rural areas, and 12 years (i.e. complete secondary education) in urban areas.

³⁰ We pool CSES 2004 and 2009 in order to increase the number of observations available. The resulting estimates capture average effects for the two surveys.

³¹ Formal workers represented 26% and 31% of workers in 2004 and 2009, respectively (own calculations based on CSES 2004 and 2009).

Table 18: OLS and Heckman selection model of log wages

	National	Men	Women	Urban	Rural
OLS					
Schooling	0.058 *** (0.003)	0.059 *** (0.004)	0.056 *** (0.005)	0.079 *** (0.005)	0.043 *** (0.004)
Experience	0.038 *** (0.003)	0.047 *** (0.004)	0.028 *** (0.005)	0.034 *** (0.005)	0.040 *** (0.004)
Experience^2	-0.001 *** (0.000)	-0.001 *** (0.000)	-0.001 *** (0.000)	0.000 *** (0.000)	-0.001 *** (0.000)
Female=1	-0.108 *** (0.018)			-0.121 *** (0.028)	-0.112 *** (0.023)
(Year 2009)=1	0.620 *** (0.028)	0.685 *** (0.030)	0.527 *** (0.036)	0.563 *** (0.036)	0.632 *** (0.035)
Other Urban=1	-0.645 *** (0.143)	-0.652 *** (0.176)	-0.576 (0.375)		
Other Rural=1	-0.770 *** (0.143)	-0.793 *** (0.176)	-0.694 * (0.375)		
N	13,490	8,158	5,332	4,451	9,039
Adjusted R2	0.336	0.337	0.355	0.341	0.274
Heckman Selection Model					
Schooling	0.041 * (0.003)	0.045 * (0.004)	0.039 * (0.005)	0.063 * (0.005)	0.033 * (0.004)
Experience	0.023 * (0.004)	0.034 * (0.004)	0.012 ** (0.005)	0.017 * (0.006)	0.025 * (0.004)
Experience^2	0.000 * (0.000)	-0.001 * (0.000)	0.000 * (0.000)	0.000 * (0.000)	-0.001 * (0.000)
Female=1	-0.043 ** (0.018)			-0.120 * (0.027)	-0.014 (0.022)
(Year 2009)=1	0.617 * (0.029)	0.691 * (0.031)	0.501 * (0.037)	0.629 * (0.035)	0.600 * (0.038)
Other Urban=1	-0.498 * (0.057)	-0.453 * (0.109)	-0.531 * (0.109)		
Other Rural=1	-0.673 * (0.056)	-0.661 * (0.105)	-0.657 * (0.110)		
N	46,435	25,069	21,366	10,286	36,149
Wald test of independent equations (Rho = 0) P-value	0.000	0.000	0.000	0.041	0.000

Note: Heteroskedasticity-consistent standard errors are estimated (in brackets), clustered at the village level. All specifications include fixed effects at the province level. OLS estimation includes dummies for 13 economic sectors. These variables are used only at the selection equation in the Heckman model (Table 42 in Annex 3).

*** Significance at 1%, ** significance at 5%, * significance at 10%

Source: Own calculations based on the CSES 2004 and 2009

Results show higher returns and significant coefficients after three years of primary education in rural areas. In urban areas, returns are only significant after complete secondary education. The return of one additional year of education (at the national level) is not significant at any level. However, returns are significant by level of education. The return of complete primary education is 29% at the national level (Heckman model) compared to no education (schooling=6), 41% in the case of lower secondary (schooling=9), 50% for upper secondary (schooling=12) and 86% for tertiary education (schooling=16).

Table 19: OLS and Heckman selection model of log wages by level of schooling

Variable	Heckman Selection Model				
	National	Men	Women	Urban	Rural
Schooling==1	0.050 (0.156)	-0.039 (0.237)	0.005 (0.226)	0.173 (0.264)	0.094 (0.175)
Schooling==2	0.148 (0.141)	0.031 (0.216)	0.140 (0.210)	-0.068 (0.236)	0.200 (0.159)
Schooling==3	0.185 (0.140)	0.164 (0.216)	0.054 (0.207)	-0.035 (0.222)	0.235 (0.159)
Schooling==4	0.248 *** (0.143)	0.163 (0.217)	0.188 (0.206)	-0.012 (0.214)	0.306 *** (0.162)
Schooling==5	0.268 *** (0.143)	0.191 (0.217)	0.196 (0.207)	0.067 (0.216)	0.304 *** (0.162)
Schooling==6	0.290 ** (0.145)	0.145 (0.220)	0.283 (0.208)	0.076 (0.217)	0.336 ** (0.165)
Schooling==7	0.337 ** (0.141)	0.237 (0.216)	0.277 (0.206)	0.139 (0.217)	0.378 ** (0.160)
Schooling==8	0.356 ** (0.144)	0.277 (0.219)	0.285 (0.208)	0.142 (0.209)	0.408 ** (0.163)
Schooling==9	0.409 * (0.143)	0.347 (0.216)	0.334 (0.208)	0.259 (0.216)	0.450 * (0.162)
Schooling==10	0.345 ** (0.148)	0.312 (0.221)	0.212 (0.218)	0.241 (0.219)	0.360 ** (0.172)
Schooling==11	0.467 * (0.149)	0.423 *** (0.223)	0.397 *** (0.221)	0.297 (0.223)	0.535 * (0.176)
Schooling==12	0.495 * (0.143)	0.453 ** (0.217)	0.399 *** (0.209)	0.440 ** (0.213)	0.477 * (0.165)
Schooling==16	0.864 * (0.150)	0.802 * (0.221)	0.840 * (0.225)	0.795 * (0.221)	0.898 * (0.209)
Schooling==18	1.071 * (0.187)	1.007 * (0.248)	0.942 * (0.313)	1.011 * (0.253)	0.964 * (0.327)
Schooling==20	1.155 * (0.297)	1.049 * (0.338)		1.058 * (0.342)	0.709 * (0.166)
Adjusted R2	0.339	0.340	0.360	0.344	0.275

Note: Heteroskedasticity-consistent standard errors are estimated (in brackets), clustered at the village level. All specifications include fixed effects at the province level. Industry dummies are used only for the selection equation on the Heckman model (Table 42 in Annex 3). Coefficients should be interpreted in comparison with Schooling=0. The p-value for the Wald test of independent equations ($\rho=0$) is 0.000 for any Heckman selection model.

*** Significance at 1%, ** significance at 5%, * significance at 10%

Source: Own calculations based on the CSES 2004 and 2009

Because of high levels of informality in Cambodia the estimation of returns on wages applies only for a limited percentage of the population. However, the CSES does not have complete and accurate data about income, and consumption is only measured at the household level. In order to adjust this (individual level) framework to the household level, two different considerations about education can be made. First, the “allocative effect” of human capital (i.e. the ability to allocate resources) can be captured by the maximum level of education in the household. Second, the “productivity effect” (i.e. the capacity to produce) can be measured by the median level of education (Jolliffe, 2002). Following this approach the function can be adjusted as follows:

$$\ln(\text{consumption}_j) = \beta + \rho_E^{hh} S_j + \lambda N_j + \pi_j \quad (\text{Equation 4})$$

where, household consumption per capita ($consumption_j$) is used to approximate income, j refers to households, S_j is the maximum level of education in the household, and N_j is a set of observable characteristics at the household level (Table 43 in Annex 3). Pooling the CSES 2004 and 2009 data allows controlling for time effects. Different estimations are presented for urban and rural areas.

However, education variables at the household level cannot be considered exogenous because they depend on previous investments on education. In order to correct for this potential bias the return on household consumption is estimated using a two-stage least squares model (2SLS), where education is firstly estimated following:

$$S_j = \gamma Z_j + \phi N_j + e_j \quad (\text{Equation 5})$$

where S_j is the maximum level of education in the household, and Z_j the education level of the head of household, a proxy for parents' education, is used as an instrumental variable.³²

Equation 4 is estimated pooling the 2004 and 2009 CSES data. The total number of observations is 21,189 households. The variables included are presented in table 43 (Annex 3). Household income is approximated by monthly total household consumption per capita as the dependent variable. Table 20 presents results at the national level for the “allocation effect”³³. The education level is endogenous, and two-stages least squares (2SLS) are used to correct for a possible endogeneity bias. The first-stage estimates the household's maximum level of education as a function of the education level of the household's head³⁴, as a proxy for parents' education (Equation 5). The education level of the head of the household is assumed to affect consumption only through the household's maximum level of education. The weak identification test, at the bottom of the table, shows that the excluded instrument is highly correlated with the endogenous variable.

Regional differences are not significant for the final equation, but they are for education level (first stage). On average, an additional year of education (maximum level) is related with a 4.4% higher household consumption ($\rho_E^{hh} = 0.044$). However, the effect is likely to change for different socio-economic conditions.

³² The validity as excluded instruments is discussed in the next section.

³³ Additional estimations included the median schooling of the working age members of the household. The coefficient was significant at 1%, however very small (between 0.0065 and 0.0073). Besides, the effect is completely captured by the maximum level of education when the variable is not included, while the adjusted R2 does not change significantly.

³⁴ In 2009, the education level of the household's head was lower than the maximum household's education level in 61% of the cases at the national level. It means that another member of the household has higher education than the head (Own calculations based on CSES 2009).

Table 20: OLS and 2SLS of log household consumption per capita

	National		National (p)		National 2SLS		First Stage	
Schooling (max)	0.030	***	0.029	***	0.044	***		
	(0.002)		(0.001)		(0.002)			
(Year 2009)=1	0.636	***	0.641	***	0.636	***	0.147	***
	(0.013)		(0.013)		(0.013)		(0.030)	
Other Urban=1	0.003		-0.152		0.018		-0.704	***
	(0.027)		(0.100)		(0.027)		(0.066)	
Other Rural=1	-0.014		-0.159		0.005		-0.818	***
	(0.028)		(0.100)		(0.028)		(0.067)	
Constant	3.800	***	3.814	***	3.704	***	3.740	***
	(0.039)		(0.038)		(0.040)		(0.121)	
Head's schooling							0.439	***
							(0.004)	
N	21,189		21,189		21,189		21,189	
Adjusted R ²	0.680		0.689		0.677		0.584	
Weak identification test (Kleinberg-Paap)								
F-statistic					3,092.42			

Note: Standard errors (in brackets) are heteroskedasticity-consistent and clustered at the primary sample unit. All specifications includes number of persons by five age groups, assets (dwelling, bicycle, motorcycle and car) and dummy variables for toilet facility, electricity and quality of roof (Table 43 in Annex 3). Additional 2SLS estimations done separately for 2004 and 2009 yield coefficients of 0.0431 and 0.0432, respectively, that are significant at the 1% level. The reported weak identification test statistic refers to the subsample of households where the head is not the person with highest level of education in the house. In that case the coefficient for schooling on log of household consumption is 0.062 instead of 0.044 (significant at 1%).

(p) Includes 24 province dummy.

*** Significance at 1%, ** significance at 5%, * significance at 10%

Source: Own calculations based on the CSES 2004 and 2009

Table 21 presents results for the 2SLS estimation by region and poverty situation. The return of an additional year of education on household consumption is between 1.6% (urban) and 1.8% (rural) for poor households and between 2.6% (rural) and 4.2% (urban) for non-poor households. The effect on poor households is similar in urban and rural areas, while for non-poor households the return is lower in rural areas. These results are likely to reflect the participation in economic sectors with lower levels of productivity in the case of poor and rural households (e.g. lower returns are related with agriculture and informal activities).

Table 21: 2SLS estimation of log household consumption per capita, by region and poverty condition

	Urban (Non-poor)		Urban (Poor)		Rural (Non-poor)		Rural (Poor)	
Schooling (max)	0.042 ***	(0.005)	0.016 **	(0.007)	0.026 ***	(0.003)	0.018 ***	(0.002)
(Year 2009)=1	0.535 ***	(0.023)	0.482 ***	(0.020)	0.504 ***	(0.012)	0.527 ***	(0.009)
_cons	3.961 ***	(0.053)	3.115 ***	(0.052)	4.033 ***	(0.049)	3.107 ***	(0.057)
N	3,626		869		9,363		7,331	
Adjusted R2	0.582		0.552		0.484		0.571	
Weak identification test (Kleinberg-Paap)								
F-statistic	434.47		131.44		1,292.99		1,146.14	

Note: Standard errors (in brackets) are heteroskedasticity-consistent and clustered at the primary sample unit. All specifications include number of persons by five age groups, economic activity (crop production, livestock and own-business), assets (dwelling, bicycle, motorcycle and car) and dummy variables for toilet facility, electricity and quality of roof (Table 43 in Annex 3). The reported weak identification test statistic refers to the subsample of households where the head is not the person with highest level of education in the house. In those cases the coefficients for schooling are 0.0409, 0.0137, 0.0325 and 0.0307 (significant at 1%), respectively by column. Coefficients using OLS are 0.0331, 0.0104, 0.0153 and 0.0105 (significant at 1%), respectively by column.

*** Significance at 1%, ** significance at 5%, * significance at 10%

Source: Own calculations based on CSES 2004 and 2009

3.3. Behavioural Effects (CSES Micro Analysis)

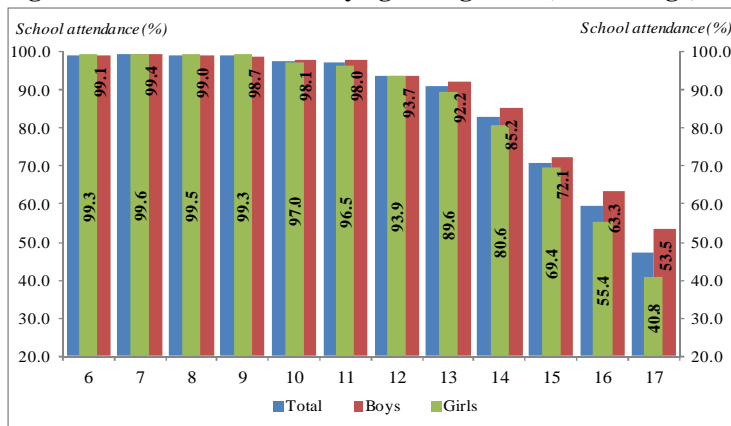
Behavioural effects are limited, in this study, to income effects (i.e. the response to changes in disposable income approximated by household consumption) on education (school attendance), health (underweight) and labour decision.³⁵ This kind of analysis is useful for analysing ex-ante the effects of policy decisions (World Bank, 2003). It serves as a guide to understand additional effects of social transfers. Individual and household characteristics are used as control variables, as well as fixed regional and time effects (2004 and 2009).

3.3.1. Education (School Attendance)

School attendance is identified in the CSES for all individuals aged 5 years and older. This dichotomous variable takes value one if a child attends school and zero otherwise. The probability of attending school is calculated using probabilistic models. School attendance is not linearly related with age. Attendance is high when a child reaches school age (6 years old) until a point where the opportunity cost (e.g. work) compensates the potential benefit, and then the probability of going to school decreases. This is consistent with a decreasing incidence of school attendance as observed in the data (Figure 5).

³⁵ This should not be confused with behavioural effects instigated by CCT conditions.

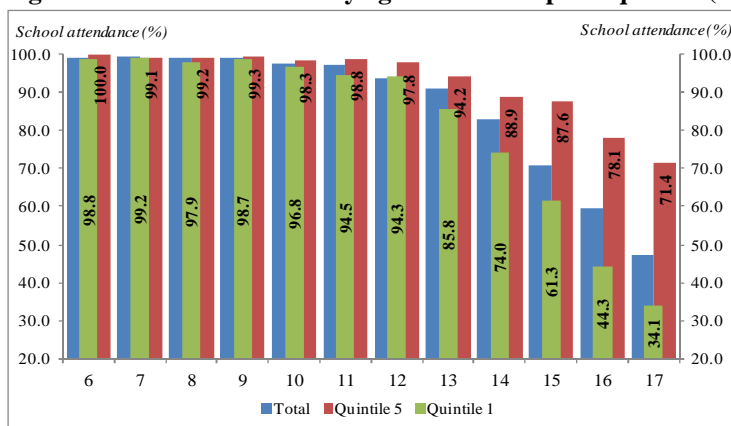
Figure 5: School attendance by age and gender (X axis = age)



Source: Own calculations based on CSES 2004 and 2009

Household economic conditions affect school attendance as they determine the capacity to cover education costs and the constraints to allocate household resources (Figure 6). Attendance rates beyond the age of 10 decrease more rapidly for children from poor households.

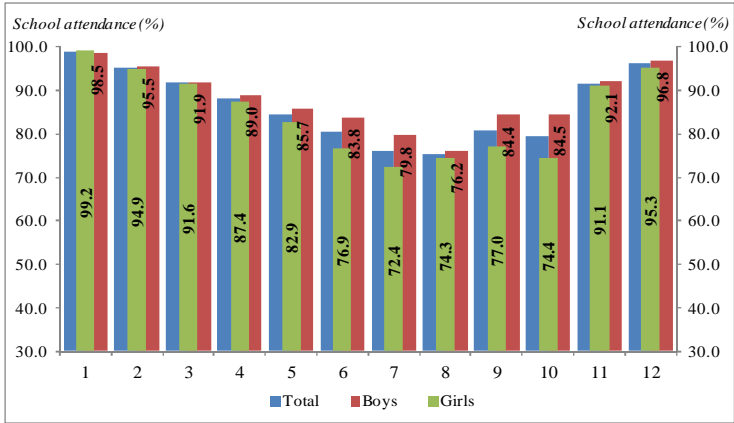
Figure 6: School attendance by age and consumption quintile (X axis = age)



Source: Own calculations based on CSES 2004 and 2009

School attendance also depends on previous school achievements. Figure 7 presents the incidence of school attendance by grade. Each individual is assigned to a specific grade not by age, but by the number of education years previously achieved. In the case of lower secondary (grades 7 to 9) and upper secondary education (grades 10 to 12) school attendance increases as students get to a higher grade. It is consistent with the idea that the benefits of education are related with the achievement of a determinate level rather than a continuous return. However, school attendance decreases as students move to a higher grade during primary education.

Figure 7: School attendance by grade and gender (X axis= grade)



Source: Own calculations based on CSES 2004 and 2009

If school attendance (Sch) is defined as a dichotomous variable it can be estimated using a probit model. Household consumption is estimated by equation 4 to deal with endogeneity. The second stage is a probit model to estimate the probability of attending school (Equation 6).

$$\Pr(Sch_i = 1) = \phi(\ln(\text{consumption})_i, N_i^{sch}, N_j^{sch}) \tag{Equation 6}$$

The sets of individual (N_i) and household (N_j) characteristics are presented in table 44 (Annex 3). Equation 6 is estimated for all individuals between 6 and 25 years old. The total number of observations is 43,562 when pooling the CSES 2004 and 2009 data. In addition, different equations are calculated for poor households by education level (primary, lower secondary and tertiary education). School attendance is defined as a function of age, household income (approximated by consumption) and the difference between age and schooling (i.e. age minus completed years of education). The last variable captures the effect of past behaviour.

Table 22 presents average marginal effects for different sub-samples. Household consumption is positively related with school attendance. At the national level a 10% increase in the level of consumption is related with a 0.2 percentage point higher probability of attending school. This effect is substantially higher for rural areas and poor households. A 10% increase in household consumption per capita (i.e. USD 3.4 per month for a median poor rural household) is related with a probability to be studying for a person between 6 and 25 years old between 2.0 and 2.7 percentage points higher in a poor and a poor rural household, respectively.³⁶

³⁶ Additional specifications using only data for 2009 present no significant effects, while the marginal effects are 2.8 and 3.4 percentage points for a 10% increase in household consumption per capita, respectively (significant at 1%) for 2004. Besides, in the case of non-poor individuals at the national level this effect is 0.9 percentage points, and 0.7 percentage points for non-poor rural individuals (significant at 1%)

Results at the bottom of table 22 are divided by three education levels. An individual is included according to the grade she should be attending given her previous achievements but independently of age (e.g. a person who has completed 4 years of education should attend grade 5). Primary education includes grades 1 to 6, lower secondary education 7 to 9, and upper secondary education 10 to 12. Individuals between 6 and 25 years old are included if they have not completed upper secondary education. In the case of poor rural individuals the effect is higher for lower secondary (a 10% increase in the level of consumption is related with a 5.6 percentage points higher probability of attending school) than for primary education (a 10% increase in the level of consumption is related with a 2.2 percentage points higher probability of attending school), while it is not significant for upper secondary. For non-poor households (urban and rural) a possible effect is only shown for secondary education, while there are no significant effects for poor urban households.³⁷

Results show that social transfers by increasing household disposable income are likely to affect education investments, and subsequently to generate positive effects on human development. In the case of poor rural households, social transfers may have a higher effect to increase attendance at lower secondary education. However, there is no significant effect for upper secondary education, which may be explained by low expected returns in the future (this can also explain a non-significant effect on urban poor individuals). In this sense, complementary policies to increase the quality of education and to enhance future labour opportunities are necessary to create incentives for school attendance, promote human development and to increase the returns of social protection investments.

³⁷ Tests for the excluded instruments are reported in table 22. A rejection of the null hypothesis on the underidentification test indicates that the instrument matrix is of full rank, which is the case for all specifications. In other words, the instrument(s) is (are) sufficient to identify the parameters. For the weak specification test the F-statistic is compared with critical values for Kleibergen-Paap. The estimated F-statistics are higher than the 5% critical value for IV relative bias in all cases, except for rural poor individuals in upper secondary model. However, alternative specifications (using two instead of three excluded instruments) provide valid results while the coefficient of interest does not change significantly. Finally, the null hypothesis for the overidentification test is that the instruments are uncorrelated with the error term. The null hypothesis cannot be rejected at 10% level on the estimated specifications, with the exception of the model for rural poor persons in lower secondary education. As in the previous case, changing the selection of instruments provides a valid result on the test with no significant change in the coefficient of interest. In the case of the models at the top of the table the null hypothesis on the overidentification test cannot be rejected at 1% level.

Table 22: Average marginal effects on the probability of attending school [Pr(school attendance = 1)]

	National		National (Poor)		Rural (Poor)	
ln(hh_consumption) (q)	0.024 *** (0.006)		0.205 *** (0.071)		0.267 *** (0.097)	
Age	0.132 *** (0.011)		0.149 *** (0.015)		0.137 *** (0.016)	
Age^2	-0.011 *** (0.001)		-0.013 *** (0.001)		-0.012 *** (0.001)	
Age^3	0.000 *** (0.000)		0.000 *** (0.000)		0.000 *** (0.000)	
(Age - Schooling)	-0.025 *** (0.001)		-0.016 *** (0.001)		-0.015 *** (0.002)	
Female=1	-0.041 *** (0.003)		-0.042 *** (0.004)		-0.042 *** (0.005)	
(Year 2009)=1	-0.072 *** (0.005)		-0.173 *** (0.038)		-0.201 *** (0.052)	
N	43,562		20,079		17,839	
Pseudo R2	0.610		0.603		0.602	
Log Pseudo likelihood	-11,263		-5,286		-4,703	
Underidentification test (Kleinberg-Paap)						
P-value	0.000		0.000		0.000	
Weak identification test (Kleinberg-Paap)						
F-statistic	296.73		36.94		24.54	
Overidentification test (Sargan J statistic)						
P-value	0.675		0.085		0.013	
	Primary Education		Lower Secondary		Upper Secondary	
	Rural Poor					
ln(hh_consumption) (q)	0.226 ** (0.089)		0.560 ** (0.262)		0.37325 (0.51574)	
N	13,316		3,693		820	
Pseudo R2	0.672		0.402		0.303	
Log Pseudo likelihood	-2,676		-1,490		-385	
Underidentification test (Kleinberg-Paap)						
P-value	0.000		0.000		0.001	
Weak identification test (Kleinberg-Paap)						
F-statistic	19.72		14.17		6.03(++)	
Overidentification test (Sargan J statistic)						
P-value	0.1078		0.0071(+)		0.6718	
	Rural Non-Poor					
ln(hh_consumption) (q)	0.035 (0.036)		0.174 *** (0.066)		0.027 (0.11454)	
	Urban Poor					
ln(hh_consumption) (q)	0.003 (0.118)		0.393 (0.276)		0.365 (0.62476)	
	Urban Non-Poor					
ln(hh_consumption) (q)	0.018 (0.036)		0.138 ** (0.070)		0.123 (0.135)	

Note: Standard errors (between brackets) are estimated using bootstrapping clustering at the household level for the probit models, and by delta method for the average marginal effects. All specifications include number of persons by five age groups, and assets dummy (dwelling, bicycle, motorcycle and car). Besides, age of head of household and the maximum level of education in the house are included as control variables. Specifications at the national level are also controlled by region (Table 44 in Annex 3). Summary statistics are for the probit model, while tests are reported for linear probability models. Excluded instruments are dummy variables for toilet facility, electricity and roof quality.

(q) Estimated by equation 4.

(+) An alternative specification with two excluded instruments (dummy variables for toilet facility and roof quality) provides a P-value for the overidentification test of 0.53. The coefficient of interest (0.562) does not change significantly and it is significant at 1%.

(++) An alternative specification with one excluded instrument (dummy variable for roof quality) provides a F-statistic for the weak specification test of 12.97. The coefficient of interest is still insignificant at 10%.

*** Significance at 1%, ** significance at 5%, * significance at 10%

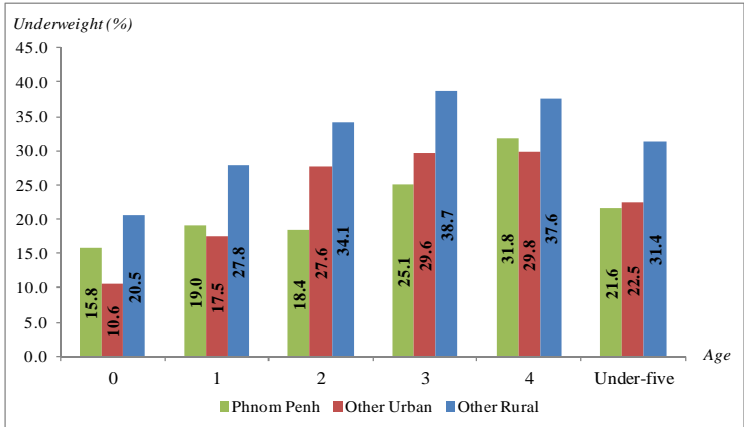
Source: Own calculations based on the CSES 2004 and 2009

3.3.2. Nutrition

Nutrition is one of the main problems in Cambodia. It is at the same time a direct cause and effect of poverty. Improving nutrition has a direct effect on reducing mortality and improving economic returns. Nutrition is also related with cognitive and productive capacity. Early years are determinant for people’s well-being during their entire life-cycle. Chronically malnourished children lag behind in their physical development. Cognitive development can also be seriously affected, leading to long-term problems during school years and later on in life (Ravallion 2009; Ortiz et al. 2011; Bloem et al. 2010; IFPRI 2009; World Bank 2008). Under-nutrition is related with different conditions that include mother health status, health care, sanitation and feeding practices. However, household economic conditions are also determinants of access to food and a quality diet (UNICEF, 2000 and 2012; Barrientos and DeJong, 2004 and 2006; Adato and Bassett, 2009; Mishra, 2011).

In 2009, the incidence of underweight among under-five children was 29.9% at the national level. In rural areas the incidence increases to 31%, while in urban areas it is between 21.6% (Phnom Penh) and 22.5% (other urban regions) (Figure 8).

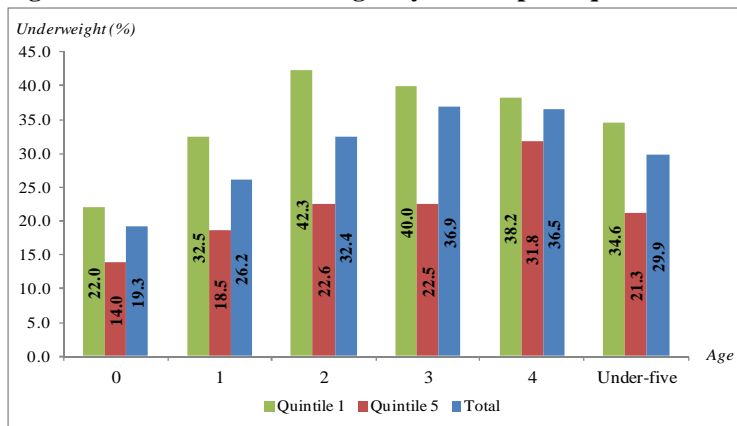
Figure 8: Under-five underweight by region



Source: Own calculations based on CSES 2009

Malnutrition is higher for children from the 20% poorest households (i.e. quintile 1) (Figure 9). Poor children are highly exposed to malnutrition, which in the end reduces their future opportunities to escape poverty.

Figure 9: Under-five underweight by consumption quintile



Source: Own calculations based on CSES 2009

Underweight (U) is a dichotomous variables and it is estimated using a probit model (Equation 7). Household consumption per capita is exogenous in the case of underweight.

$$\Pr(U_i = 1) = \phi(\ln(\text{consumption})_j, N_i^u, N_j^u, \psi_v^u) \quad (\text{Equation 7})$$

The sets of individual (N_i) and household (N_j) characteristics are presented in table 45 (Annex 3). Due to data limitations many factors related with child malnourishment cannot be included in the model. Control variables are introduced to deal with observable characteristics and unobservable ones are assumed to be equally distributed. In this sense, the model does not predict underweight but identifies the effect of household economic conditions on the probability of being malnourished.

Equation 7 is calculated for children under 5 years old including random effects at the village level (ψ_v^u). The estimation is done for all children under 5 years old, pooling the CSES 2004 and 2009 data. The total number of observations is 7,329.

Table 23 presents average marginal effects. At the national level, on average, a 10% increase in household consumption per capita is related with a 0.4 percentage points lower probability of being underweighted. The relation between household consumption and underweight is not significant for poor households. These findings show that other (non-income) factors are more relevant to explain the causes of current malnutrition of poor children in Cambodia, and that complementary policies are needed to achieve this kind of objective. Having a proper toilet facility (as a proxy for sanitation conditions) is associated with a 6 to 8 percentage points lower probability of being underweight in poor households. A higher household education level (estimated by the maximum level in the household) is also related with a lower probability of being malnourished. It is significant at the household level for the national average, while mother's education is significant in the case of poor children but not in rural areas. Mother's age is negatively correlated with children being underweight.

Table 23: Average marginal effects on the probability of a underweight child (<5) [Pr(underweight = 1)]

Variable	National	National (Poor)	Rural (Poor)
ln(Consumption)	-0.043 *** (0.015)	-0.048 (0.038)	-0.038 (0.041)
Age (months)	0.005 *** (0.000)	0.005 *** (0.001)	0.005 *** (0.001)
Mother complete primary education=1	-0.012 (0.015)	-0.028 (0.026)	-0.029 (0.028)
Mother complete lower secondary=1	-0.036 (0.025)	-0.127 *** (0.047)	-0.092 (0.059)
Mother complete upper secondary=1	-0.019 (0.040)	0.118 (0.137)	0.071 (0.177)
Mother's age	-0.002 * (0.001)	-0.003 * (0.002)	-0.003 * (0.002)
Female=1	-0.029 ** (0.011)	-0.015 (0.017)	-0.008 (0.020)
(Year 2009)=1	-0.043 *** (0.017)	-0.077 ** (0.030)	-0.077 ** (0.033)
Schooling (household max)	-0.004 * (0.002)	-0.003 (0.005)	-0.001 (0.005)
Other Urban=1	-0.002 (0.028)	-0.044 (0.055)	
Other Rural=1	0.038 (0.026)	0.012 (0.050)	
No toilet=1	0.026 (0.016)	0.062 ** (0.029)	0.081 *** (0.029)
N	7,329	3,268	2,892
Log Pseudo Likelihood	-4,320	-2,051	-1,822
Groups	1,375	947	781
Sigma^2 (village)	0.135	0.173	0.176

Note: Standard errors (between brackets) are estimated by bootstrapping, clustering at the household level, for the probit models, and by the delta method for the average marginal effects. Random effects are included at the village level. All specifications include the number of persons by five age groups, and dummy variables for assets (dwelling, bicycle, motorcycle and car). Besides, dummies for single headed household and roof quality, distance to water source and number of persons per room are included as control variables (Table 45 in Annex 3).

*** Significance at 1%, ** significance at 5%, * significance at 10%

Source: Own calculations based on the CSES 2004 and 2009

The results suggest that malnutrition is not only determined by household economic conditions. In the case of poor children, the mother's education and the sanitation conditions (approximated by toilet facility) have a higher effect on the probability of being malnourished. However, social transfers may generate positive effects on nutrition if they are implemented together with other policies (e.g. sanitation, health care, child care).

3.3.3. Labour

Social transfers have a direct effect on household disposable income. This effect generates adjustments on labour decisions. This section analyses the effect on labour participation as a dichotomous variable (i.e. whether a person works or not) and labour supply as a continuous variable for the number of hours a person works per week (i.e. how much a person works). Receiving a transfer may reduce labour supply and/or participation, because it guarantees a minimum disposable income under any working situation. In this sense a person may have the same income working less time. However, this effect is likely to be different by age and socio-economic conditions. The effect also depends on the transfer level in relation to wages and other income from work. At the household level work is a matter of resource allocation,

where each member may be affected differently (e.g. a reduction on child labour may be compensated by higher labour supply of adults). Finally, a higher and more secure income may create incentives for productive investments and reduce credit constraints, thereby increasing labour participation.

Labour participation (L) is calculated using a multinomial probit regression to estimate the probability of working, differentiating between paid and un-paid work. Household consumption per capita is endogenous and estimated using equation 4. Equation 8 includes all individuals at least 5 years old, divided up in six age groups and by region (urban and rural). The sets of individual (N_i) and household (N_j) characteristics used in the next models (equations 8 to 11) are presented in table 46 (Annex 3).

$$\Pr \left(L_i = \begin{cases} 0 & \text{if not working} \\ 1 & \text{if unpaid work} \\ 2 & \text{if paid work} \end{cases} \right) = \Phi(\ln(\widehat{consumption})_j, N_i^l, N_j^l) \quad \text{(Equation 8)}$$

Labour participation is estimated for all individuals between 5 and 80 years old. The total number of observations is 74,329, from which 28,593 are poor, when pooling the CSES 2004 and 2009 data. Table 1 presents labour participation rates by age group, region and poverty condition. Unpaid work is higher for the young population (between 5 and 17 years old), especially in rural areas, while unemployment is higher in urban areas for all working age groups (between 18 and 64 years old).

Table 24 presents the average marginal effects for the probability of work, paid work and unpaid work independently. Household consumption is treated as endogenous and estimated by equation 4. A 10% higher household consumption reduces the probability of work by 0.2 percentage points. The effect is a reduction of 0.19 percentage points in the case of paid work and 0.12 percentage points for unpaid work. Gender differences are significant, and show that women are more likely to work on unpaid activities than men. After controlling for individual and household characteristics, a woman has an 11 percentage points lower probability to work on paid activities but a 5.3 percentage points higher probability for unpaid activities than a man. Finally, paid activities are related with own-business and access to credit, while unpaid work is related with agriculture activities.³⁸

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³⁸ Tests for the excluded instruments reported in table 24 show the validity of the excluded instruments. They are sufficient to identify the parameters and there are no weak specification problems at the 10% level (critical value: 19.93). Besides, the null hypothesis for the overidentification test (i.e. instruments are uncorrelated with the error term and correctly excluded from the equation) cannot be rejected at the 10% level in all the specifications.

Table 24: Average marginal effect on the probability of working [Pr(labour participation = 1)]

Variable	Work		Paid work		Unpaid work	
ln(Consumption) (q)	-0.023	***	-0.019	***	-0.012	*
	(0.007)		(0.006)		(0.007)	
Age	0.045	***	0.052	***	-0.004	***
	(0.000)		(0.000)		(0.001)	
Age^2	-0.001	***	-0.001	***	-0.000	***
	(0.000)		(0.000)		(0.000)	
Female=1	-0.072	***	-0.107	***	0.053	***
	(0.003)		(0.003)		(0.003)	
(Year 2009)=1	0.026	***	0.110	***	-0.100	***
	(0.006)		(0.005)		(0.006)	
Schooling	0.008	***	0.009	***	0.009	***
	(0.001)		(0.001)		(0.001)	
Other Urban=1	0.006		-0.002		0.037	***
	(0.007)		(0.007)		(0.010)	
Other Rural=1	0.056	***	0.017	**	0.074	***
	(0.007)		(0.007)		(0.010)	
Head of house (age)	0.001	***	-0.003	***	0.004	***
	(0.000)		(0.000)		(0.000)	
Schooling (max)	-0.012	***	-0.007	***	-0.011	***
	(0.001)		(0.001)		(0.001)	
Number of persons (0-4)	-0.011	***	0.004		-0.021	***
	(0.003)		(0.003)		(0.003)	
Number of persons (5-14)	-0.004	**	-0.014	***	-0.000	
	(0.002)		(0.002)		(0.002)	
Number of persons (15-17)	-0.002		-0.008	***	0.023	***
	(0.003)		(0.003)		(0.003)	
Number of persons (18-64)	-0.001		-0.008	***	0.015	***
	(0.002)		(0.002)		(0.002)	
Number of persons (65+)	0.013	***	0.006		0.006	
	(0.005)		(0.004)		(0.005)	
Plot=1	0.070	***	-0.031	***	0.109	***
	(0.005)		(0.005)		(0.006)	
Livestock=1	0.074	***	0.002		0.080	***
	(0.005)		(0.005)		(0.006)	
Business=1	0.048	***	0.016	***	0.034	***
	(0.004)		(0.004)		(0.004)	
Credit=1	0.006	*	0.015	***	-0.005	
	(0.004)		(0.004)		(0.004)	
N	74,302		74,302		74,302	
Pseudo R2	0.247		0.333		0.144	
Underidentification test (Kleinberg-Paap)						
P-value	0.000		0.000		0.000	
Weak identification test (Kleinberg-Paap)						
F-statistic	288.48		288.48		288.48	
Overidentification test (Sargan J statistic)						
P-value	0.895		0.161		0.328	

Note: Heteroskedasticity-consistent standard errors (in brackets) are estimated, clustered at the household level for the probit models, and by the delta method for the average marginal effects. All specifications include dummy variables for assets (dwelling, bicycle, motorcycle and car) and roof quality as control variables. Summary statistics are for the probit model, while tests are reported for linear probability models. Excluded instruments are dummy variables for toilet facility and electricity (Table 46 in Annex 3).

(q) Estimated by equation 4.

*** Significance at 1%, ** significance at 5%, * significance at 10%

Source: Own calculations based on the CSES 2004 and 2009

Equation 8 is estimated by a multinomial probit model (Table 25). At the national level an increase of 10% in household consumption does not significantly affect the probability of unpaid work for all persons 5 years old and older (column 1), while it reduces paid work

participation by 0.2 percentage points and increases the probability of not working by the same magnitude. In the case of people 18 years and older the effect is not significant at the national level (column 2). However, it differs by region, age group and poverty condition. A 10% increase in household consumption reduces the probability of unpaid work by 10 and 8.9 percentage points for poor individuals in urban and rural areas (persons between 18 and 64 years old) respectively, and by 2.8 and 1.4 percentage points for non-poor persons. The effect on paid work is not significant, except for poor individuals in rural areas, where it is positive (5.9 percentage points). The effects are higher for the age group between 18 and 30 years old (column 5), while they are not significant for persons between 31 and 64 years old (columns 6 and 7). A reduction on the probability of unpaid work together with an increase of the probability of paid work in the case of poor rural persons may be explained by the labour mobility to more formal activities in the household, but also because additional resources may cover transportation costs to a paid labour place.

The effect on unpaid work for poor children between 5 and 14 (Table 25) years old (column 3) is a reduction of unpaid work of 15 percentage points in urban and rural areas, while the effect on paid work is not significant. It means that children stop working. This effect is similar for poor individuals between 15 and 17 years old (column 4) in rural areas. However, in the case of poor persons in urban areas the reduction in unpaid work is due to an increase in the probability of paid work and no-work. Finally, results cannot be interpreted for poor old age population (over 64 years old) (column 8) in urban areas due to a low number of observations, while a reduction on the probability of paid work is significant at 10% for poor rural persons.

The results show that higher household consumption may discourage labour participation in general terms; it is, however, not the case for poor working age persons in Cambodia. The effects are positive or not significant for paid work. Moreover, labour mobility from unpaid to paid work can be generated in rural areas. It is consistent with the idea that increasing permanent household consumption may help to afford transportation costs and overcome financial constraints to generate productive activities especially in rural areas, at the time when child labour may be reduced.

Table 25: Average marginal effects of log household consumption per capita on Pr(not working = 1, unpaid worker = 2, paid worker = 3)

	(5+)	(18-64)	(5-14)	(15-17)	(18-30)	(31-45)	(46-64)	(65+)
Unpaid work								
National	-0.006 (0.007)	0.005 (0.007)						
N	74,302	48,104						
Urban (Poor)		-1.002 * (0.516)	-1.533 * (0.815)	-4.076 *** (1.004)	-1.605 * (0.832)	-0.499 (0.544)	-0.369 (0.806)	0.017 *** (0.000)
N		2,019	785	381	1,011	639	369	47
Rural (Poor)		-0.887 *** (0.247)	-1.520 *** (0.440)	-1.442 ** (0.568)	-1.236 *** (0.395)	-0.547 (0.344)	-0.119 (0.349)	-0.026 (0.554)
N		14,889	6,997	3,091	7,474	4,896	2,519	382
Urban (Non poor)		-0.279 *** (0.056)						
Rural (Non poor)		-0.142 *** (0.048)						
Paid work								
National	-0.018 *** (0.006)	-0.005 (0.008)						
Urban (Poor)		0.211 (0.504)	-0.353 (0.338)	1.940 *** (0.745)	0.936 (0.803)	-0.921 (0.674)	-0.025 (0.916)	-0.335 *** (0.000)
Rural (Poor)		0.593 ** (0.261)	-0.042 (0.192)	-0.256 (0.448)	1.004 ** (0.395)	0.374 (0.388)	-0.605 (0.452)	-2.302 ** (1.100)
Urban (Non poor)		-0.080 (0.071)						
Rural (Non poor)		-0.065 (0.051)						
No work								
National	0.024 *** (0.007)	0.000 (0.007)						

Note: Heteroskedasticity-consistent standard errors (in brackets) are estimated, clustered at the household level for the probit models, and by the delta method for the average marginal effects. All specifications include age and age square, gender dummy, time effects, schooling, head of house age, household maximum schooling, number of persons by five age groups, dummy variables for assets (dwelling, bicycle, motorcycle and car), roof quality and dummy variables for productive livelihoods (plot, livestock, business and credit) as control variables (Table 46 in Annex 3). Summary statistics are for the multinomial probit model. ln(household consumption per capita) is predicted by equation 4.

*** Significance at 1%, ** significance at 5%, * significance at 10%

Source: Own calculations based on the CSES 2004 and 2009

Labour supply (LS) is estimated using a Heckman selection model. Equation 9 is the selection equation for paid work, and equation 10 estimates the number of hours a person works (κ_i is the error term assumed to be normally distributed with mean zero). The model includes all individuals between 15 and 64 years old. Household consumption was previously estimated with equation 4.

$$\Pr(L(\text{paid})_i = 1) = \phi(\ln(\widehat{\text{consumption}})_j, N_i^{lp}, N_j^{lp}) \quad (\text{Equation 9})$$

$$\ln(w_hours_i) | L(\text{paid})_i = 1 = \omega + \vartheta \ln(\widehat{\text{consumption}})_j + \mu N_i^{lp} + \sigma N_j^{lp} + \kappa_i \quad (\text{Equation 10})$$

Household consumption does not have a significant effect on labour supply for poor urban persons (Table 26).³⁹ Household consumption has a negative effect on labour supply for the age groups 18-30 and 31-45 in poor rural households.⁴⁰ A 1% increase in household consumption reduces the number of working hours by 0.9% and 0.7% for poor persons in rural areas that are 18-30 years old and 31-45 years old, respectively. This effect may be explained by a change from unpaid to paid work (Table 25) as well as from informal to formal labour (Table 27). In this way SPI can help households to enhance and formalize their own economic activities, but also to cover transportation costs and then to be able to mobilize to a paid work place.

At the national level (Table 26), for persons between 18 and 64 years old, a 10% increase in household consumption increases the number of working hours by 1.2%. The effect is the same for persons with consumption per capita lower than USD 100 per month (quintiles 1 to 4), while it is not significant for persons with higher consumption (quintile 5).⁴¹ A positive effect is related with the capacity to overcome financial constraints to start or enhance productive activities. This kind of effects has been found especially for poor individuals (e.g. Samson et al, 2004).

³⁹ The Wald test of independent equations shows that the error terms of the selection and the structural equations are un correlated but only for the age groups 18-30 and 18-64. The excluded instruments are validated by the overidentification test for all age groups (the null hypothesis cannot be rejected at 5% level), while it is rejected for the structural equation for the subsamples that include the age group 18-30.

⁴⁰ In the models for poor rural persons the error terms of the selection and structural equation are not correlated (the null hypothesis of $\rho=0$ is rejected at 1% level for all the specification, except for the age group 15-17 where it is rejected at 10% level). The null hypothesis for the overidentification test (i.e. instruments are uncorrelated with the error term and correctly excluded from the equation) cannot be rejected at 10% level for the structural equation, and at 1% level for the selection equation

⁴¹ The null hypothesis that the error terms between the selection and structural equations are not correlated is rejected at 1% level. The null hypotheses for the overidentification test cannot be rejected at 1% and 10% levels for the structural and selection equations respectively for the general model and the subsample of persons with higher consumption, while the null hypotheses cannot be rejected at 1% and 10% levels for the structural and selection equations for model of lower consumption.

Finally, a probit model with sample selection is estimated to identify the effect on formal work (i.e. earning a wage) (Equation 11). The selection equation estimates the probability of paid work (Equation 9).⁴²

$$\Pr(L(\text{formal})_i = 1 | L(\text{paid})_i = 1) = \phi(\ln(\widehat{\text{consumption}})_j, N_i^{\text{lf}}, N_j^{\text{lf}}) \quad (\text{Equation 11})$$

A 10% increase in household consumption is related with a 22 percentage points higher probability of formal work for persons between 18 and 64 years old in urban areas (Table 27). However, the effect is only significant for those between 18 and 30 years old. In the case of rural areas the effect is an increase of 7.8 percentage points for all persons between 18 and 64 years old. In this case, the effect is higher for persons between 31 and 45 years old (14 percentage points). In general, the probability to move to formal work may increase if household financial constraints are reduced, especially in urban areas; however the final effect depends on the capacity of the formal economy to include more workers.

This subsection has analysed the effect of SPI on labour decisions, using household consumption as a proxy for household disposable income. First, we have examined the choice between paid, unpaid and no work. For persons between 18 and 64 years old, a 10% higher household consumption reduces the probability of unpaid work for poor individuals in urban (10 percentage points) and rural (8.9 percentage points) areas as well as for non poor individuals in urban (2.8 percentage points) and rural (1.4 percentage points) areas. The effect on paid work is not significant in urban areas, but it is positive for poor individuals in rural areas (5.9 percentage points). In this sense social protection is likely to generate labour mobility from unpaid to paid activities in Cambodia, because poor households are able to afford transportation costs and to overcome financial constraints.

Second, we have examined labour supply in terms of the number of hours worked. Higher household consumption does not affect the labour supplied for poor urban persons. However it does reduce labour supply in the case of poor rural individuals, which may be related with a change from unpaid to paid activities. More precisely, a 10% increase in household consumption increases labour supply by 1.2% for all individuals between 18 and 64 years old, with consumption under USD 100 per person per month. For these reasons, it can be said that social protection rather than discouraging labour supply may instead foster it especially in the case of poor persons. Finally, it has been shown that social protection, by increasing household disposable income (approximated by consumption), encourages formal labour. A 10% higher household consumption increases the probability of paid work by 22 percentage points in the case of persons between 18 and 30 years old. However, this last effect depends on the capacity to expand in the formal sector of the economy.

⁴² Tests for the excluded instruments validate them. The null hypothesis of the overidentification test (i.e. instruments are uncorrelated with the error term and correctly excluded from the equation) cannot be rejected at the 5% level for the selection equation, while it cannot be rejected at the 1% level for the final equation.

Table 26: Selection model of log work hours; selection: Pr(paid work = 1)

Variable	(15-17)	(18-30)	(31-45)	(46-64)	(18-64)	
Urban (Poor)						
ln(Consumption) (q)	1.035 (1.719)	0.305 (0.496)	0.397 (0.448)	0.003 (0.708)	0.188 (0.325)	
Age	-3.133 (6.052)	-0.142 (0.097)	-0.019 (0.106)	0.320 (0.215)	-0.053 (0.010)	***
Age^2	0.099 (0.188)	0.002 (0.002)	0.000 (0.001)	-0.003 (0.002)	0.001 (0.000)	***
Female=1	0.279 * (0.168)	0.036 (0.045)	-0.230 (0.068)	0.325 ** (0.155)	0.138 (0.031)	***
(Year 2009)=1	-0.312 (0.877)	-0.297 (0.251)	-0.238 (0.224)	0.060 (0.367)	-0.236 (0.163)	
Schooling	-0.067 (0.061)	-0.003 (0.013)	-0.003 (0.014)	0.015 (0.015)	-0.003 (0.008)	
N	381	1,011	639	369	2,019	
Log Pseudo Likelihood	-185	-833	-630	-300	-1,830	
Wald test of independent equations (Rho = 0) P-value	0.870	0.00	0.980	1.000	0.000	
Overidentification test (Sargan J statistic) P-value	0.596	0.007	0.663	0.059	0.011	
P-value (selection equation)	0.085	0.347	0.300	0.237	0.119	
Rural (Poor)						
ln(Consumption) (q)	-0.757 (0.889)	-0.918 ** (0.452)	-0.744 * (0.415)	0.357 (0.697)	-0.585 * (0.305)	
Age	-4.246 ** (2.038)	-0.167 *** (0.040)	0.026 (0.052)	-0.091 (0.078)	-0.044 (0.004)	***
Age^2	0.137 ** (0.064)	0.003 *** (0.001)	-0.000 (0.001)	0.001 (0.001)	0.000 (0.000)	***
Female=1	0.070 (0.050)	0.054 ** (0.022)	0.174 *** (0.025)	0.219 *** (0.036)	0.139 (0.015)	***
(Year 2009)=1	0.460 (0.481)	0.314 (0.239)	0.239 (0.219)	-0.350 (0.371)	0.142 (0.161)	
Schooling	-0.007 (0.014)	0.009 (0.006)	0.008 (0.007)	0.003 (0.008)	0.007 (0.004)	*
N	3,091	7,474	4,896	2,519	14,889	
Log Pseudo Likelihood	-1,850	-6,930	-5,050	-2,890	-15,200	
Wald test of independent equations (Rho = 0) P-value	0.096	0.000	0.000	0.000	0.000	
Overidentification test (Sargan J statistic) P-value		0.218	0.797	0.583	0.531	
P-value (selection equation)	0.092	0.027	0.479	0.761	0.038	
National						
ln(Consumption) (q)					0.124 (0.015)	***
ln(Consumption>100) (q)					0.133 (0.163)	
ln(Consumption<=100) (q)					0.124 (0.015)	***

Note: Heteroskedasticity-consistent standard errors (in brackets) are estimated, clustered at the household level. All specifications include head of house age, household maximum schooling, number of persons by five age groups, dummy variables for assets (dwelling, bicycle, motorcycle and car) and a dummy for public provided electricity. Dummy variables for productive livelihoods (plot, livestock, business and credit) are included in the selection equation. The model at the national level also includes dummy variables for three regions (Phnom Penh, other urban and other rural). Summary statistics are for the selection model, while tests are reported for linear models independently for the final and the selection equations. Excluded instruments are dummy variables for toilet facility and roof quality (Table 46 in Annex 3).

(q) Predicted by equation 4.

*** Significance at 1%, ** significance at 5%, * significance at 10%

Source: Own calculations based on the CSES 2004 and 2009

Table 27: Average marginal effect on Pr(formal labour = 1 | paid work =1)

Variable	(18-30)	(31-45)	(18-45)	(18-64)
Urban (Poor)				
ln(Consumption) (q)	2.129 *** (0.743)	0.638 (1.597)	1.516 ** (0.596)	2.172 *** (0.446)
Age	0.139 ** (0.055)	0.081 (0.085)	-0.001 (0.014)	0.007 (0.006)
Age^2	-0.003 ** (0.001)	-0.001 (0.001)	-0.000 (0.000)	-0.000 ** (0.000)
Female=1	-0.126 *** (0.027)	-0.188 (0.213)	-0.168 *** (0.024)	-0.187 *** (0.018)
(Year 2009)=1	-0.982 *** (0.368)	-0.257 (0.862)	-0.684 ** (0.296)	-0.985 *** (0.222)
Schooling	0.000 (0.007)	0.008 (0.007)	0.010 * (0.005)	0.011 ** (0.005)
Plot=1	-0.169 *** (0.037)	-0.130 (0.085)	-0.156 *** (0.031)	-0.061 *** (0.015)
Livestock=1	-0.061 * (0.036)	0.033 (0.027)	-0.021 (0.028)	0.004 (0.015)
Business=1	-0.026 (0.034)	-0.063 (0.053)	-0.041 * (0.025)	0.031 ** (0.013)
Credit=1	0.019 (0.029)	-0.091 (0.063)	-0.032 (0.021)	0.000 (0.012)
N	1,011	639	1,650	2,019
Overidentification test (Sargan J statistic)				
P-value	0.593	0.493	0.873	0.868
P-value (selection equation)	0.132	0.387	0.096	0.052
Rural (Poor)				
ln(Consumption) (q)	0.745 ** (0.365)	1.408 *** (0.360)	0.699 ** (0.277)	0.778 *** (0.229)
Age	0.028 (0.019)	-0.003 (0.027)	0.002 (0.004)	0.003 (0.002)
Age^2	-0.001 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 *** (0.000)
Female=1	-0.043 *** (0.011)	-0.146 *** (0.011)	-0.099 *** (0.007)	-0.095 *** (0.006)
(Year 2009)=1	-0.304 (0.194)	-0.685 *** (0.192)	-0.292 ** (0.147)	-0.340 *** (0.122)
Schooling	0.009 *** (0.003)	0.017 *** (0.003)	0.014 *** (0.002)	0.015 *** (0.001)
Plot=1	-0.165 *** (0.018)	-0.004 (0.003)	-0.142 *** (0.012)	-0.117 *** (0.010)
Livestock=1	-0.081 *** (0.018)	0.001 (0.003)	-0.057 *** (0.012)	-0.056 *** (0.011)
Business=1	-0.009 (0.012)	0.014 *** (0.002)	-0.003 (0.008)	0.004 (0.007)
Credit=1	0.011 (0.011)	0.003 (0.002)	0.016 ** (0.007)	0.015 ** (0.006)
N	7,474	4,896	12,370	14,889
Overidentification test (Sargan J statistic)				
P-value	0.028	0.528	0.041	0.056
P-value (selection equation)	0.342	0.279	0.214	0.219

Note: Heteroskedasticity-consistent standard errors (in brackets) are estimated, clustered at the household level for the final probit models, and by the delta method for the average marginal effects. All specifications include head of house age, household maximum schooling, number of persons by five age groups, dummy variables for assets (dwelling, bicycle, motorcycle and car) and a dummy for roof quality. Dummy variables for productive livelihoods (plot, livestock, business and credit) are included in the selection equation. Summary statistics are for the selection model, while tests are reported for linear models independently for the final and the selection equations. Excluded instruments are dummy variables for toilet facility and electricity (Table 46 in Annex 3).

(q) Predicted by equation 4.

*** Significance at 1%, ** significance at 5%, * significance at 10%

Source: Own calculations based on the CSES 2004 and 2009

3.4. Dynamic model: Benefits, Costs and Rates of Return

In order to identify potential benefits of SPI over time, we apply dynamic microsimulation⁴³. The main difference between static and dynamic microsimulation is that the latter allows individuals to change due to endogenous factors. The baseline is 2009 using the data from the CSES 2009. Weights are aligned with official projections (i.e. NIS, 2011c) by post stratification differentiating between urban and rural households in any period. The objective of the model is to estimate changes over time in: human capital (schooling), household consumption and labour force at the regional (Phnom Penh, other urban and other rural) and national level.

Benefits are estimated as the difference between the base line (without any SPI) and a given policy scenario. Scenario 10 is used in order to include different social protection instruments, based on the selection done in the previous section. This scenario includes: i) cash transfers for poor children up to 6 years old in rural areas, limited up to two children per household (Scenario 3), ii) Social pensions for poor persons over 64 years old (Scenario 5), iii) Scholarships for poor children in rural areas attending lower secondary education (Scenario 7), and iv) Public works programme (PWP) covering 10% of poor households in rural areas (Scenario 9).

The model includes three modules: demography, human capital accumulation and household consumption based on the effects estimated in the previous section. Other variables and changes in economic and structural conditions are assumed to have the same effects on the base line and policy scenarios, and therefore they cancel out. The simulation is done for 20 discrete periods $t = \{1, \dots, 20\}$. It is not aimed at generating predictions but at providing estimates for a comparative analysis between a base line and the joint policy scenario (Scenario 10). Beneficiary households are identified at each period based on targeting criteria (age of individuals, poverty condition and region).

Households are determined by the number of members by age and by gender, region (Phnom Penh, other urban and other rural), household consumption and poverty condition⁴⁴ using the CSES 2009. Schooling (i.e. total number of education years achieved) is determined for each individual by gender and age. Finally, initial probabilities are identified by gender and age for: school attendance, labour participation and paid (formal and informal) and unpaid labour.

Population ageing (demographic module) is based on survival rates calculated from official population projections by age, sex and region (urban and rural) available from the National Institute of Statistics (NIS). Age is increased one year by period. Finally, new births are probabilistically assigned to each household as follows:

$$\Pr(\text{New_birth}_j = 1) = \phi(\ln(\text{consumption})_j, N_j^{n-b}) \quad (\text{Equation 12})$$

⁴³ For surveys on dynamic microsimulation models and techniques, see O'Donoghue (2001) and Li and O'Donoghue, (2012).

⁴⁴ Based on "updated" poverty lines (Box 1).

Equation 12 is estimated independently by gender (boys and girls). Estimation is done based on household characteristics, and restricted to be positive only for households with at least one woman at childbearing age (i.e. 15 to 44 years old). The set of household characteristics (N_j^{n-b}) is presented in table 47 (Annex 3), and results are in table 48 (Annex 4). Later, total population is compared with official projections (by age, gender and region) and weights are adjusted by post stratification, differentiating between urban and rural regions, to align with official projections (i.e. NIS, 2011c). Periods correspond to years between 2009 and 2028, using the CSES 2009 as starting point.

Aggregate results are presented in table 50 (Annex 5). The difference between simulated aggregates and official projections for the population is lower than 0.3% for any period. The total population in Cambodia is projected to grow at an average rate of 1.3% per period, increasing from 14 million people in period 1 to 18 million in period 20. The relation between rural and total population decreases from 0.8 to 0.7 throughout 20 periods, while total dependency ratio (population under 15 years old plus individuals 65 years old and older over persons between 15 and 64 years old) decreases from 0.58 to 0.56. The model estimates SPI costs per period, education level (schooling), household consumption and poverty and inequality. Comparative outcomes between the base line and policy scenario are presented in table 51 (Annex 6).

Human capital accumulation is limited to education achievements. School attendance is simulated using the results of equation 6. Benefits (B_s) are estimated as the difference between the change in average schooling for the total population of the policy ($S^{l,1}$) and the base line ($S^{l,0}$) scenario over time (from $t = 1$ to $t = T$), following:

$$B_{S^l, t=T} = (S_{t=T}^{l,1} - S_{t=1}^l) - (S_{t=T}^{l,0} - S_{t=1}^l) = (S_{t=T}^{l,1} - S_{t=T}^{l,0}) \quad (\text{Equation 13})$$

Household consumption is initially determined using the CSES 2009, and then adjusted using the policy scenario. From the second period on, changes on household consumption are simulated through the return on human capital accumulation (previously simulated) based on the results of equation 4. Total household consumption (C) growth rates ($g_C = (C_{t=T}/C_{t=1})^{1/T} - 1$) are estimated over time (from $t = 1$ to $t = T$) for the base line and the policy scenario. The difference between them represents the benefit in economic development at the micro level (B_C).

$$B_{C, t=T} = \left[\left(\frac{C_{t=T}^1}{C_{t=1}} \right)^{1/T} - 1 \right] - \left[\left(\frac{C_{t=T}^0}{C_{t=1}} \right)^{1/T} - 1 \right] = \frac{(C_{t=T}^1)^{1/T} - (C_{t=T}^0)^{1/T}}{(C_{t=1})^{1/T}} \quad (\text{Equation 14})$$

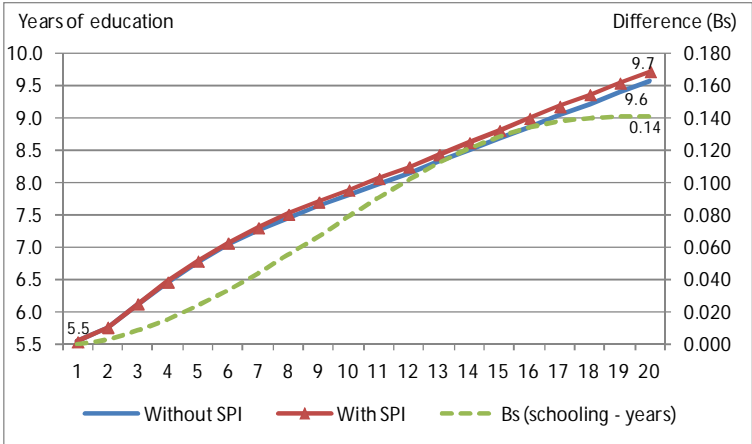
The dynamic benefit on poverty and inequality (B_p^d, B_G^d) is estimated for the effect between $t=1$ and $t=T$, where $T = \{1, \dots, 20\}$, based on the results of the dynamic microsimulation. These benefits include household effects and the returns on human capital accumulation at the household level. The benefit is the difference of the changes in poverty and inequality between the base line and policy scenarios over time (from $t=1$ to $t=T$).

$$B_{P,t=T}^d = (P_{t=1}^0 - P_{t=T}^1) - (P_{t=1}^0 - P_{t=T}^0) = (P_{t=T}^0 - P_{t=T}^1) \tag{Equation 15}$$

$$B_{G,t=T}^d = (G_{t=1}^0 - G_{t=T}^1) - (G_{t=1}^0 - G_{t=T}^0) = (G_{t=T}^0 - G_{t=T}^1) \tag{Equation 16}$$

Table 28 presents results of equations 13 to 16 for selected periods. Results for every period are in table 52 (Annex 7). SPI and their benefits are simulated according to the demographic pattern previously mentioned, and the outcomes from table 51 (Annex 6). Total average education level is slightly higher if social protection investments are introduced. For example, in periods 5 and 20 the median education level (schooling) is 0.02 and 0.14 years higher (0.4% and 1.5%, respectively) under a simulation with SPI than under the simulation without it.

Figure 10: Total population average education level (schooling) with and without SPI (X axis = period)



Source: Own calculations based on CSES 2009.

Nevertheless the difference is higher than 0.5% after 6 periods and higher than 1% after 10 periods. In this sense, the duration of SPI is important to achieve benefits in terms of human capital accumulation. Furthermore, the increasing quality of education and its economic returns create incentives to invest further in education.

Table 28: Dynamic benefits of social protection investments – Difference between base line and policy scenarios in period $t = T = \{5, 10, 15, 20\}$

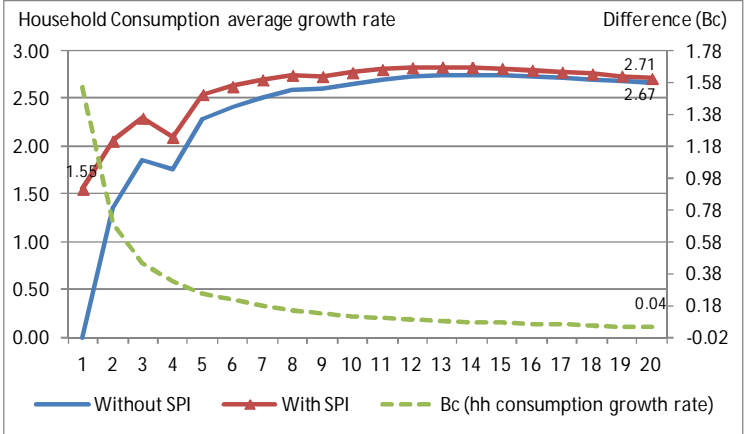
Benefit	Period 5	Period 10	Period 15	Period 20
Bs (Schooling - years)	0.024	0.079	0.129	0.141
Bc (Average household consumption growth rate per year - %)	0.256	0.116	0.072	0.043
Bp (Poverty - headcount - %)	4.830	4.200	3.800	2.630
Bg (Inequality - Gini index)	0.014	0.013	0.012	0.010

Note: Average household consumption growth rate per year is estimated between periods $t=1$ and $t=T$.

Source: Own calculations based on CSES 2009.

Total household consumption grows by an additional 0.04 percentage points if SPI are implemented over the period $t=1$ to period $t=T=20$. The change in the level of total household consumption in period 1 is solely due to the social protection instruments (transfers), while the increase in subsequent periods is also due to higher human capital (approximated by education level). Household consumption grows faster if SPI are implemented (Figure 11) indicating the potential positive economic impact of SPI in Cambodia. The difference does decrease over time as the need for SPI is going down due to the decline in poverty.

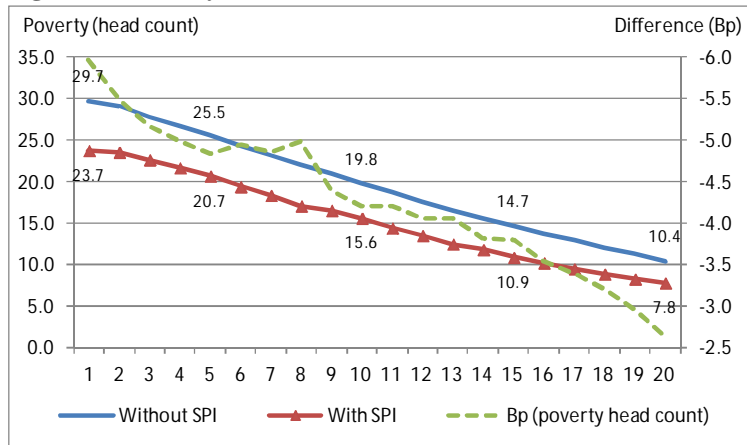
Figure 11: Household consumption average growth rate between $t=1$ and $t=T$, % (X axis = period T)



Source: Own calculations based on the CSES 2009.

Finally, poverty and inequality decrease faster thanks to SPI. The poverty headcount is 4.8 (2.6) percentage points lower if SPI are implemented after 5 (20) periods (Figure 12); while the Gini coefficient for consumption is 0.014 (0.010) points lower with SPI in the same period. The size of these benefits decreases over time because less people receive the transfers each period as it is targeted to the poor. It is important to note that the model does not generate prediction about future poverty levels, because poverty lines may change over time. However, the model allows comparing between two different scenarios under similar conditions. Results show that social protection investments do generate both social and economic returns in Cambodia.

Figure 12: Poverty headcount (National level), % (X axis = Period)



Source: Own calculations based on the CSES 2009.

3.4.1. Rates of Return of Social Protection in Cambodia

The rate of return (RoR) on economic development is estimated in terms of household consumption based on the return of human capital accumulation previously estimated (micro level economic development). In addition, the potential effect of SPI through human capital accumulation on productive capacity is analysed. The numerator in Equation 17 is the present value of the difference between total household consumption of the policy (C_t^1) and baseline (C_t^0) scenarios. It is the net benefit of SPI on household consumption from period 1 to period T. The denominator is the present value of the cost of SPI. δ is the discount rate used to compute present values. In this analysis three values are used ($\delta = \{2\%, 3\%, 4\%\}$). In this sense the RoR_c is calculated for any period between $t = 1$ and $t = 20$. It is the net benefit (in terms of household consumption) as the percentage of the SPI's cost in period T.

$$RoR_{C,T} = \left[\frac{\sum_{t=1}^T (C_t^1 - C_t^0)(1 + \delta)^{-t}}{\sum_{t=1}^T I_t (1 + \delta)^{-t}} - 1 \right] \times 100 \quad (\text{Equation 17})$$

Table 29 presents the results of equations 17 in periods 5, 10, 15 and 20 using different discount rates⁴⁵ (results for every period are in table 52, annex 7). The RoR of SPI measured by total household consumption increases with time from -11.6% in period 1 to -10.1% in period 5, and to between 11.9% and 14.7% in period 20.

⁴⁵ In order to estimate RoR over time it is necessary to calculate present values. In this study three referential discount rates are used for sensitivity analysis.

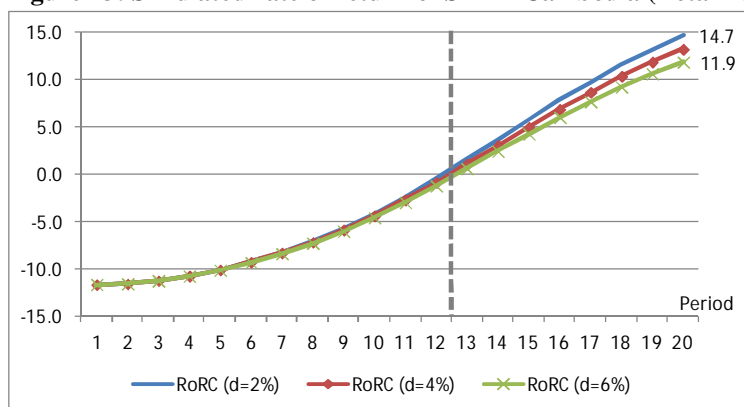
Table 29: Rates of return of SPI in Cambodia, between period 1 and period T = {5,10,15,20}

Rates of return	Period 5	Period 10	Period 15	Period 20
Discount rate (%)	2	2	2	2
RoRc (hh Consumption)	-10.05	-4.14	5.77	14.68
Discount rate (%)	3	3	3	3
RoRc (hh Consumption)	-10.07	-4.35	5.01	13.25
Discount rate (%)	4	4	4	4
RoRc (hh Consumption)	-10.09	-4.55	4.29	11.88

Source: Own calculations based on the CSES 2009.

The RoR becomes positive after period 12 (Figure 13). It means that the net benefit (difference in total household consumption between policy and baseline scenario) becomes higher than the cost of the investment (including administrative costs) after 12 periods, generating a positive economic return of around 5% after 15 periods and between 12% and 15% after 20 periods. This return is related to the benefit, presented in the previous subsection (Figure 11), of a 0.04 percentage points higher per year higher average total household consumption's growth rate.

Figure 13: Simulated rate of return of SPI in Cambodia (Total household consumption)



Source: Own calculations based on the CSES 2009.

However, the final effect through higher household consumption should be complemented by higher productive capacity. In this case of Cambodia it is likely to happen because a GDP growth rate around 7% is expected and different policies are being implemented to reach this objective. In addition, it is important to note that benefits and RoR are most probably underestimated due to the exclusion of possible institutional, health improvements (e.g. nutrition), spillover, local multiplier, and behavioural (non-income) effects. Moreover, the model does not include the effects of PWP due to new infrastructure creating and livelihoods generation. Similarly, complementary policies in the area of sanitation, health care and quality of education will strengthen the positive effect on the potential RoR. Besides, if vulnerability and human capital constraints are not addressed, future economic development can be compromised.

The specific design of social protection interventions, administrative issues and financing aspects also affect the potential benefits and returns of SPI investments. For instance, the

efficiency and effectiveness of SPI must be constantly reviewed by systematic and regular monitoring and evaluation. Finally, financial sustainability and the effect of taxation and budget reallocation must be studied in the near future to ensure a successful implementation of NSPS. In any case, the results show that SPI investment may generate positive effects on both social and economic outcomes, and, hence, are necessary for the future development of Cambodia. However, the investment will pay off with positive returns only in the mid and long-term. In this sense it is important to maintain political will and social commitment, and to coordinate the implementation of SPI with all the stakeholders in the country. Finally, complementary policies to achieve and sustain high economic growth and to increase public services quality and coverage will further strengthen the effects of SPI. In this sense, the implementation of the NSPS should be seen as a multisectoral policy to achieve higher results than those that can be produced by SPI alone.

IV. FINAL REMARKS

Despite important socio-economic improvements in Cambodia, vulnerability is still high for most of the population. Total GDP grew at an average rate of 7.3% per year between 1992 and 2010, while the poverty rate declined from 47% in 1993 to 30.1% in 2007. Furthermore, net enrolment in primary education reached 95% in 2009 and under-five mortality decreased to 54 per 1,000 lives in 2010. However maternal mortality rate and the prevalence of underweight among under-five children have not changed in the last years. In addition, people are exposed to vulnerable employment, natural disasters, lack of basic infrastructure, low quality of health care and low levels of human capital.

In order to address some of the current and future challenges in Cambodia, the Royal Government of Cambodia launched at the end of 2011 the National Social Protection Strategy for the Poor and Vulnerable (NSPS) with the objective to “contribute not only to the rehabilitation and stability of the economy in the near future, but also to the enhancement of human capital indicators, including those on education, health and livelihoods development, towards the longer-term achievement of the Cambodian Millennium Development Goals” (RGC, 2011b). This study provides evidence to support the design and implementation of the NSPS by estimating potential Rates of Return using ex-ante microsimulation techniques.

In line with the international evidence direct (distributional) and behavioural effects of non-contributory social protection are studied using data from the Cambodian Socio-economic Survey (CSES). Static microsimulation is used to estimate the cost and effect of different social protection instruments (cash transfers, scholarships, social pensions and public works programmes) on poverty and inequality. A joint policy scenario is defined to cover persons throughout the life cycle. The cost is estimated at 1.6% of GDP using the CSES 2009. It is shown that poverty headcount can be reduced by 5.9 percentage points with a minimum package of social protection instruments (SPI). In the same way the Gini coefficient is reduced to 4.9%.

To estimate a rate of return to SPI a certain number of computations are necessary. First, we must include the return of education on income (approximated by wages for those persons in the formal sector). On average, an additional year of education is related with a 4.1% (6.3% in urban areas, and 3.3% in rural regions) higher wage in Cambodia. It means that promoting higher education may increase labour productivity and income. These results are low in comparison with international evidence. It may be due to a low quality of education and a low economic productivity. In this sense, complementary policies may be needed to increase the effect of education on income. Because most Cambodians work in the informal sector, an additional estimation is needed. Due to data limitations the model is adjusted to the household level, and the return of education on household income (approximated by consumption) is calculated. The maximum level of education in a household is used to capture the “allocative effect” (i.e. the ability to allocate resources). On average, an additional year of education is related with a 4.4% higher household consumption. This effect is 4.2% (1.6%) for (poor) urban persons, and 2.6% (1.8%) for (poor) rural individuals.

Second, the effect of higher household consumption on school attendance and underweight are estimated. On average a 10% increase on household consumption raises the probability of attending school by 0.2 percentage points. This effect is significantly higher for rural (2.0 percentage points) and poor rural persons (2.7 percentage points). However, it is found that the effect is higher, in the case of poor rural households, for lower secondary education (5.6 percentage points) than for primary education (2.2. percentage points), and not significant for tertiary education. In this sense, social transfer may increase school attendance by generating the necessary resources, especially in the case of poor rural individuals. Furthermore, the effect is higher if the transfer is targeted to lower secondary education. It is to be noted that these effects can be enhanced if complementary policies are implemented to increase the quality of education and labour market opportunities. In the case of health status, the effect of household consumption on under-five malnutrition is estimated. On average, a 10% increase in household consumption per capita is related with a 0.4 percentage points lower probability of being underweighted. However, this effect is not significant for poor children. In fact, other factors such as sanitation conditions and the mother's education level should be addressed by complementary policies.

Third, the effect of social transfers through higher disposable income on labour decisions is studied using three different regression models. In the case of labour participation it is found that social transfers may discourage unpaid work for poor individuals, but to promote (positive effect) paid work for poor individuals in rural areas. In this sense, SPI if properly targeted to the poor, rather than discouraging labour supply, generates resources to cover transportation costs and to overcome financial and credit constraints. Similar results are found for labour supply in terms of number of hours of work supplied. The effect is positive for individuals from a household with consumption under USD 100 per person per month (80% of the population), and it is insignificant for the richest 20% of the population. Even more, it is found that social transfers by increasing household disposable income promote formal labour.

Fourth, based on the previous results, a dynamic microsimulation model is estimated in order to identify SPI benefits and Rates of Return (RoR) over time. Four SPI (cash transfers, social pensions, scholarships and public works) are jointly modelled as cash transfers. Specific design characteristics can therefore not be captured. It is found that the population's average years of education are higher if SPI are implemented. After 20 periods the difference is 0.14 years (1.5% higher) and it is increasing over time. However, the benefit is not generated immediately. SPI should be implemented permanently in order to guarantee resources to invest in education. In the case of total household consumption it is found that, after 20 periods, the average annual growth rate is 0.04 percentage points higher if SPI are implemented. It means that SPI investments have the potential to increase economic growth rate, as long as the economy can react to higher effective demand, which is likely to happen if resources are not being fully utilized and/or under expectations of high economic growth as in the case of Cambodia. In addition, both poverty headcount and Gini coefficient are lower if SPI are implemented. These results show that SPI may generate positive effects on socio-

economic development but also on economic performance. Finally, the RoR are calculated by dividing the difference in total household consumption between the policy (with SPI) and the baseline scenario (without SPI) by the cost of SPI, all properly discounted. It needs 12 periods to obtain a positive RoR. In period 20 the RoR is between 11.9% and 14.7% using different rates of discount. After 20 periods the cost of the investment is more than fully recovered, including administrative costs.

It is important to note that due to data and modelling limitations all SPI are simulated as cash transfers and the returns are assumed to be the same for all SPI. Nevertheless, behavioural (income) effects may be different according to specific design characteristics. In addition the model does not include financing issues neither is it able to compare with potential alternative investments. In this sense, the final results may be overestimated. On the other hand, behavioural (non-income) effects, health improvements (e.g. nutrition), spillovers, regional multipliers, and institutional effects are not taken into account, which most probably results in an underestimation of the returns. Moreover, if SPI are implemented as part of a multisectoral strategy returns can be fostered as sanitation conditions, infrastructure and public services (e.g. health and education) quality and coverage are developed and economic productivity is increased. Even more, social protection by solving human capital constraints helps to generate the conditions for future economic development. In the same way, SPI should be designed in order to promote positive behavioural (non-income) effects. Finally, permanent monitoring and evaluation during the implementation of the NSPS is vital to guarantee that the expected effects (e.g. school attendance, best feed and health care practices, livelihoods generations) are being achieved. Furthermore, collection of economic information over time at the local level (i.e. commune) and the design of a social accounting matrix are recommended for future research on the economic impact of the NSPS.

The study shows that SPI investments in Cambodia may generate both social and economic benefits, even recovering the cost of investment in the long term. The cost of the proposed SPI reaches 1.6% of GDP in period 1 and then decreases to 0.8% of GDP in period 20. This amount of resources seems affordable for Cambodia, and the political will has been established in the NSPS. However, it is necessary to guarantee resources for SPI investments over time, as most of the benefits occur in the long term. In addition, it is important to note that social protection also generates social cohesion and helps to build peace. Finally, it is advisable for the Royal Government of Cambodia to generate data and a research agenda to study aspects of the implementation of the NSPS not covered in this study as for example: i) financing aspects through taxation, contributory schemes and a comparison with alternative public investments; ii) behavioural (non-income) effects; iii) health sector (i.e. HEF and CBHI); iv) macro analysis using a social accounting matrix; and v) regional multipliers by collecting economic data at the commune level.

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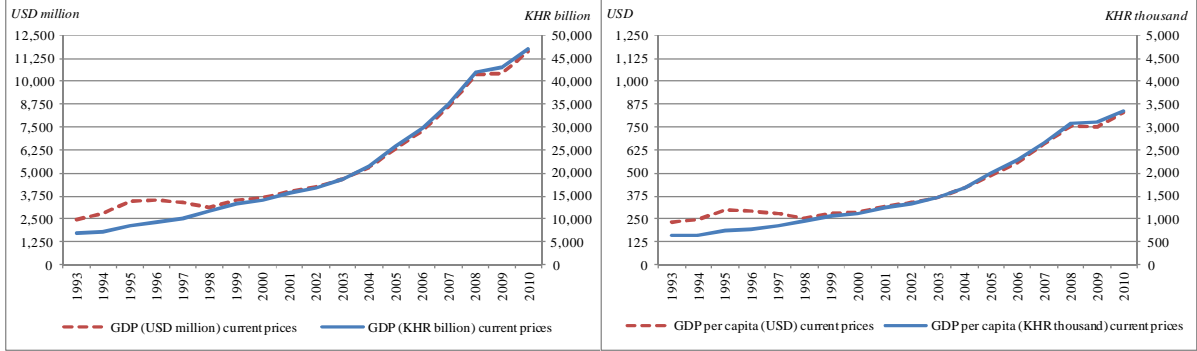
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Annex 1: Economic Background Information

Current GDP increased from USD 2,480 million (KHR 6,813 billion) in 1993 to USD 11,634 million (KHR 47.048 billion) in 2010. Per capita GDP grew at an annual average rate of 5.3% between 1993 and 2010, increasing from USD 229 (KHR 629 thousand) to USD 830 (KHR 3,355 thousand) in current prices, during the period (Figure 12).

Figure 14: Total GDP and per capita GDP at current prices (1993 – 2010)



Source: NIS (2011b) and SNEC (2011)

The average growth rate, of total GDP, at constant prices (2000) during 1993-2010 is 7.3% per year. Between 2004 and 2007 Cambodia achieved economic growth rate over 10%. In 2011, 34.6% of GDP is concentrated in agriculture, fishery and forestry, especially in crop production (20%). “Cambodia is and will remain for the foreseeable future fundamentally a rural society and economy, with most Cambodians depending directly or indirectly on agriculture for their livelihoods” (RGC, 2011a: 12). However, the share of the industrial sector on total GDP has increased from 14.3% in 1995 to 22.1% in 2011, and is expected to represent almost 25% of the economy for 2015. The industrial sector is mainly related with textile, wearing apparel and footwear manufacturing (10%) and construction (5.8%). Finally the service sector accounts for 37.5% of current GDP (Table 30).

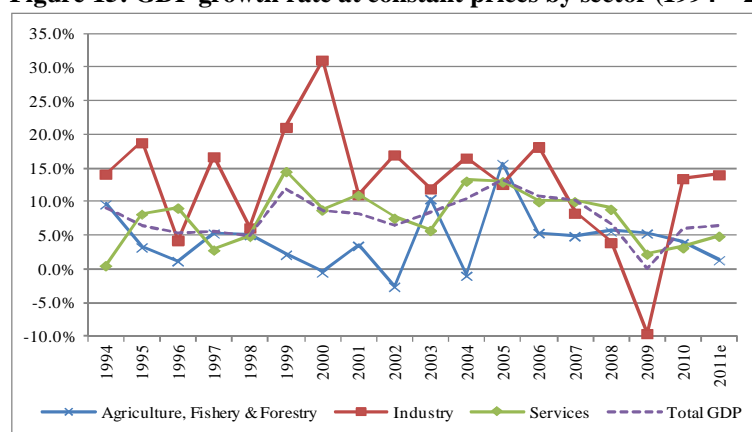
Table 30: GDP shares at current prices by sector (1995 – 2015)

GDP shares at current prices (%)	1995	2000	2005	2009	2010	2011e	2015p
Agriculture, Fishery & Forestry	47.7%	35.9%	30.7%	33.5%	33.9%	34.6%	32.5%
Crops	23.2%	16.1%	15.7%	18.4%	19.0%	20.6%	20.1%
Livestock & Poultry	6.1%	5.6%	4.7%	4.5%	4.5%	4.2%	3.9%
Fisheries	12.3%	10.8%	7.3%	7.7%	7.5%	7.2%	6.3%
Forestry & Logging	6.2%	3.5%	3.0%	2.9%	2.8%	2.6%	2.2%
Industry	14.3%	21.9%	25.0%	21.7%	21.9%	22.1%	24.4%
Mining	0.2%	0.2%	0.4%	0.5%	0.6%	0.6%	0.8%
Manufacturing	9.1%	16.0%	17.8%	14.4%	14.7%	15.2%	17.2%
Food, Beverages & Tobacco	4.1%	3.2%	2.4%	2.3%	2.3%	2.2%	2.3%
Textile, Wearing Apparel & Footwear	1.5%	9.2%	12.3%	9.1%	9.4%	10.0%	11.9%
Wood, Paper & Publishing	1.3%	0.9%	0.6%	0.6%	0.6%	0.6%	0.5%
Rubber Manufacturing	0.4%	0.5%	0.5%	0.4%	0.5%	0.5%	0.5%
Other Manufacturing	1.9%	2.2%	2.1%	2.0%	2.0%	1.9%	1.9%
Electricity, Gas & Water	0.4%	0.4%	0.5%	0.5%	0.5%	0.5%	0.5%
Construction	4.5%	5.2%	6.3%	6.3%	6.0%	5.8%	5.9%
Services	34.2%	37.1%	39.1%	38.8%	38.3%	37.5%	36.9%
Trade	11.9%	10.7%	9.2%	9.0%	9.3%	9.1%	9.1%
Hotel & Restaurants	2.8%	3.7%	4.3%	4.5%	4.5%	4.3%	4.6%
Transport & Communications	5.2%	6.6%	7.4%	7.5%	7.6%	7.6%	7.7%
Finance	0.9%	1.2%	1.1%	1.4%	1.4%	1.5%	1.9%
Public Administration	2.8%	2.7%	1.8%	1.8%	1.7%	1.6%	1.5%
Real Estate & Business	5.7%	6.1%	6.6%	6.1%	5.5%	5.2%	4.8%
Other services	4.9%	6.1%	8.6%	8.5%	8.3%	8.0%	7.3%
Taxes on Products less Subsidies	4.7%	6.2%	6.2%	7.3%	7.2%	7.1%	7.8%
Less: Subsidies	0.1%	0.2%	0.3%	0.1%	0.1%	0.2%	0.2%
Less: Finance Service Charge	0.9%	1.1%	1.0%	1.1%	1.1%	1.1%	1.6%
Total GDP	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

(e) Expected; (p) Projected

Source: NIS (2011b) and SNEC (2011)

Figure 13 shows growth rates at constant prices by sector. While the service sector closely follows the general economy, agriculture and industry show higher volatility and even opposite trends between them. The industrial sector appears to be the main component to explain high economic growth in Cambodia over the last years. However, the sector was strongly affected in 2009 by the global economic crisis.

Figure 15: GDP growth rate at constant prices by sector (1994 – 2011)

(e) Expected

Source: NIS (2011b) and SNEC (2011)

Expenditure shares are presented in table 31. Household final consumption expenditures account for more than 73% of GDP for all the years between 1993 and 2010.

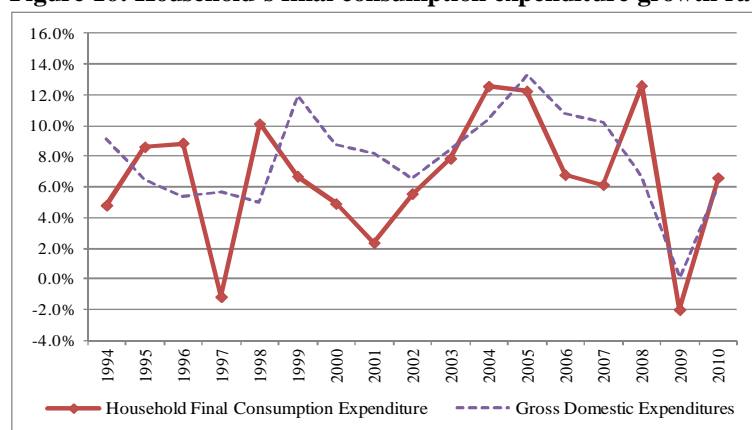
Table 31: GDP shares at current prices by expenditure (1995 – 2015)

GDP shares at current prices by expenditure (%)	1995	2000	2005	2009	2010	2011e	2015p
Final Consumption Expenditure	100.7%	94.0%	90.1%	84.1%	83.6%	75.0%	64.5%
Household Final Consumption Expenditure	92.6%	86.7%	81.9%	74.0%	73.1%	67.5%	58.1%
Private Non Profit Organisations (Serving Households)	2.2%	2.1%	2.4%	2.1%	2.1%	2.1%	2.0%
Government Consumption Expenditure	5.8%	5.2%	5.8%	8.0%	8.4%	5.4%	4.4%
Gross Fixed Capital Formation	13.9%	18.3%	18.9%	20.1%	16.0%	15.6%	26.5%
Livestock	0.9%	0.3%	0.3%	0.2%	0.1%	0.1%	0.1%
Durable Equipment	4.3%	7.9%	5.9%	5.3%	5.1%	5.1%	12.5%
Construction	8.7%	10.1%	12.7%	14.7%	10.8%	10.4%	14.0%
Change in Inventories	0.6%	-0.8%	-0.4%	1.3%	1.2%	1.3%	0.8%
Livestock & Poultry	-0.1%	-1.4%	1.1%	0.6%	0.5%	0.6%	0.4%
Industry	0.7%	0.6%	-1.5%	0.7%	0.7%	0.7%	0.4%
Exports of Goods and Services	31.2%	49.8%	64.1%	59.9%	66.1%	71.0%	58.5%
Merchandise, f.o.b.	25.8%	38.1%	46.3%	44.5%	49.7%	55.1%	46.0%
Services	5.4%	11.7%	17.8%	15.4%	16.3%	15.8%	12.4%
Less: Imports of Goods and Services	46.6%	61.8%	72.7%	63.0%	66.4%	66.9%	57.5%
Merchandise, f.o.b.	41.1%	52.8%	62.5%	53.7%	57.0%	58.3%	51.2%
Services	5.5%	8.9%	10.3%	9.3%	9.4%	8.7%	6.3%
Balance on External Goods and Services	-15.4%	-11.9%	-8.7%	-3.1%	-0.3%	4.1%	1.0%
Statistical Discrepancy	0.2%	0.3%	0.1%	-2.5%	-0.5%	4.1%	7.9%
Gross Domestic Expenditures	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

(e) Expected; (p) Projected

Source: NIS (2011b) and SNEC (2011)

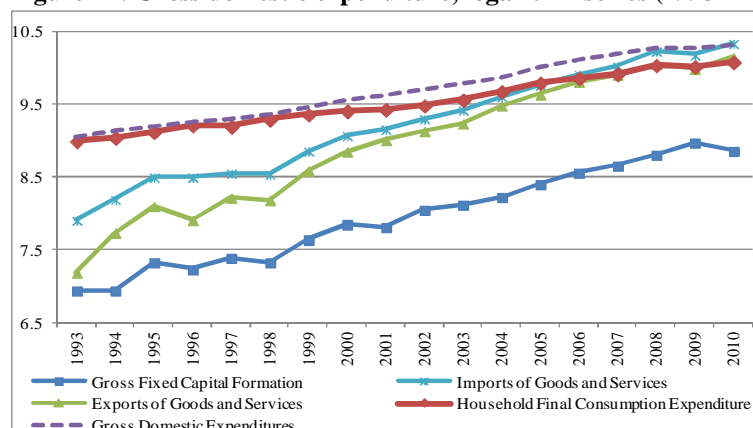
Household final consumption expenditures grew at an annual average rate of 6.2% between 1993 and 2010. Figure 14 shows that household consumption and total gross domestic expenditure followed a similar pattern between 1994 and 2010, with the exception of 1997 and 2008. The difference can be explained by changes in the trade balance (Figure 14) and public expenditure (Figure 18).

Figure 16: Household's final consumption expenditure growth rate (1994 – 2010)

Source: NIS (2011b) and SNEC (2011)

The relation between gross domestic expenditure and household expenditure can be seen in figure 18. The two series follow a similar trend, with a relatively stable long-term growth rate per year of 7.3% for GDP and 6.2% for household consumption. Both series had an average growth rate of 5.2% per year. After 1998 gross fixed capital formation and trade present a higher growth rate than in the previous years. Exports, imports and gross fixed capital formation have average growth rates of 17.9%, 14.4% and 11.3% per year between 1993 and 2010, respectively.

Figure 17: Gross domestic expenditure, logarithm series (1993 – 2010)



Source: NIS (2011b) and SNEC (2011)

Cambodian exports account for 33.4% of GDP in 2010, while imports represent 47.0% in the same year (Table 32). Current account deficit was 10.1% of GDP in 2010, and 3.8% including official transfers (grants, food aid, projects aid and technical assistance payments). Official transfers represent between 5.2% (2005) and 12.5% (1996) of GDP between 1993 and 2010. Foreign direct investment (FDI) decreased from 5.9% of GDP in 2000 to 3.0% in 2010.

Table 32: Current account as percentage of GDP (1995 – 2015)

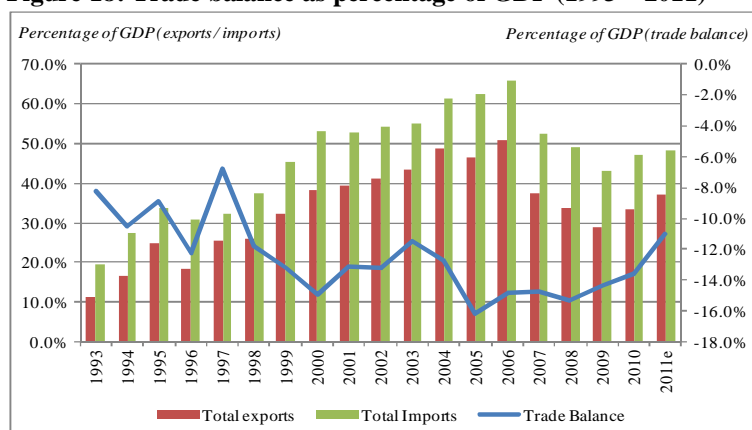
Percentage of GDP (%)	1995	2000	2005	2009	2010	2011e	2015p
Trade Balance	-8.9%	-14.9%	-16.2%	-14.4%	-13.6%	-11.0%	-5.2%
Total exports	25.0%	38.3%	46.2%	28.8%	33.4%	37.1%	46.0%
Total Imports	33.9%	53.2%	62.4%	43.2%	47.0%	48.1%	51.2%
Current accounts	-12.2%	-11.7%	-9.4%	-10.2%	-10.1%	-7.3%	-1.6%
Official transfers	9.8%	8.7%	5.2%	5.7%	6.3%	5.6%	4.2%
Current accounts (including transfers)	-2.4%	-3.0%	-4.2%	-4.5%	-3.8%	-1.7%	2.6%
Foreign Direct Investment	4.0%	5.9%	2.8%	3.0%	3.0%	2.3%	4.1%

(e) Expected; (p) Projected

Source: SNEC (2011)

Cambodia incurred a permanent trade deficit between 1993 and 2011 (Figure 19). This deficit increased from 8.2% of GDP in 1993 to 16.2% in 2008, and then reduced to 13.6% in 2010 (11.0% in 2011). Economic projections present a scenario to reduce the trade deficit to 5.2% of GDP in 2015.

Figure 18: Trade balance as percentage of GDP (1993 – 2011)



(e) Expected

Source: SNEC (2011)

Total investment represents 25% of GDP in 2011 (Table 33), which corresponds to the average level between 2005 and 2011, and a similar level is projected until 2015. Public investment accounts for 8.1% of GDP (33% of total investment) in 2011, while private investment corresponds to 16.8% of GDP (67% of total investment) in the same year. Private investment is mainly domestically financed. On the other hand public investment is foreign financed by 68% (2011).

Table 33: Investment as percentage of GDP (1995 – 2015)

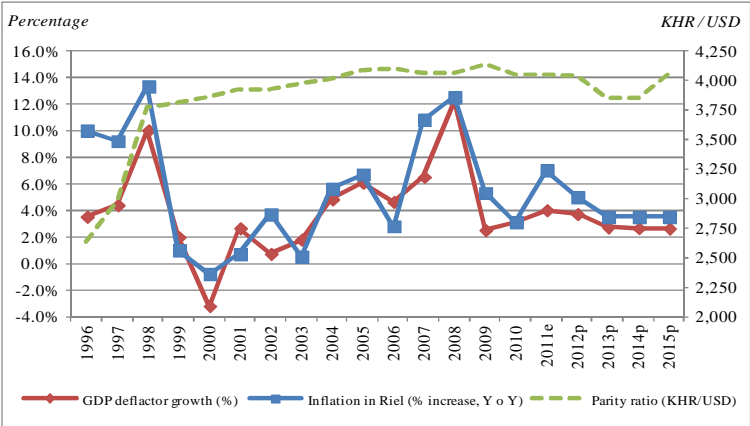
Percentage of GDP (%)	1995	2000	2005	2009	2010	2011e	2015p
Total Investment	22.8%	20.5%	21.5%	25.6%	28.4%	24.9%	25.4%
Public Investment	6.1%	5.9%	5.3%	9.1%	10.3%	8.1%	8.0%
Domestic financed	-0.6%	1.4%	0.8%	1.8%	2.5%	2.6%	2.6%
Foreign financed	6.7%	4.5%	4.5%	7.3%	7.9%	5.5%	5.4%
Private Investment	16.8%	14.7%	16.3%	16.5%	18.0%	16.8%	17.4%
Domestic financed	12.4%	10.8%	10.3%	11.5%	11.5%	11.5%	11.7%
Foreign financed	4.4%	3.9%	6.0%	5.0%	6.5%	5.3%	5.7%
Total Domestic Financed	11.8%	12.1%	11.1%	13.3%	14.0%	14.2%	14.3%
Total Foreign Financed	11.1%	8.4%	10.5%	12.3%	14.4%	10.8%	11.1%

(e) Expected; (p) Projected

Source: SNEC (2011)

Finally, inflation in KHR reached a peak of 12.5% in 2008, and then decreased to 3.1% in 2010. Future projections establish a scenario with a rate of 3.5% (Figure 20). The parity between KHR and USD increased from 2,474 KHR/USD in 1993 to USD 3,924 KHR/USD in 2001. The average relation during the 2000s has been around 4,000 KHR/USD, and it is expected to stay at 4,050 KHR/USD (year average) after 2011.

Figure 19: Inflation and currency parity (1996 – 2015)



(e) Expected; (p) Projected
 Source: SNEC (2011)

Public Finance

Domestic revenues were KHR 6,849 billion (~ USD 1,712 million), equivalent to 13.2% of GDP, in 2011 (Table 34). Current revenues represents 98.5% of domestic revenues, and the main source are indirect taxes (47% of domestic revenues), while direct taxes represents 15% of domestic revenues. Total public expenditures account for KHR 10,227 billion (~ USD 2,557 million) in 2011, representing 19.6% of GDP. Current expenditure represents 59% of total expenditures. Defence and security account for 21% of current expenditure; while civil administration represents 74% (salaries are 33% of civil administration expenditure).

The public budget presents a permanent deficit around 6% (6.5% in 2011) of GDP, which is mainly financed by foreign resources, mainly project aid (Figure 19), accounting for 82% of the deficit (5.3% of GDP) in 2011.

Table 34: Budget operations as percentage of GDP (1995 – 2015)

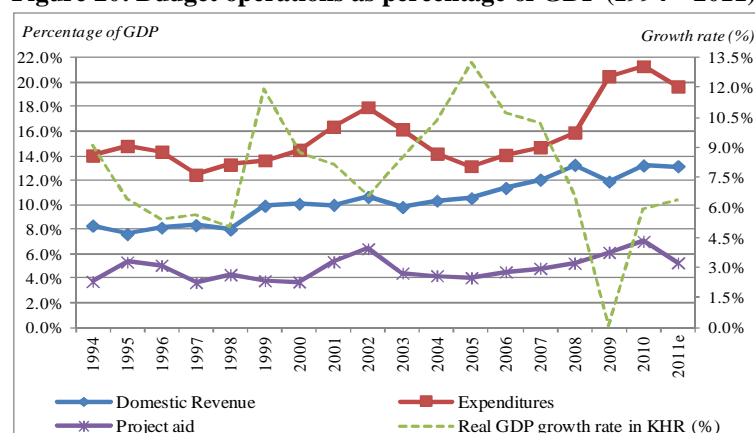
Percentage of GDP (%)	1995	2000	2005	2009	2010	2011e	2015p
Domestic Revenue	7.6%	10.1%	10.6%	11.9%	13.2%	13.2%	14.9%
Current Revenue	7.5%	9.9%	10.0%	11.8%	12.9%	13.0%	14.8%
Tax Revenue	5.3%	7.4%	7.7%	10.1%	10.7%	11.0%	12.7%
Tax Revenue (Central Gov.)	5.3%	7.4%	7.4%	9.7%	10.1%	10.5%	12.1%
Direct Taxes	0.2%	1.0%	0.9%	1.7%	1.7%	2.0%	2.5%
Indirect Taxes	1.2%	3.7%	4.3%	5.5%	6.0%	6.2%	7.1%
International Trade Taxes	3.8%	2.8%	2.2%	2.5%	2.5%	2.4%	2.6%
Tax Revenue (Prov.)	0.0%	0.0%	0.3%	0.4%	0.6%	0.5%	0.5%
Non Tax Revenue	2.3%	2.5%	2.2%	1.7%	2.3%	2.0%	2.0%
Capital Revenue	0.1%	0.2%	0.6%	0.1%	0.3%	0.1%	0.1%
Expenditures	14.8%	14.5%	13.2%	20.5%	21.3%	19.6%	18.5%
Capital Expenditures	6.1%	5.9%	5.3%	9.1%	10.3%	8.1%	8.1%
Through National Treasury	0.7%	2.2%	1.2%	2.6%	2.8%	3.0%	3.2%
Direct Foreign financed	5.4%	3.7%	3.9%	6.4%	7.3%	5.0%	4.8%
Provincial Capital Expenditures	0.0%	0.0%	0.1%	0.1%	0.3%	0.1%	0.0%
Current Expenditures	8.7%	8.6%	7.9%	11.4%	11.0%	11.5%	10.4%
Defence and Security	5.1%	3.2%	1.8%	3.3%	2.6%	2.4%	1.7%
Salaries	2.7%	2.2%	1.2%	2.1%	1.8%	1.7%	1.7%
Civil Administration	3.6%	5.3%	5.7%	7.5%	7.8%	8.5%	7.9%
Salaries	1.4%	1.5%	1.6%	2.6%	2.6%	2.8%	2.8%
Interest	0.0%	0.1%	0.2%	0.2%	0.3%	0.3%	0.2%
Provincial Expenditures (net subsidy)	0.0%	0.0%	0.2%	0.4%	0.2%	0.4%	0.5%
Adjustment	0.0%	0.0%	-0.1%	2.2%	-0.6%	0.0%	0.0%
Overall Deficit/surplus	-6.7%	-4.3%	-2.7%	-6.4%	-8.7%	-6.5%	-3.7%
Financing	6.7%	4.3%	2.7%	6.4%	8.7%	6.5%	3.7%
Foreign Financing	6.7%	4.5%	4.4%	6.6%	7.1%	5.3%	4.4%
Domestic Financed	0.0%	-0.1%	-1.5%	-0.1%	1.6%	1.2%	-0.7%
Errors and Omissions	0.0%	-0.1%	-0.1%	0.0%	0.0%	0.0%	0.0%
GDP (KHR billion) current prices	8,434	14,083	25,754	43,057	47,048	52,069	76,285
GDP (KHR billion) constant 2000 prices	9,896	14,083	22,009	28,692	30,403	32,347	42,218
GDP (USD million) current prices	3,419	3,649	6,293	10,400	11,634	12,856	18,836
GDP (USD million) constant 2000 prices	4,011	3,649	5,378	6,931	7,518	7,987	10,424

(e) Expected; (p) Projected

Source: SNEC (2011)

Figure 21 presents budget operations as percentage of GDP. Public expenditure does not have a stable trend, but it is driven by foreign funded aid projects. Public expenditures represent around 14% of GDP during 1994-2000 and 2004-2007, while it has increased during economic slowdowns (2001-2003 and 2008-2010).

Figure 20: Budget operations as percentage of GDP (1994 – 2011)

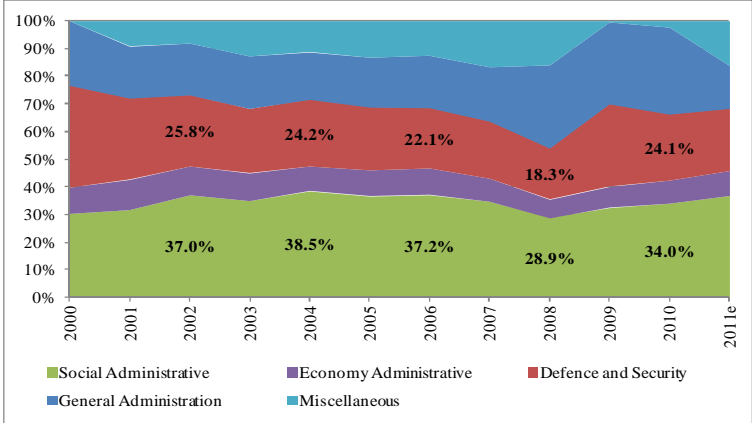


(e) Expected

Source: SNEC (2011)

Current expenditure shares are presented in Figure 22. Unfortunately, capital expenditure information is not available by Ministry, and cannot be included in the analysis. In 2010, “Social Administrative” accounts for 34.0% of total current expenditure, followed by “General Administration⁴⁶” accounts for (31.6%), “Defence and Security” (24.1%) and “Economy Administrative” (8.0%). These shares have been relatively stable between 2000 and 2010. However, projections from SNEC expect an increment of “Social Administration” to 44.1% in 2015, and reductions on “General Administration” and “Defence and Security” to 14.2% and 17.3%, respectively.

Figure 21: Current budget expenditure shares by Ministry (2000 – 2015)



(e) Expected
Source: SNEC (2011)

As percentage of GDP “Social Administrative” increased from 2.6% in 2000 to 3.7% in 2010 and to 3.9% in 2011. Future projections estimate that this sector will account for 4.4% of GDP in 2015 (Table 35). Within “Social Administrative” the Ministers of Education, Youth and Sports (MoEYS) and Health (MoH) represent 82% of the sector.

⁴⁶ “General Administration” includes: Royal Palace (1.0% of total current expenditures in 2010), National Assembly (2.2%), Senate (0.6%), Constitutional Council (0.1%), Council of Ministers (5.7%), Civil Service Secretariat (0.05%), CDC (0.1%), Interior-Administration (1.1%), Relations Assembly and Extensions (0.3%), Foreign Affairs (1.4%), Economy and Finance (16.5%), Planning (0.4%), Justice (0.6%), National Election Committee (0.2%), National Audit Authority (0.1%) and Affaire and Vocational Training (1.2%).

Table 35: Current budget expenditure by Ministry as percentage of GDP (2000 – 2015)

Percentage of GDP (%)	2000	2005	2008	2009	2010	2011e	2015p
General Administration	2.0%	1.4%	3.2%	3.3%	3.4%	1.6%	1.4%
Defence and Security	3.2%	1.8%	1.9%	3.3%	2.6%	2.4%	1.7%
Social Administrative	2.6%	2.8%	3.1%	3.6%	3.7%	3.9%	4.4%
Information	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Public Health	0.7%	0.9%	1.0%	1.2%	1.3%	1.3%	1.6%
Education, Youth and Sport	1.2%	1.4%	1.4%	1.6%	1.6%	1.8%	2.0%
Culture and Fine-Arts	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Environment	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Social Affairs, Labour & Vocational Training	0.2%	0.4%	0.4%	0.5%	0.5%	0.5%	0.5%
Public Worship and Religion	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Woman Affairs and Veteran	0.4%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%
Economy Administrative	0.8%	0.7%	0.7%	0.8%	0.9%	0.9%	0.9%
Civil Aviation Secretariat	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Industry, Mines and Energy	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Commerce	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Agriculture, Forestry and Fishery	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
Rural Development	0.1%	0.1%	0.1%	0.1%	0.2%	0.2%	0.2%
Posts and Telecommunications	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%
Public Works and Transport	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Tourism	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%
Urbanization and Construction	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%
Water Resources and Meteorology	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Miscellaneous	0.0%	1.0%	0.0%	0.0%	2.0%	1.8%	1.5%
Total	8.6%	7.9%	9.3%	11.4%	12.7%	11.0%	10.8%

(e) Expected; (p) Projected

Source: SNEC (2011)

Annex 2: General Statistics, CSES 2004 and 2009 (Tables)

Table 36: Individual statistics, CSES 2004

Region Sex	Phnom Penh			Other Urban			Other Rural			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Population (thousands)	532	573	1,105	692	726	1,417	5,043	5,468	10,511	6,266	6,767	13,033
Population (Region | Sex) (%)	8.5	8.5	8.5	11.0	10.7	10.9	80.5	80.8	80.7	100.0	100.0	100.0
Population (Sex | Region) (%)	48.1	51.9	100.0	48.8	51.2	100.0	48.0	52.0	100.0	48.1	51.9	100.0
Population (Age group)												
Under 5 (%)	8.1	7.4	7.8	10.1	9.2	9.6	10.9	9.6	10.2	10.6	9.3	9.9
Between 5 and 14 (%)	21.2	17.3	19.2	26.9	23.3	25.0	28.9	25.8	27.3	28.0	24.8	26.4
Working age (15-17) (%)	7.2	7.8	7.5	8.6	7.9	8.2	8.1	6.8	7.4	8.0	7.0	7.5
Working age (18-64) (%)	60.4	63.8	62.1	51.1	55.2	53.2	48.6	53.1	50.9	49.9	54.2	52.1
Old age (65+) (%)	3.1	3.7	3.4	3.4	4.5	3.9	3.5	4.8	4.2	3.5	4.6	4.1
Average age (years)	26.4	28.2	27.3	24.3	26.7	25.5	23.4	26.2	24.9	23.8	26.4	25.1
Education												
Read (Over 5 years old) (%)	96.9	96.2	96.5	92.4	92.3	92.3	88.9	89.1	89.0	90.0	90.0	90.0
Write (Over 5 years old) (%)	96.2	94.7	95.4	91.5	91.2	91.3	87.2	86.9	87.0	88.4	88.0	88.2
Average schooling (Over 5 years old) (years)	7.9	6.7	7.3	5.9	5.2	5.5	4.7	4.1	4.4	5.2	4.5	4.8
Average schooling (Working age) (years)	9.3	7.5	8.3	7.2	6.1	6.7	5.9	4.9	5.5	6.5	5.4	5.9
Education level (Working age)												
None (%)	0.3	1.1	0.7	0.3	0.7	0.5	0.4	0.6	0.5	0.4	0.7	0.5
Incomplete primary (%)	17.0	32.9	25.2	32.1	46.2	39.1	47.2	64.2	55.3	42.0	57.9	49.7
Complete primary (%)	6.4	7.7	7.1	11.0	10.5	10.7	12.6	10.0	11.4	11.7	9.8	10.8
Incomplete lower secondary (%)	19.7	21.2	20.5	23.3	19.9	21.6	22.5	16.1	19.5	22.3	17.3	19.8
Complete lower secondary (%)	25.2	16.1	20.6	14.1	10.0	12.1	8.3	5.3	6.9	11.0	7.3	9.2
Incomplete upper secondary (%)	10.6	9.5	10.1	10.0	8.2	9.1	5.4	2.5	4.0	6.5	4.1	5.4
Complete upper secondary (%)	9.9	6.7	8.2	7.4	4.1	5.8	3.0	1.1	2.1	4.3	2.2	3.3
Tertiary (%)	10.9	4.8	7.7	1.8	0.5	1.2	0.5	0.2	0.4	1.9	0.8	1.4
School attendance (Age group)												
Between 6 and 11 (%)	98.9	98.5	98.7	98.5	98.9	98.7	99.1	98.8	99.0	99.0	98.8	98.9
Between 12 and 14 (%)	97.0	94.5	95.8	95.9	92.9	94.4	94.3	91.7	93.0	94.7	92.0	93.3
Between 15 and 17 (%)	84.0	75.2	79.3	78.6	64.8	71.9	70.3	58.7	64.8	72.4	61.1	67.0
Health												
Disability (%)	2.4	3.5	3.0	4.0	3.5	3.8	4.4	4.7	4.6	4.2	4.5	4.3
Illness treated (%)	87.4	89.0	88.3	64.7	65.6	65.2	63.7	64.9	64.4	65.9	67.3	66.7
Vitamin A (Under 5 years old) (%)	83.4	84.4	83.9	82.3	79.0	80.7	81.8	82.8	82.3	82.0	82.5	82.2
Diarrhoea (Under 5 years old) (%)	...	...	...	...	...	...	...	...	...	...	...	...
Nutrition												
Stunted (Under 5 years old) (%)	54.2	51.2	52.6	53.3	48.8	51.1	58.6	58.9	58.8	57.8	57.3	57.6
Underweight (Under 5 years old) (%)	32.0	23.2	27.6	40.0	35.0	37.5	43.8	43.4	43.6	42.7	41.1	41.9

Region Sex	Phnom Penh			Other Urban			Other Rural			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Work												
Work (Working age) (%)	74.3	61.9	67.7	82.4	74.5	78.2	89.5	79.9	84.4	87.2	77.5	82.1
Work (Age group)												
Between 5 and 14 (%)	12.2	19.4	15.6	34.3	33.5	33.9	54.6	51.7	53.1	49.4	47.8	48.6
Working age (15-17) (%)	25.6	42.9	34.9	52.2	58.1	55.1	75.7	74.4	75.1	69.2	69.5	69.3
Working age (18-64) (%)	80.1	64.2	71.6	87.4	76.9	81.8	91.8	80.6	85.7	90.1	78.6	83.9
Old age (65+) (%)	29.1	21.2	24.6	49.6	32.8	39.9	56.7	36.6	44.7	53.8	35.1	42.8
Industry (Working persons)												
Agriculture/Forestry/Fishing (%)	3.4	2.0	2.7	42.7	42.0	42.3	70.2	68.1	69.2	62.4	60.8	61.6
Manufacturing (%)	9.5	21.9	15.6	5.1	8.7	6.9	6.6	12.0	9.3	6.7	12.4	9.5
Water supply/Sewerage/Waste management (%)	1.6	0.9	1.3	0.5	0.4	0.4	0.4	0.3	0.3	0.5	0.3	0.4
Construction (%)	6.3	0.9	3.7	5.6	1.1	3.4	4.2	0.5	2.4	4.5	0.6	2.6
Wholesale/Retail trade (%)	25.0	48.7	36.6	16.7	34.4	25.5	6.8	14.9	10.8	9.2	19.3	14.2
Transportation and storage (%)	11.8	0.4	6.2	9.6	0.5	5.1	3.5	0.3	1.9	4.8	0.4	2.6
Accommodation/Food (%)	1.9	2.2	2.0	0.8	1.3	1.0	0.2	0.2	0.2	0.4	0.5	0.4
Public administration/Defence (%)	20.1	4.4	12.5	7.8	1.6	4.7	2.4	0.2	1.3	4.2	0.6	2.4
Education (%)	5.0	3.5	4.2	3.5	2.6	3.1	1.4	0.7	1.0	1.9	1.1	1.5
Health (%)	1.3	1.0	1.2	0.9	0.5	0.7	0.4	0.2	0.3	0.5	0.3	0.4
Other services (%)	11.2	11.8	11.5	4.7	6.0	5.3	3.2	2.2	2.7	3.9	3.3	3.6
Others (%)	3.0	2.5	2.7	2.2	1.0	1.6	0.8	0.4	0.6	1.1	0.6	0.8

Source: Own calculations based on the CSES 2004

Table 37: Individual statistics CSES 2009

	Phnom Penh			Other Urban			Other Rural			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Population (thousands)	626	688	1,314	650	713	1,363	5,547	5,821	11,368	6,823	7,221	14,044
Population (Region | Sex) (%)	9.2	9.5	9.4	9.5	9.9	9.7	81.3	80.6	80.9	100.0	100.0	100.0
Population (Sex | Region) (%)	47.7	52.3	100.0	47.7	52.3	100.0	48.8	51.2	100.0	48.6	51.4	100.0
Population (Age group)												
Under 5 (%)	9.1	6.8	7.9	9.7	8.1	8.9	11.0	9.6	10.3	10.7	9.2	9.9
Between 5 and 14 (%)	17.5	14.2	15.7	21.4	19.1	20.2	24.4	22.2	23.3	23.5	21.2	22.3
Working age (15-17) (%)	6.7	6.2	6.5	8.4	7.0	7.7	8.0	6.7	7.3	7.9	6.7	7.3
Working age (18-64) (%)	63.1	68.5	65.9	56.8	61.6	59.3	52.9	56.2	54.6	54.2	57.9	56.1
Old age (65+) (%)	3.7	4.4	4.0	3.8	4.2	4.0	3.8	5.3	4.6	3.8	5.1	4.4
Average age (years)	27.8	29.6	28.7	26.2	27.9	27.1	24.7	27.3	26.1	25.1	27.6	26.4
Education												
Read (Over 5 years old) (%)	98.0	97.7	97.8	94.8	94.6	94.7	90.2	89.8	90.0	91.4	91.1	91.2
Write (Over 5 years old) (%)	97.8	97.3	97.5	94.1	93.9	94.0	89.4	88.9	89.2	90.7	90.2	90.5
Average schooling (Over 5 years old) (years)	8.8	7.6	8.2	7.0	6.2	6.6	5.4	4.7	5.0	5.9	5.2	5.6
Average schooling (Working age) (years)	10.1	8.3	9.2	8.1	7.0	7.5	6.3	5.4	5.9	7.0	6.0	6.5
Education level (Working age)												
None (%)	0.0	0.2	0.1	0.3	0.4	0.3	0.4	0.6	0.5	0.3	0.6	0.4
Incomplete primary (%)	12.4	25.1	19.1	21.8	36.2	29.2	41.4	54.5	47.7	35.9	48.3	42.0
Complete primary (%)	5.3	8.2	6.8	10.9	9.5	10.2	12.1	12.0	12.0	11.1	11.2	11.2
Incomplete lower secondary (%)	16.3	18.4	17.4	22.6	22.3	22.4	23.3	19.0	21.3	22.4	19.3	20.9
Complete lower secondary (%)	13.2	13.9	13.6	12.2	11.0	11.6	9.4	7.1	8.3	10.1	8.5	9.3
Incomplete upper secondary (%)	12.0	11.1	11.6	15.0	9.1	12.0	7.4	4.3	5.9	8.8	5.8	7.3
Complete upper secondary (%)	18.9	12.1	15.3	11.5	7.6	9.5	4.7	1.9	3.4	7.1	4.0	5.6
Tertiary (%)	22.0	10.9	16.1	5.6	3.9	4.7	1.4	0.5	0.9	4.2	2.3	3.3
School attendance (Age group)												
Between 6 and 11 (%)	99.2	98.0	98.7	98.0	98.2	98.1	98.7	98.5	98.6	98.7	98.4	98.6
Between 12 and 14 (%)	97.8	97.1	97.4	93.6	83.9	89.0	89.2	87.7	88.5	90.2	88.0	89.2
Between 15 and 17 (%)	84.8	72.2	78.5	71.4	65.8	68.7	60.3	51.8	56.3	63.5	55.2	59.6
Health												
Disability (%)	5.1	6.6	5.9	5.6	6.1	5.9	6.3	6.6	6.4	6.1	6.5	6.3
Illness treated (%)	92.2	100.0	96.7	93.2	88.4	90.6	92.5	93.7	93.1	92.5	93.4	93.0
Vitamin A (Under 5 years old) (%)	91.0	91.0	91.0	89.2	91.7	90.4	81.4	82.2	81.8	82.8	83.6	83.2
Diarrhoea (Under 5 years old) (%)	7.6	12.2	9.6	17.0	13.1	15.1	17.3	17.7	17.5	16.5	16.9	16.7
Nutrition												
Stunted (Under 5 years old) (%)	49.8	43.1	46.8	40.0	43.5	41.7	50.5	48.6	49.6	49.5	47.8	48.7

	Phnom Penh			Other Urban			Other Rural			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Underweight (Under 5 years old) (%)	23.5	19.4	21.6	22.4	22.5	22.5	33.5	29.2	31.4	31.8	27.9	29.9
Work												
Work (Working age) (%)	77.0	61.4	68.6	81.6	72.7	76.8	91.2	84.3	87.6	88.8	80.6	84.5
Work (Age group)												
Between 5 and 14 (%)	2.6	5.2	3.9	12.9	16.2	14.6	33.3	31.4	32.4	29.5	28.4	28.9
Working age (15-17) (%)	22.4	31.7	27.1	48.0	54.1	50.9	74.0	72.4	73.2	67.3	66.9	67.1
Working age (18-64) (%)	82.8	64.1	72.6	86.5	74.8	80.2	93.8	85.8	89.6	91.9	82.2	86.7
Old age (65+) (%)	37.9	27.2	31.8	38.9	25.6	31.7	57.8	36.1	44.9	54.2	34.5	42.6
Industry (Working persons)												
Agriculture/Forestry/Fishing (%)	1.7	2.7	2.2	26.3	25.9	26.1	71.1	69.8	70.5	61.8	60.8	61.3
Manufacturing (%)	11.5	21.2	16.2	8.7	14.5	11.6	6.5	12.0	9.3	7.1	12.9	10.0
Water supply/Sewerage/Waste management (%)	0.7	0.3	0.5	1.0	1.7	1.3	1.0	1.6	1.3	1.0	1.5	1.3
Construction (%)	6.5	0.4	3.6	5.7	1.3	3.5	5.1	0.7	3.0	5.3	0.8	3.0
Wholesale/Retail trade (%)	18.8	37.2	27.7	17.3	31.5	24.5	4.8	10.3	7.5	7.0	14.2	10.6
Transportation and storage (%)	14.1	0.9	7.7	13.5	0.7	7.0	3.9	0.3	2.1	5.6	0.3	3.0
Accommodation/Food (%)	4.4	11.0	7.6	4.2	8.9	6.6	0.9	2.5	1.7	1.5	3.8	2.6
Public administration/Defence (%)	18.7	4.3	11.7	8.5	1.3	4.9	2.1	0.3	1.2	4.0	0.7	2.3
Education (%)	3.5	3.2	3.3	3.1	3.8	3.5	1.2	0.7	0.9	1.5	1.1	1.3
Health (%)	2.2	2.1	2.2	1.0	1.6	1.3	0.3	0.2	0.2	0.5	0.4	0.5
Other services (%)	11.3	11.8	11.6	5.0	5.4	5.2	1.4	1.0	1.2	2.5	2.2	2.4
Others (%)	6.5	5.0	5.8	5.7	3.5	4.5	1.5	0.7	1.1	2.3	1.2	1.8

Source: Own calculations based on the CSES 2009

Table 38: Household's statistics, CSES 2004

	Phnom Penh	Other Urban	Other Rural	Total
Households	207,244	278,762	2,132,235	2,618,241
(%)	7.9	10.6	81.4	100.0
Household size (persons)	5.3	5.1	4.9	5.0
Number of persons per house (Age group)				
Under 5 (persons)	0.4	0.5	0.5	0.5
Between 5 and 14 (persons)	1.0	1.3	1.3	1.3
Working age (15-17) (persons)	0.4	0.4	0.4	0.4
Working age (18-64) (persons)	3.3	2.7	2.5	2.6
Old age (65+) (persons)	0.2	0.2	0.2	0.2
Household's youth dependency ratio	52.7	78.3	86.1	82.6
Household's old age dependency ratio	7.7	12.0	12.6	12.2
Household's total dependency ratio	59.9	87.4	95.2	91.5
Single head (%)	23.2	21.2	21.7	21.8
Women head (%)	25.1	22.2	21.2	21.6
Head age (years)	47.3	45.8	44.5	44.8
Education				
Head's schooling (years)	7.2	5.0	3.7	4.1
Maximum schooling (years)	10.4	7.8	6.3	6.8
Average schooling (years)	7.1	5.4	4.3	4.7
Median schooling (years)	7.2	5.4	4.3	4.6
Maximum schooling (Working age) (years)	10.4	7.9	6.5	7.0
Average schooling (Working age) (years)	8.0	6.4	5.3	5.7
Median schooling (Working age) (years)	8.1	6.4	5.3	5.6
Food security				
Starve (%)	3.6	16.8	24.3	21.9
Weeks of starvation per year (Starve)	5.4	8.4	9.5	9.4
Housing				
Owned (%)	84.4	92.3	96.1	94.7
Not owned but not rent (%)	7.1	4.4	3.3	3.7
Rented (%)	8.4	3.2	0.4	1.3
Other (%)	0.1	0.1	0.2	0.2
Persons per bedroom	3.4	3.9	4.4	4.2
Electricity				
Publicly-provided (%)	83.3	39.6	2.3	12.7
Generator (%)	12.4	11.3	5.9	7.0
Battery (%)	1.9	10.9	28.3	24.4
Kerosene lamp (%)	1.8	37.0	62.5	55.0
None (%)	0.1	0.1	0.0	0.0
Other (%)	0.5	1.2	0.9	0.9
Wall				
Bamboo/Leaves/Grass (%)	1.4	17.1	31.3	27.4
Wood/Logs (%)	14.0	37.0	26.3	26.4
Plywood (%)	23.8	19.9	17.3	18.1
Concrete/Brick/Stone (%)	55.0	12.8	2.8	8.0
Metal (%)	2.6	3.5	1.8	2.1
Cement (%)	0.6	0.3	0.1	0.2
Mixed materials (%)	1.9	1.1	1.5	1.5
Other (%)	0.8	8.3	19.0	16.4
Floor				
Earth/Clay (%)	4.2	7.3	8.0	7.6
Wooden plants (%)	15.2	61.7	79.5	72.5
Cement/Brick/Stone (%)	14.6	7.6	3.1	4.5
Parquet/Polished wood (%)	18.1	11.0	7.0	8.3
Polished stone/Marble (%)	0.4	0.3	0.0	0.1
Vinyl (%)	0.3	0.1	0.0	0.0
Ceramic tiles (%)	44.7	10.4	1.1	5.6
Other (%)	2.5	1.7	1.3	1.4
Roof				
Thatch/Leaves/Grass (%)	0.8	16.2	24.1	21.4
Tiles (%)	12.0	18.8	30.2	27.5
Cement (%)	11.0	6.5	4.2	5.0

	Phnom Penh	Other Urban	Other Rural	Total
Metal (%)	48.1	51.2	31.0	34.5
Salvaged materials (%)	0.0	0.3	0.2	0.2
Mixed good (%)	0.5	1.7	0.8	0.8
Mixed low (%)	0.3	0.3	0.7	0.6
Concrete (%)	26.6	3.4	0.8	3.1
Plastic sheet (%)	0.3	0.0	0.1	0.1
Other (%)	0.5	1.7	8.0	6.7
Toilet				
Pour flush/Sewerage (%)	61.1	5.2	0.4	5.8
Pour flush/Septic tank (%)	28.8	38.1	10.7	15.1
Latrine (%)	1.5	4.7	3.9	3.8
Other (%)	0.0	0.4	0.3	0.3
None (%)	8.7	51.6	84.7	75.1
Other livelihoods				
Access to farm plot (%)	6.3	44.3	83.4	73.1
Crops (%)	3.4	40.3	79.6	69.4
Livestock (%)	7.4	50.4	80.4	71.4
Fishery (%)	0.4	27.9	59.5	51.4
Forestry and hunting (%)	1.7	44.7	83.8	73.1
Business (%)	60.0	49.9	33.6	37.4
Credit (%)	23.0	31.1	43.1	40.2
Durables				
Radio (%)	43.0	37.5	35.3	36.1
Television (%)	87.3	56.8	40.7	46.1
Telephone (%)	65.3	28.1	5.8	12.9
Bicycle (%)	48.1	56.9	66.5	64.0
Motorcycle (%)	72.6	42.1	22.5	28.6
Car (%)	15.8	6.1	0.8	2.6
Jeep or van (%)	2.0	1.1	0.3	0.5
Refrigerator (%)	17.9	3.4	0.2	1.9
Kitchen (%)	26.0	5.9	0.3	2.9
Computer (%)	...	...	...	...

Source: Own calculations based on the CSES 2004

Table 39: Household's statistics, CSES 2009

	Phnom Penh	Other Urban	Other Rural	Total
Households	261,458	284,828	2,392,381	2,938,667
(%)	8.9	9.7	81.4	100.0
Household size (persons)	5.0	4.8	4.8	4.8
Number of persons per house (Age group)				
Under 5 (persons)	0.4	0.4	0.5	0.5
Between 5 and 14 (persons)	0.8	1.0	1.1	1.1
Working age (15-17) (persons)	0.3	0.4	0.3	0.3
Working age (18-64) (persons)	3.3	2.8	2.6	2.7
Old age (65+) (persons)	0.2	0.2	0.2	0.2
Household's youth dependency ratio	46.8	62.0	76.9	72.8
Household's old age dependency ratio	9.2	10.5	13.5	12.8
Household's total dependency ratio	54.1	69.5	86.1	81.6
Single head (%)	25.3	23.8	19.6	20.6
Women head (%)	25.2	23.8	20.9	21.6
Head age (years)	48.4	46.3	45.0	45.5
Education				
Head's schooling (years)	7.9	6.1	4.0	4.5
Maximum schooling (years)	11.4	9.1	6.9	7.6
Average schooling (years)	8.0	6.4	4.9	5.3
Median schooling (years)	8.1	6.5	4.9	5.4
Maximum schooling (Working age) (years)	11.5	9.2	7.1	7.7
Average schooling (Working age) (years)	8.9	7.3	5.7	6.2
Median schooling (Working age) (years)	9.0	7.4	5.7	6.2
Food security				
Starve (%)	1.0	7.0	18.4	15.7
Weeks of starvation per year (Starve)	2.0	5.7	6.6	6.5
Housing				
Owned (%)	80.6	85.9	96.7	94.2
Not owned but not rent (%)	4.0	5.3	2.9	3.2
Rented (%)	15.3	8.8	0.3	2.5
Other (%)	0.1	0.0	0.1	0.1
Persons per bedroom	3.0	3.4	4.1	3.9
Electricity				
Publicly-provided (%)	98.5	76.7	11.5	25.6
Generator (%)	0.4	1.0	1.9	1.7
Battery (%)	0.2	9.2	46.8	39.0
Kerosene lamp (%)	0.4	12.6	37.1	31.5
None (%)	0.0	0.0	0.1	0.1
Other (%)	0.6	0.7	2.6	2.2
Wall				
Bamboo/Leaves/Grass (%)	1.2	13.4	38.8	33.0
Wood/Logs (%)	25.1	50.8	50.1	47.9
Plywood (%)	0.4	1.2	0.5	0.6
Concrete/Brick/Stone (%)	69.1	26.2	4.2	12.1
Metal (%)	3.8	6.2	4.9	5.0
Cement (%)	0.0	0.4	0.1	0.1
Mixed materials (%)	0.1	1.2	0.7	0.7
Other (%)	0.2	0.5	0.6	0.6
Floor				
Earth/Clay (%)	2.2	9.6	8.2	7.8
Wooden plants (%)	19.0	53.9	84.1	75.4
Cement/Brick/Stone (%)	18.2	17.1	4.9	7.2
Parquet/Polished wood (%)	2.1	2.1	1.1	1.3
Polished stone/Marble (%)	0.1	0.3	0.0	0.1
Vinyl (%)	0.1	0.0	0.0	0.0
Ceramic tiles (%)	58.2	17.0	1.7	8.2
Other (%)	0.2	0.0	0.1	0.1
Roof				
Thatch/Leaves/Grass (%)	0.6	4.3	18.8	15.8

	Phnom Penh	Other Urban	Other Rural	Total
Tiles (%)	10.7	18.5	29.8	27.0
Cement (%)	6.5	10.4	7.5	7.7
Metal (%)	46.2	61.6	42.8	44.9
Salvaged materials (%)	0.2	0.1	0.2	0.2
Mixed good (%)	0.4	1.2	0.5	0.5
Mixed low (%)	0.1	0.3	0.1	0.1
Concrete (%)	35.3	3.7	0.3	3.8
Plastic sheet (%)	0.0	0.1	0.1	0.1
Other (%)	0.0	0.0	0.1	0.0
Toilet				
Pour flush/Sewerage (%)	75.4	13.3	1.7	9.4
Pour flush/Septic tank (%)	23.0	59.7	20.7	24.7
Latrine (%)	0.1	3.0	5.4	4.7
Other (%)	0.0	0.3	0.1	0.1
None (%)	1.5	23.8	72.1	61.1
Other livelihoods				
Access to farm plot (%)	12.3	37.0	82.8	72.1
Crops (%)	3.9	26.6	77.9	66.4
Livestock (%)	5.2	36.1	82.3	71.0
Fishery (%)	1.2	19.5	66.5	56.2
Forestry and hunting (%)	1.4	34.9	90.3	77.0
Business (%)	60.5	56.4	28.1	33.7
Credit (%)	11.5	27.5	42.0	37.9
Durables				
Radio (%)	41.5	45.2	42.3	42.5
Television (%)	96.3	80.3	53.2	59.6
Telephone (%)	92.5	70.7	35.5	44.0
Bicycle (%)	44.8	61.3	71.1	67.8
Motorcycle (%)	86.1	66.9	42.8	49.0
Car (%)	20.2	8.4	1.5	3.8
Jeep or van (%)	2.5	2.5	0.7	1.0
Refrigerator (%)	34.4	9.1	0.3	4.2
Kitchen (%)	83.7	40.5	6.1	16.3
Computer (%)	25.1	7.2	0.5	3.3

Source: Own calculations based on the CSES 2009

Table 40: Poverty and inequality, CSES 2004

	Phnom Penh	Other Urban	Other Rural	Total
Consumption per capita per month (KHR)	217,415	122,668	77,546	94,330
Consumption per capita per month (Phnom Penh equivalent) (KHR)	217,415	155,200	106,339	121,084
Consumption per capita per month (USD)	54	30	19	23
Consumption per capita per month (Phnom Penh equivalent) (USD)	54	38	26	30
Consumption per capita per month (Median) (KHR)	178,221	88,947	61,497	67,230
Consumption per capita per month (Phnom Penh equivalent) (Median) (KHR)	178,221	112,537	84,331	90,880
Poverty				
Food poverty line per day (Original) (KHR)	1,782	1,568	1,389	
Poverty line per day (Original) (KHR)	2,351	1,952	1,753	
Food poverty headcount (%)	2.5	14.2	22.3	19.7
Poverty headcount (%)	4.6	24.8	39.3	34.7
Poverty gap	0.267	0.168	0.068	0.078
Poverty severity	0.108	0.067	0.049	0.051
Food poverty line per day (Updated) (KHR)	2,284	1,772	1,598	
Poverty line per day (Updated) (KHR)	3,749	2,963	2,734	
Food poverty headcount (%)	5.2	16.3	25.5	22.8
Poverty headcount (%)	20.0	48.2	68.2	62.0
Poverty gap	0.271	0.317	0.345	0.341
Poverty severity	0.111	0.137	0.153	0.150
Inequality				
Consumption (Original)				
Gini index	0.367	0.432	0.339	0.396
Consumption (Updated)				
Gini index	0.312	0.360	0.287	0.327
Q5/Q1 ratio	5.1	5.9	4.2	5.1
D10/D1 ratio	7.7	8.9	6.0	7.6
Phnom-Penh/Region ratio	1.0	1.4	2.0	1.8
Phnom-Penh/Region ratio (Median)	1.0	1.6	2.1	2.0

Note: Poverty gap (severity) is estimated as the average (square) relative gap for the poor.

Source: Own calculations based on the CSES 2004

Table 41: Poverty and inequality, CSES 2009

	Phnom Penh	Other Urban	Other Rural	Total
Consumption per capita per month (KHR)	497,211	318,877	184,510	226,739
Consumption per capita per month (Phnom Penh equivalent) (KHR)	497,211	393,906	244,418	282,520
Consumption per capita per month (USD)	120	77	45	55
Consumption per capita per month (Phnom Penh equivalent) (USD)	120	95	59	68
Consumption per capita per month (Median) (KHR)	385,350	243,473	150,451	164,940
Consumption per capita per month (Phnom Penh equivalent) (Median) (KHR)	385,350	300,760	199,301	215,700
Poverty				
Food poverty line per day (Original) (KHR)	3,395	2,907	2,721	
Poverty line per day (Original) (KHR)	4,185	3,438	3,213	
Food poverty headcount (%)	0.8	2.8	8.7	7.4
Poverty headcount (%)	1.9	6.9	17.0	14.6
Poverty gap	0.172	0.149	0.187	0.185
Poverty severity	0.040	0.036	0.055	0.054
Food poverty line per day (Updated) (KHR)	3,681	2,980	2,779	
Poverty line per day (Updated) (KHR)	5,716	4,627	4,315	
Food poverty headcount (%)	1.1	2.4	8.2	7.0
Poverty headcount (%)	5.3	15.6	34.7	30.1
Poverty gap	0.199	0.210	0.240	0.238
Poverty severity	0.058	0.063	0.083	0.081
Inequality				
Consumption (Original)				
Gini index	0.341	0.370	0.309	0.354
Consumption (Updated)				
Gini index	0.318	0.343	0.284	0.327
Q5/Q1 ratio	5.1	5.6	4.2	5.1
D10/D1 ratio	7.9	8.2	6.1	7.7
Phnom-Penh/Region ratio	1.0	1.3	2.0	1.8
Phnom-Penh/Region ratio (Median)	1.0	1.3	1.9	1.8

Note: Poverty gap (severity) is estimated as the average (square) relative gap for the poor.

Source: Own calculations based on the CSES 2009

Annex 3: Variables

Table 42: Variables (Equations 3)

Variables		N	Mean	Std. Dev.
ln(Wi)	ln(wage)	13,490	12.12	0.98
Si	Schooling	46,484	6.12	3.10
Ei	Experience = (age - schooling)	46,484	25.76	13.43
Ei^2	Experience^2	46,484	843.89	817.07
Ni	Female=1	46,484	0.46	0.50
	(Year 2009)=1	46,484	0.56	0.50
	Region (Phnom Penh=1, Other Urban =2, Other Rural=3)	46,484	2.69	0.65
	Province (24 categories)	46,484	9.82	6.40
Ni / Selection	Industry (13 categories)	46,484	3.14	3.17
	Formal=1	46,435	0.28	0.45

Source: Own calculations based on the CSES 2004 and 2009

Table 43: Variables (Equations 4 and 5)

Variables		N	Mean	Std. Dev.
ln(consumptionj)	ln(household consumption per capita)	21,189	3.76	0.69
Sj	Schooling (household max)	21,189	7.51	3.17
Nj	Number of persons (0-4)	21,189	0.49	0.68
	Number of persons (5-14)	21,189	1.20	1.17
	Number of persons (15-17)	21,189	0.39	0.59
	Number of persons (18-64)	21,189	2.77	1.28
	Number of persons (65+)	21,189	0.18	0.45
	No Rent=1	21,189	0.98	0.15
	Bicycle=1	21,189	0.69	0.46
	Motorcycle=1	21,189	0.43	0.50
	Car=1	21,189	0.04	0.19
	No toilet=1	21,189	0.65	0.48
	Electricity=1	21,189	0.21	0.41
	Roof of thatch/leaves/grass=1	21,189	0.16	0.37
	(Year 2009)=1	21,189	0.54	0.50
	Zj	Schooling (head of house)	21,189	4.87	3.62
Subsamples	Region (Phnom Penh=1, Other Urban =2, Other Rural=3)	21,189	2.71	0.63
	Poor=1	21,189	0.39	0.49

Source: Own calculations based on the CSES 2004 and 2009

Table 44: Variables (Equation 6)

	Variables	N	Mean	Std. Dev.
Pr(Schi=1)	School attendance	43,562	0.62	0.49
ln(hh_consumption) ^	ln(household consumption per capita) by equation 4	43,562	3.63	0.61
Ni (Sch)	Age	43,562	15.17	5.30
	Age^2	43,562	258.17	166.88
	Age^3	43,562	4787.94	4327.79
	Past behaviour = (age - schooling)	43,562	10.60	4.23
	Female=1	43,562	0.49	0.50
Nj (Sch)	(Year 2009)=1	43,562	0.51	0.50
	Age (head of house)	43,562	45.68	11.45
	Schooling (household max)	43,562	7.67	2.86
	Number of persons (0-4)	43,562	0.41	0.63
	Number of persons (5-14)	43,562	1.68	1.27
	Number of persons (15-17)	43,562	0.62	0.67
	Number of persons (18-64)	43,562	3.16	1.42
	Number of persons (65+)	43,562	0.16	0.41
	No Rent=1	43,562	0.98	0.12
	Bicycle=1	43,562	0.76	0.43
	Motorcycle=1	43,562	0.45	0.50
	Car=1	43,562	0.03	0.18
	Region (Phnom Penh=1, Other Urban =2, Other Rural=3)	43,562	2.73	0.60
	Excluded instruments	No toilet=1	43,562	0.66	0.47
Electricity=1		43,562	0.19	0.40
Roof of thatch/leaves/grass=1		43,562	0.15	0.35

Source: Own calculations based on the CSES 2004 and 2009

Table 45: Variables (Equation 7)

	Variables	N	Mean	Std. Dev.
Pr(Ui=1)	Underweight	7,329	0.33	0.47
ln(hh_consumption)	ln(household consumption per capita)	7,329	3.67	0.66
Ni (U)	Age (months)	7,329	28.77	17.77
	Complete primary education (mother) = 1	7,329	0.27	0.44
	Complete lower secondary education (mother) = 1	7,329	0.09	0.29
	Complete upper secondary education (mother) = 1	7,329	0.04	0.20
	Age (mother)	7,329	29.24	6.52
	Female=1	7,329	0.49	0.50
Nj (U)	(Year 2009)=1	7,329	0.54	0.50
	Single headed household=1	7,329	0.11	0.31
	Schooling (household max)	7,329	7.51	3.19
	Number of persons (0-4)	7,329	1.41	0.56
	Number of persons (5-14)	7,329	1.11	1.16
	Number of persons (15-17)	7,329	0.19	0.45
	Number of persons (18-64)	7,329	2.66	1.27
	Number of persons (65+)	7,329	0.14	0.41
	No Rent=1	7,329	0.97	0.16
	Bycycle=1	7,329	0.61	0.49
	Motorcycle=1	7,329	0.46	0.50
	Car=1	7,329	0.04	0.20
	Distance to water source (mts)	7,329	59.29	165.89
	No toilet=1	7,329	0.67	0.47
	Roof of thatch/leaves/grass=1	7,329	0.17	0.37
	Persons per room (household)	7,329	4.56	1.98
Region (Phnom Penh=1, Other Urban =2, Other Rural=3)	7,329	2.70	0.63	

Source: Own calculations based on the CSES 2004 and 2009

Table 46: Variables (Equations 8 to 11)

Variables		N	Mean	Std. Dev.
Li	Work	74,329	0.71	0.45
	Work (None=1, Unpaid=2, Paid=3)	74,329	1.16	0.84
	L(paid)i	74,329	0.45	0.50
	L(unpaid)i	74,329	0.26	0.44
	L(formal)i	53,106	0.26	0.44
	ln(w_hoursi)	53,106	3.58	0.67
ln(hh_consumption) ^	ln(household consumption per capita) by equation 4	74,329	3.77	0.63
Ni	Age	74,329	27.36	15.43
	Age^2	74,329	986.61	1078.68
	Female=1	74,329	0.48	0.50
	(Year 2009)=1	74,329	0.53	0.50
	Schooling	74,329	5.57	3.26
Nj	Age (head)	74,329	46.50	12.01
	Schooling (household max)	74,329	8.20	3.21
	Number of persons (0-4)	74,329	0.42	0.64
	Number of persons (5-14)	74,329	1.42	1.22
	Number of persons (15-17)	74,329	0.52	0.65
	Number of persons (18-64)	74,329	3.20	1.48
	Number of persons (65+)	74,329	0.18	0.45
	No Rent=1	74,329	0.98	0.14
	Bicycle=1	74,329	0.73	0.44
	Motorcycle=1	74,329	0.50	0.50
	Car=1	74,329	0.05	0.22
	Plot=1	74,329	0.70	0.46
	Livestock=1	74,329	0.70	0.46
	Business=1	74,329	0.42	0.49
Credit=1	74,329	0.39	0.49	
Nj / Excluded instruments	No toilet=1	74,329	0.59	0.49
	Electricity=1	74,329	0.26	0.44
	Roof of thatch/leaves/grass=1	74,329	0.13	0.33
Subsamples	Region (Phnom Penh=1, Other Urban =2, Other Rural=3)	74,329	2.61	0.70
	Poor=1	74,329	0.38	0.49
	Age group (4 categories - between 2 and 5)	74,329	3.46	0.86

Source: Own calculations based on the CSES 2004 and 2009

Table 47: Variables (Equations 12)

Variables		N	Mean	Std. Dev.
New birth	Female new birth=1	11,345	0.05	0.22
	Male new birth=1	11,345	0.06	0.23
ln(hh_consumption)	ln(household consumption per capita)	11,345	4.13	0.57
Nj (n_b)	Number of women (15-44)	11,345	1.22	0.84
	Age (head of house)	11,345	45.35	13.69
	Schooling (household max)	11,345	7.64	3.39
	Number of persons (1-4)	11,345	0.36	0.58
	Number of persons (5-14)	11,345	1.09	1.11
	Number of persons (15-17)	11,345	0.36	0.57
	Number of persons (18-64)	11,345	2.74	1.34
	Number of persons (65+)	11,345	0.20	0.48
	Rural=1	11,345	0.79	0.40
	Province (24 categories)	11,345	9.72	6.49

Source: Own calculations based on the CSES 2004 and 2009

Annex 4: Household gender specific new birth probability

Table 48: Average marginal effects on Pr(male new birth = 1)

Variable	I	II	III	IV	V
Number of women (15-44)	0.011 *** (0.002)	0.005 ** (0.002)	0.011 *** (0.003)	0.013 *** (0.003)	0.013 *** (0.003)
ln(Consumption)		-0.025 *** (0.004)	-0.040 *** (0.005)	-0.051 *** (0.005)	-0.055 *** (0.006)
Head of house (age)			-0.002 *** (0.000)	-0.002 *** (0.000)	-0.002 *** (0.000)
Schooling (max)			0.002 * (0.001)	0.001 (0.001)	0.001 (0.001)
Number of persons (1-4)				-0.013 *** (0.004)	-0.014 *** (0.004)
Number of persons (5-14)				-0.014 *** (0.002)	-0.014 *** (0.002)
Number of persons (15-17)				-0.034 *** (0.005)	-0.034 *** (0.005)
Number of persons (18-64)				0.008 *** (0.002)	0.007 *** (0.002)
Number of persons (65+)				0.013 ** (0.006)	0.012 ** (0.005)
Rural=1		-0.004 (0.006)	-0.010 (0.006)	-0.009 (0.006)	-0.007 (0.007)
Province fixed effect	NO	NO	NO	NO	YES
N	11,345	11,345	11,345	11,345	11,345
Pseudo R2	0.004	0.011	0.054	0.085	0.094
Log Pseudo Likelihood	-604,000	-549,000	-574,000	-555,000	-550,000

Note: Heteroskedasticity-consistent standard errors are estimated clustered at the household level.

*** Significance at 1%, ** significance at 5%, * significance at 10%

Source: Own calculations based on the CSES 2009

Table 49: Average marginal effects on Pr(female new birth = 1)

Variable	I	II	III	IV	V
Number of women (15-44)	0.006 *** (0.002)	0.005 ** (0.002)	0.006 *** (0.002)	0.007 ** (0.003)	0.007 ** (0.003)
ln(Consumption)		-0.025 *** (0.004)	-0.025 *** (0.005)	-0.033 *** (0.005)	-0.035 *** (0.005)
Head of house (age)			-0.002 *** (0.000)	-0.002 *** (0.000)	-0.002 *** (0.000)
Schooling (max)			0.001 (0.001)	0.000 (0.001)	0.000 (0.001)
Number of persons (1-4)				-0.012 *** (0.004)	-0.013 *** (0.004)
Number of persons (5-14)				-0.012 *** (0.002)	-0.013 *** (0.002)
Number of persons (15-17)				-0.034 *** (0.005)	-0.034 *** (0.005)
Number of persons (18-64)				0.010 *** (0.002)	0.009 *** (0.002)
Number of persons (65+)				0.006 (0.005)	0.005 (0.005)
Rural=1		-0.004 (0.006)	-0.004 (0.006)	-0.003 (0.006)	-0.006 (0.007)
Province fixed effect	NO	NO	NO	NO	YES
N	11,345	11,345	11,345	11,345	11,345
Pseudo R2	0.001	0.011	0.035	0.067	0.074
Log Pseudo Likelihood	-554,000	-549,000	-536,000	-518,000	-514,000

Note: Heteroskedasticity-consistent standard errors are estimated, clustered at the household level.

*** Significance at 1%, ** significance at 5%, * significance at 10%

Source: Own calculations based on the CSES 2009

Annex 5: Population (dynamic microsimulation)

Table 50: Population (Period 1 to 20), thousands

	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7	Period 8	Period 9	Period 10
Total	14,085	14,298	14,512	14,609	14,942	15,160	15,378	15,596	15,815	16,034
Growth (%)		1.5	1.5	0.7	2.3	1.5	1.4	1.4	1.4	1.4
Urban	2,815	2,920	3,033	3,032	3,268	3,392	3,519	3,646	3,776	3,905
Male	1,340	1,392	1,449	1,450	1,568	1,629	1,693	1,757	1,822	1,888
Under 5	125	136	149	160	190	211	231	248	263	270
Between 5 and 14	263	263	261	250	261	267	270	285	301	318
Between 15 and 17	101	100	103	93	95	85	88	87	87	90
Between 18 and 64	803	840	879	888	954	991	1,022	1,047	1,074	1,098
Over 64	49	53	57	58	68	75	81	90	97	112
Female	1,475	1,528	1,585	1,583	1,701	1,763	1,826	1,889	1,953	2,018
Under 5	109	120	140	151	183	205	222	236	249	255
Between 5 and 14	246	242	238	231	240	245	251	265	282	304
Between 15 and 17	98	96	91	82	77	74	81	84	84	83
Between 18 and 64	960	1,003	1,043	1,044	1,113	1,142	1,168	1,185	1,205	1,226
Over 64	63	67	73	75	86	97	104	119	133	151
Rural	11,270	11,378	11,479	11,577	11,673	11,768	11,859	11,950	12,040	12,129
Male	5,501	5,557	5,608	5,660	5,712	5,764	5,813	5,862	5,910	5,958
Under 5	603	625	636	655	682	663	662	652	636	623
Between 5 and 14	1,338	1,307	1,282	1,256	1,220	1,208	1,184	1,174	1,161	1,142
Between 15 and 17	439	447	439	410	393	395	401	408	404	404
Between 18 and 64	2,912	2,962	3,028	3,105	3,172	3,233	3,289	3,338	3,411	3,481
Over 64	208	215	223	233	246	264	277	290	298	309
Female	5,770	5,821	5,871	5,918	5,961	6,004	6,046	6,088	6,130	6,171
Under 5	556	584	606	621	640	636	638	630	614	600
Between 5 and 14	1,280	1,252	1,220	1,196	1,161	1,140	1,107	1,095	1,089	1,080
Between 15 and 17	387	383	378	377	381	386	396	396	388	374
Between 18 and 64	3,243	3,300	3,359	3,402	3,444	3,482	3,521	3,557	3,604	3,658
Over 64	304	303	307	321	336	360	385	410	433	459
Total*	14,085	14,303	14,521	14,622	14,963	15,184	15,405	15,626	15,848	16,070
Urban*	2,815	2,927	3,043	3,043	3,286	3,412	3,541	3,670	3,801	3,932
Rural*	11,270	11,376	11,478	11,579	11,677	11,772	11,865	11,956	12,047	12,138
Households	2,945	2,979	3,009	3,030	3,077	3,099	3,119	3,141	3,164	3,188
Urban	574	588	602	608	640	650	660	670	680	690
Rural	2,371	2,390	2,407	2,422	2,437	2,448	2,459	2,471	2,484	2,498

	Period 11	Period 12	Period 13	Period 14	Period 15	Period 16	Period 17	Period 18	Period 19	Period 20
Total	16,251	16,465	16,675	16,882	17,084	17,281	17,471	17,654	17,831	18,003
Growth (%)	1.4	1.3	1.3	1.2	1.2	1.2	1.1	1.0	1.0	1.0
Urban	4,035	4,164	4,293	4,420	4,545	4,669	4,791	4,911	5,030	5,148
Male	1,953	2,019	2,084	2,148	2,212	2,274	2,336	2,398	2,459	2,520
Under 5	273	274	272	269	265	261	258	256	255	256
Between 5 and 14	350	381	412	449	485	506	527	542	554	556
Between 15 and 17	87	86	78	75	72	81	95	113	117	132
Between 18 and 64	1,121	1,145	1,179	1,205	1,228	1,257	1,277	1,300	1,338	1,374
Over 64	123	133	143	151	161	170	180	188	196	202
Female	2,082	2,145	2,208	2,271	2,334	2,395	2,454	2,513	2,571	2,628
Under 5	259	260	258	255	252	248	245	244	244	246
Between 5 and 14	327	357	391	424	461	482	500	512	522	524
Between 15 and 17	84	81	74	66	61	73	87	108	115	127
Between 18 and 64	1,241	1,260	1,282	1,304	1,325	1,342	1,360	1,378	1,412	1,448
Over 64	171	187	203	221	235	250	262	271	278	283
Rural	12,216	12,301	12,383	12,463	12,539	12,612	12,680	12,743	12,801	12,856
Male	6,005	6,051	6,096	6,141	6,185	6,227	6,268	6,305	6,341	6,375
Under 5	611	603	598	595	594	595	595	594	591	585
Between 5 and 14	1,133	1,133	1,127	1,132	1,150	1,091	1,083	1,071	1,057	1,048
Between 15 and 17	397	370	342	311	280	322	328	351	300	304
Between 18 and 64	3,540	3,600	3,667	3,721	3,756	3,801	3,823	3,837	3,932	3,970
Over 64	324	345	362	381	404	418	438	453	460	468
Female	6,211	6,250	6,287	6,322	6,355	6,385	6,412	6,437	6,460	6,481
Under 5	588	579	573	570	569	569	570	569	567	562
Between 5 and 14	1,067	1,075	1,078	1,079	1,089	1,045	1,038	1,027	1,013	1,003
Between 15 and 17	372	345	317	287	271	307	306	321	284	291
Between 18 and 64	3,687	3,714	3,747	3,778	3,787	3,791	3,800	3,798	3,862	3,878
Over 64	497	537	572	608	639	673	699	722	734	747
Total*	16,289	16,505	16,717	16,926	17,130	17,328	17,519	17,704	17,883	18,057
Urban*	4,063	4,193	4,322	4,449	4,576	4,700	4,823	4,944	5,065	5,184
Rural*	12,226	12,312	12,396	12,476	12,554	12,628	12,696	12,760	12,818	12,873
Households	3,209	3,232	3,256	3,281	3,301	3,316	3,330	3,345	3,359	3,370
Urban	699	708	718	728	738	747	755	763	771	778
Rural	2,510	2,523	2,538	2,552	2,563	2,570	2,575	2,581	2,588	2,592

*Official population projections from NIS (2011c).

Source: Own calculations based on the CSES 2009 and NIS (2011c).

Annex 6: Dynamic microsimulation (results)

Table 51: Outcomes dynamic microsimulation (base line and policy scenario)

	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7	Period 8	Period 9	Period 10
Cost (KHR billion)										
SPI	684	617	606	599	590	595	589	564	533	500
Total household consumption (KHR billion)										
With SPI	39,530	40,544	41,669	42,294	44,130	45,477	46,891	48,338	49,609	51,157
Without SPI	38,925	39,998	41,126	41,750	43,582	44,910	46,311	47,760	49,034	50,584
Poverty headcount										
With SPI	23.7	23.5	22.6	21.7	20.7	19.4	18.3	17.1	16.5	15.6
Without SPI	29.7	29.0	27.8	26.7	25.5	24.3	23.2	22.1	20.9	19.8
Consumption Gini coefficient										
With SPI	0.313	0.315	0.315	0.314	0.314	0.314	0.314	0.314	0.314	0.314
Without SPI	0.329	0.329	0.329	0.328	0.328	0.328	0.328	0.328	0.328	0.327
Median labour force education level (Schooling)										
With SPI	6.0	6.0	6.1	6.8	7.0	7.4	8.0	8.1	8.2	8.3
Without SPI	6.0	6.0	6.1	6.6	7.0	7.3	7.9	8.1	8.2	8.3
	Period 11	Period 12	Period 13	Period 14	Period 15	Period 16	Period 17	Period 18	Period 19	Period 20
Cost (KHR billion)										
SPI	480	449	433	421	407	395	385	366	344	327
Total household consumption (KHR billion)										
With SPI	52,761	54,366	55,946	57,513	59,037	60,522	62,010	63,508	64,994	66,467
Without SPI	52,177	53,779	55,345	56,902	58,419	59,902	61,389	62,903	64,417	65,917
Poverty headcount										
With SPI	14.4	13.5	12.5	11.8	10.9	10.2	9.5	8.9	8.3	7.8
Without SPI	18.6	17.6	16.6	15.6	14.7	13.7	12.9	12.1	11.2	10.4
Consumption Gini coefficient										
With SPI	0.313	0.313	0.311	0.309	0.308	0.306	0.305	0.303	0.303	0.302
Without SPI	0.326	0.325	0.324	0.322	0.320	0.318	0.316	0.315	0.313	0.312
Median labour force education level (Schooling)										
With SPI	8.4	8.4	8.4	8.4	8.4	8.4	8.5	8.5	8.5	8.6
Without SPI	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.5	8.5	8.5

Note: Results based on 2009 economic conditions.

Source: Own calculations based on the CSES 2009.

Annex 7: Dynamic benefits, rates of return and costs of social protection instruments

Table 52: Dynamic benefits (difference between base line and policy scenarios), rates of return and costs of social protection investments in period $t = T = \{1, \dots, 20\}$

Benefit	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7	Period 8	Period 9	Period 10
Bs (schooling - years)	0.000	0.003	0.009	0.016	0.024	0.033	0.044	0.055	0.067	0.079
Bc (hh consumption growth rate - %)	1.554	0.689	0.446	0.330	0.256	0.215	0.182	0.155	0.133	0.116
Bp (Poverty - headcount - %)	5.970	5.490	5.160	4.990	4.830	4.950	4.860	4.990	4.390	4.200
Bg (Inequality - Gini index)	0.016	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.013	0.013
Rates of return										
Discount rate (%)	2	2	2	2	2	2	2	2	2	2
RoRc (hh Consumption)	-11.6	-11.5	-11.2	-10.7	-10.0	-9.2	-8.2	-7.1	-5.7	-4.1
Discount rate (%)	3	3	3	3	3	3	3	3	3	3
RoRc (hh Consumption)	-11.6	-11.6	-11.2	-10.7	-10.1	-9.3	-8.3	-7.2	-5.8	-4.3
Discount rate (%)	4	4	4	4	4	4	4	4	4	4
RoRc (hh Consumption)	-11.6	-11.6	-11.2	-10.7	-10.1	-9.3	-8.4	-7.3	-6.0	-4.6
Cost (% of GDP)	1.6	1.4	1.4	1.4	1.4	1.4	1.4	1.3	1.2	1.2

Benefit	Period 11	Period 12	Period 13	Period 14	Period 15	Period 16	Period 17	Period 18	Period 19	Period 20
Bs (schooling - years)	0.091	0.102	0.113	0.121	0.129	0.134	0.138	0.140	0.141	0.141
Bc (hh consumption growth rate - %)	0.104	0.093	0.085	0.078	0.072	0.066	0.061	0.055	0.048	0.043
Bp (Poverty - headcount - %)	4.210	4.060	4.060	3.810	3.800	3.530	3.380	3.210	2.960	2.630
Bg (Inequality - Gini index)	0.013	0.013	0.013	0.012	0.012	0.012	0.012	0.011	0.011	0.010
Rates of return	Period 11	Period 12	Period 13	Period 14	Period 15	Period 16	Period 17	Period 18	Period 19	Period 20
Discount rate (%)	2	2	2	2	2	2	2	2	2	2
RoRc (hh Consumption)	-2.4	-0.4	1.6	3.7	5.8	7.8	9.7	11.6	13.2	14.7
Discount rate (%)	3	3	3	3	3	3	3	3	3	3
RoRc (hh Consumption)	-2.7	-0.8	1.1	3.1	5.0	6.9	8.7	10.4	11.9	13.3
Discount rate (%)	4	4	4	4	4	4	4	4	4	4
RoRc (hh Consumption)	-3.0	-1.2	0.6	2.5	4.3	6.0	7.7	9.3	10.7	11.9
Cost (% of GDP)	Period 11	Period 12	Period 13	Period 14	Period 15	Period 16	Period 17	Period 18	Period 19	Period 20
Cost (% of GDP)	1.1	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.8	0.8

Source: Own calculations based on the CSES 2009.

Annex 8: Terms of reference

BACKGROUND INFORMATION

Within its framework of cooperation, UNICEF plans to assist the newly established Social Protection Coordination Unit (SPCU) in coordinating formulation of results/evidence based policies and programmes through commission of a research in estimating Rates of Return on the various key and relevant Social Protection (SP) Instruments, including those on the anvil and in the pipeline.

The underlying hypothesis of this planned research study is, ‘increase in public expenditure which translates into benefits for the poor especially women and children has a positive impact on economic growth and a negative impact on inequality’⁴⁷. This may be for various reasons, including the avoidance of irreversible disadvantage to a person’s future productivity (especially through investment in children and adolescents), mitigation of the intergenerational transfer of poverty, and the reduction of future costs to health, education and social welfare systems, through timely, predictable transfers.

The research aims to contribute to the evidence on the links between government spending, social protection and child welfare, economic growth and inequality through econometric analysis of cross-country (i.e. national-level) data and ex-ante estimation of such costs and benefits where post ante data are not available. Due to the complex and limited nature of intergenerational and inter-demographics data, and the general perception of poor and vulnerable and children as either a special interest group or as a sub-group of a homogenous population, many attempts to use empirical analysis to map out this link between investments in Social Protection/welfare and especially children and growth have been limited to looking at specific sectors. These include the many analyses of the returns to education for example. Arguably, there have been far fewer attempts to map out the link at the multi-sectoral or macro-level. This study aims to fill in this gap for Cambodia in particular and contribute to global knowledge base more broadly.

The literature on the effects of social welfare, including child-welfare outcomes on economic development is more comprehensive. For example this literature demonstrates that there is strong evidence that a country's level of child survival is positively correlated with its subsequent economic growth (e.g. Barro and Sala-i-Martin, 2005); there is also evidence that higher rates of school enrolment raise growth (e.g. Mankiw et al.1992). There is also an extensive literature on the links between investing in education and the resulting long-term effects on economic growth through such factors as higher wage rates and reduced fertility, which are still debated (e.g Murrugara, 1999; Schultz,2003). There is also some evidence that improvements in child outcomes can reduce inequality (Li et al., 1998).

47. The impact of investing in children: assessing the cross-country econometric evidence, Edward Anderson and Sarah Hague* , From Working Paper 280,June 2007 Overseas

Given the global evidence, it emerges that further research examining the relationship between government expenditure in a wide range of sectors that may benefit poor, vulnerable and children, and the subsequent impact of increased protection and development outcomes, (especially those related to child welfare) on economic growth and inequality, can make a useful contribution to the process of national policy and programme formulation and national budgetary planning process.

Following a national policy exercise started in the wake of the triple F (food, fuel , finance) crisis of 2008, the government of Cambodia recently adopted a comprehensive strategy of social protection, national Social Protection Strategy (NSPS) for Poor and Vulnerable, to channelize its social welfare and social safety net instruments, with a broader national commitment to contribute to the rehabilitation and stability of the economic sector, and also to enhance the human capital indicators including education, health and livelihood development towards the achievement of the Millennium Development Goals (MDGs). The Royal Government of Cambodia (RGC) considers this strategy as an important complement to its overall vision of achieving growth with equity.

Though, the recent adoption of a comprehensive social protection system constitutes the cornerstone for the transition from a framework of humanitarian assistance to a framework of recovery and sustainable development in the country, Cambodia is still lags behind in providing some basic protection to its citizens.

As NSPS is still in its infancy, a nation-wide social protection programme is yet to emerge. There are a few social safety net instruments which are small in coverage in rather sporadic (unpredictable) in nature like the occasional public works and some pension schemes or the targeted ‘emergency’ food distribution programmes. Several cash transfer activities, focusing mainly on cash for work, were implemented by a few UN Agencies (UNDP, WFP and ILO), USAID and international NGOs time and again in the aftermath of some emergency the most recent being the 2008 food-fuel-finance. The impact of these initiatives is currently being evaluated and an ILO study is looking into the estimating the cost of a nation-wide public works programme.

With the recent commitment of the RGC within the NSPS, there is need to plan for a progressive realization of social protection, which includes a basic minimum of health, education and income for the vulnerable, i.e. Social Protection Floor.

This analysis and research of estimation of RoR on SP instruments, should take place within the overall framework of the National Social Protection Strategy, under the oversight of the SPCU (Social Protection Coordination Unit), to help strengthen the government’s implementation and resourcing and ownership of the strategy. This will support SPCU’s efforts at making a case to the National Ministry of Finance on the budgetary allocations to SP instruments, based on the SP as an investment rather than a cost.

The national investments in social protection is on the decline and at the current levels of coverage Cambodia is one of the lowest on the social protection index.⁴⁸ As of today, in the context of the rather low social protection environment and where, an estimated 30% people (2007 estimates) are living below the poverty line and 18 % below the food poverty line⁴⁹, now that the strategy is in place, the government is faced with the challenge and the opportunity of increasing its investments in social protection instruments. This investment has to be backed by a sound assessment of financial and economic returns, which will make SP both politically and financially an attractive policy option.

In sum, the following are the features and issues in the SP context in Cambodia:

- Most of the current SP instruments are funded by the development partners but the recent approval of the NSPSS which was formulated through a national consultative exercise, spearheaded by the govt./CARD/SPCU, may see increasing investments from the RGC in the medium-to long term.
- The implementation is still largely fragmented leading to missed opportunities of enhancing impacts for vulnerable population.
- There is a persistent worry and concern about dependency issues and hence there is a deep seated phobia of unconditional cash or kind transfers, save emergency contexts.
- Though the NSPS was approved by the National Council of Ministers, the line agencies are yet to appreciate the implications of an integrated and concerted framework in SP that the strategy calls for and hence the challenge of shared responsibility and accountability is yet to largely take roots within the broader national and sub-national apparatus.

Within the NSPS vision, there are several instruments that are available and ILO has commissioned a costing study of some of these key instruments. The ILO study aims at:

- A Social Protection Expenditure and Performance Review of Cambodia;
- A detailed Overview of the financial / fiscal Costs of Cambodia's Social Protection Strategy for the poor and vulnerable;
- A Social Budget for Cambodia.

Costing is here understood as estimating the monetary amounts of benefits to be paid, and, accordingly, the gross amount of financial resources required in order paying those benefits of the programmes under the NSPS. This proposed study of UNICEF is aimed at answering the other side of the equation of cost benefit analysis and will complement the ILO study. Put together with ILO's study it will give a credible and data/evidence based rationale and investment framework to the RGC for its SP investments.

This approach of estimating return, which is linked to the impact and cost effectiveness, is also closely related to the results based management approach that the UN and other development partners seek to emphasize within the RGC.

⁴⁸ Cambodia ranks 'a very low' 0.18⁴⁸ on the Social Protection Index, devised by the ADB

⁴⁹ Ranking on the Global Hunger Index (IFPRI) is 21.2 (2009).20.9 (2010)

Thus, this study proposes to use the following inputs to estimate the rates of returns:

- **ILO costing study**-The above mentioned ILO study. This study covers largely existing Social Protection Programmes (NSSF, NSSFC and others) for the formal sector, plus possible extension of Social Protection/social security (Social Health Insurance, Pension). Most of this information is focus on the formal sector due to the availability of the data. Here the estimation of RoR will include key instruments (as covered by ILO) scaled up and/or with a narrower coverage. In addition to this document the planning documents for an ILO supported Public Works Programme will also be included estimation of RoR⁵⁰. This is targeted at the informal sector.
- **Integrated programme and other key instruments for achievement of NSPS objectives**-In addition to the costing which are already available through the ILO exercise, which will be used to estimate scalable rates of return (corresponding to various levels of coverage), the study will need to carry out some scenario based rate of return estimation. One of the key scenarios would be an implementation of an integrated life-cycle based approach. Some discussion of this proposed integrated or what was also referred to as the backbone approach is merited. Though the NSPS is explicit about adoption of life-cycle based approaches to addressing vulnerabilities and building and protecting life human assets, this ‘backbone’ approach or an integrated programme approach to SP in Cambodia first entered the SP discussion lexicon thanks to WB supported TA⁵¹. This led to some lively, inspired and passionate discussion at an SP core group meeting in July at the WB, where after much deliberation and back and forth among the DPs and the SPCU officials, it was decided that the planned UNICEF-WB-AusAID CCT pilot aimed at enhancing health and nutrition outcomes among children under 2, could start to form a kernel of a backbone/integrated programme for Cambodia and be part of a menu available to the govt. come 2014/2015 for national up-scaling and replication. This planned pilot is still to include any education related outcomes or is not really as comprehensive and integrated in vision as the MEXICO Oportunidades, but seems to have a potential of developing into and is also at an advanced stage of conception and thinking, giving enough variables and estimated costs to the consultant to estimate the rates of return on. In addition to the consultant, in consultation with SPCU, will agree RoR on a few additional instruments from the ambit of NSPS that have a potential of national implementation like the Health Equity Funds, the scholarship for poor students etc.
- **Cost efficiencies through integration**-The third aspect of the study will be estimation of the cost efficiencies resulting from various approaches to integration, but in line with the recently crafted guiding principles for implementation of the NSPS. Here the consultant is also expected to bring in his/her expertise and knowledge of global best practices to help guide the on-going discussions on integration and coordination with the NSPS framework.

⁵⁰ Reportedly the project document already includes an estimation of cost and benefit at the macro level.

⁵¹ Mr. Rogelio Gomez Hermosillo, the WB TA visited Cambodia in May/June, bringing his expertise with the Oportunidades Program in Mexico to the country

PURPOSE AND SCOPE OF THE ASSIGNMENT

Keeping the above need for building strong economic arguments and rationale for the Government and ensuring that NSPS gets implemented in a sustainable manner, the following objectives are proposed for this UNICEF supported research:

- Assist RGC/SPCU in long term policy development
- Assist Ministry of Economy and Finance (MoEF) in planning its annual allocation for SP instruments
- Identify cost efficient approaches to SP programming in the Cambodian context especially in line with the NSPS implementation principle i.e. ‘Ten commandments document’.
- Assist UNICEF in development its approach to SP in Cambodia in line with the principles of relevance, efficiency, effectiveness, equity, human rights based and child-focused

Scope:

- **Economic Rate of Return (ERR)**-The research will estimate Economic Rates of Return. Here ERR is defines as ‘net benefits to all members of society, as a percentage of cost, taking into account externalities and other market imperfections.⁵² Wherever possible financial rates of return will be estimated as well.
- **Macro and Micro**-The Return on Investment will be estimated for the nation and for the entire economy but an estimation of the benefits at the micro/household level and at sub-national level, will be made wherever possible. Transferring a dollar from the average consumer to the poorest raises welfare of the poor. The consultant devise an approach to illustrate ERR under a plausible range of assumptions regarding the social value of transferring to the poor. The measurable impact on growth of a transfer (even the best of the lot) is compared to the average return to similar investments in health or infrastructure then transfers will not appear to be the better set of investments. That is, if the Question is whether a CCT is the best way to invest in education (or health) the answer is likely no. If, however, the Q is whether a CCT is the best way to spend our transfer \$, the answer is likely yes. The problem is that SNs have multiple objectives and to look at only a subset often implicitly assigns zero value to the others. Sayan investment can give a return of X while an equal value SN can give a return of a (a .c X) but also increases consumption of the poor which has a value in terms of the how much society values redistribution that has a value of b where (b .c X), the question of interest is whether (a+ b) ;: or .c X. Unfortunately, it is difficult if not impossible to quantify b; the implicit welfare weights are not directly observable although there are many applications of parametric weights using a grid of possible weights (see, for example, Deaton's Analysis of Survey Data chapter 3). But it is wrong to assume this is zero. If we focus only on a, we are likely to be viewed as a poor investment.

⁵² The net benefits to all members of society, as a percentage of cost, taking into account externalities and other market imperfections, as per the , online dictionary of economics, <http://www.economics-dictionary.com/definition/economic-rate-of-return.html>

- **Scalable and Scenario Planning**-Scalability and scenario building (scenario based estimation of RoR) will be the cornerstone of this RoR research , as it is mean to aid further policy development and national investment planning.
- **Ex-Ante ERR:** As most of the scenarios don't have a data from actual implementation, this will largely be an ex ante estimation of returns. Only in some cases, like that of public works, which will include some post-ante estimation of ERR.
- **Joint monitoring indicator**-On the basis of the RoR estimation the study will make a well argued recommendation on the joint monitoring indicator for SP implementation, to aid government planning and budgeting framework'. The Joint Monitoring Indicators (JMIs) are intended to link monitoring of Government, development partner and TWG activity to a set of priority targets associated with the NSDP. They are the most important tool for routinely incorporating the principles of results-based monitoring and mutual accountability into the development partnership. This then serves to connect the joint activities of Government and its partners to the attainment of development results.

Terms of Reference:

- Collect and analyze information from all key stakeholders involved in the NSPS proces, in particular UN agencies, international and national NGOs, and various line agencies implementing SP instruments.
- Identify the range of formal and informal instruments and mechanisms already available for ensuring the access to services and social protection for poor and vulnerable communities, agree on the most effective and relevant ones and add them to the repertoire of the SP instruments that should be studied for RoR.
- Develop an RoR estimation framework for the various instruments and scenarios, including that of the backbone/integrated programme.
- Commission an informal/formal peer review of the above framework, through posting on the Solution Exchange, UNICEF Poverty CPN network etc.
- Review and refer to studies and past/ongoing experiences from other countries in similar settings with lessons learned that could be applied to the Cambodia return/reintegration context.
- Work with SPCU to model and estimate this. Train SPCU and MoEF M&E and finance staff in developing some capacity in these cost efficiency estimations.

Expected Outcomes:

The principal outputs for this consultancy will be:

- A Situation Analysis Report including the outcomes from the collection of information and analysis, and that from the ILO study.
- An inception report including SP instruments/programmes/projects selected for estimation, framework of estimation of return on investments.
- A peer review report of the proposed framework
- A draft report shared at national consultation workshop, to be organized in partnership with SPCU, MoEF and SNEC

- A final report including outcomes from first round of consultation on the draft report. Recommendations should be identified and substantiated on how to integrate the model's lessons learned and experience into the national social protection policy development process.
- The length of the report should be 50 pages, bar annexes and the executive summary should be up to 7 pages and not less than 5.

Other specifications for the expected reports (content, style etc.) will be agreed upon at the onset of the consultancy.