Komoto, Ginalyn; Stone, Susan

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Determining poverty impacts on Lao People's Democratic Republic and Cambodia: Reconciling household and GTAP data

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Determining Poverty Impacts on Lao People’s Democratic Republic and Cambodia: Reconciling Household and GTAP Data

Ginalyn Komoto and Susan Stone

No. 141
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Abstract

Poverty-related studies are usually general examinations of the impact of policy reforms or major investments on the poor. However, policy changes may have varying consequences across different segments of the poor. To more accurately determine the poverty implications of policy initiatives, it is important to stratify households according to income source and decompose their factor earnings.

This paper applies a method that builds consistency between information in the Lao People’s Democratic Republic (PDR) and Cambodian household surveys, and the outputs of the general equilibrium model developed at the Global Trade Analysis Project, or GTAP model. This allows for a consistent platform for translating policy changes to changes in poverty headcount across income strata. Thus, changes in sector outcomes arising from policy reforms or major investments (such as infrastructure projects) can be traced through changes in factor incomes. From there, a connection can be drawn between improvements in sector-specific outcomes and movements of people in and out of poverty. As such, this method will help ensure effective policy design when the objective is poverty reduction. This method can be readily extended to other developing countries’ survey data.

JEL Classification: I32, O2
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1. INTRODUCTION

The current economic crisis has heightened concerns about poverty across the world. One outcome of the recent Group of Twenty (G-20) meeting in London was a call for all developed countries to fulfill their commitments on providing aid and continued development assistance to the developing world. Indeed, the Asian Development Bank (ADB) recently received a 200% General Capital Increase, while announcing a US$3 billion counter-cyclical support facility for the region.

The extent to which these measures will offset the major economic slowdown in the region remains unclear. The full extent of the slowdown’s impacts on the poor is also as yet unknown, but ADB is projecting an additional 131 million poor in 2010 (ADB 2009).

While poverty reduction remains a major pillar in the development agendas of multilateral development banks, the current economic situation has placed increased stress on available resources. Not only are donor countries experiencing pressure at home to prop up their own economies, traditional aid agencies and domestic governments alike are also facing increasing, and increasingly diverse, demands for funds. Rarely has the need to maximize value for every public dollar spent been more important.

Despite the significant inroads made in the region, poverty is still a major challenge in Asia. While cases of extreme poverty (i.e. those living on US$1/day or less) have fallen, the number of those living at or near the poverty line of US$2/day remains high. Along with the rise in the number of ‘working poor’ has come a rise in income inequality. Indeed, studies have shown increasing levels of income inequality over the last ten years in Asia (Ali 2008).

These trends have not been lost on policymakers. “Equitable growth” and “holistic growth” have become the new catchwords in development policy formulation. Large economies such as India and the People’s Republic of China (PRC) have instituted a number of policies to address the potentially destabilizing effects of the over-concentration of benefits within particular groups in society (Ganguly 2009).

The ultimate distribution of benefits from policy or public spending is pivotal for a number of reasons. First, from a strictly economic sense, as the number of consumers grows, so do opportunities for market expansion and competition. This allows companies to reap the benefits of economies of scale and scope. Economies that support competitive markets enjoy greater innovation and increase consumer utility by widening product choice and service provision. Second, from a social policy perspective, a policy that has limited impacts on income can lead to uneven income growth. This, in turn, can lead to social unrest and the development of a permanent underclass. Aside from raising moral dilemmas, these outcomes represent real burdens on government budgets. Expanding the potential gains from any development project can ease such pressures on government budgets, while simultaneously expanding the tax base. Thus, it is imperative that policymakers understand and anticipate the potential income effects of public spending or policy initiatives, and plan accordingly.

This paper outlines one way of measuring the impact of policy initiatives on the poor. The use of the poverty headcount to measure poverty impact is well established (Bourguignon 2003; Ravallion and Dat 1999; Ravallion and Chen 1997). However, this approach usually measures the impact of policy on the poor in general, and not on specific groups. The consequences of policy reforms vary widely among various household segments, depending on their primary source of income, endowment, and consumption patterns. Therefore, it is important to stratify households according to income source and decompose their factor earnings, when attempting to determine the actual impact of policy measures. This can be done by calculating the effects of changes in the factor earnings on poverty headcount across strata (Hertel et al. 2007a).
In order to measure the impacts of various transport policy initiatives in Cambodia and Lao PDR, households were stratified according to primary income source. Five groups of households that rely almost solely (95% or more) on one source of income were identified. The households that rely on several sources of income (less than 95% on each source) were classified as diversified, and further broken down into rural and urban households. In total, there are seven strata: self-employed agriculture based, self-employed non-agriculture based, rural and urban wage earners, transfer-based, and rural and urban diversified (Hertel et al. 2007a).

Income earned by households in Cambodia and Lao PDR was taken from household surveys and categorized into ten factor income sources: Land, Agriculture-Unskilled (AgUnskl); Agriculture-Skilled (AgSkl); Non-agriculture-Unskilled (NagUnskl); Non-agriculture-Skilled (NagSkl); Wage-Unskilled (WgUnskl); Wage-Skilled (WgSkl); Agriculture Capital (Agcap); Non-Agriculture-Capital (Nagcap); and Transfers. AgUnskl and AgSkl are imputed returns to self-employed agriculture labor. NagUnskl and NagSkl are imputed returns to self-employed non-agriculture labor. WgUnskl and WgSkl are labor wages that were reported directly in the survey as wage earnings. Land and Agcap are split from the residual of agriculture profits and determined by alpha (as derived from the Global Trade Analysis Project [GTAP] database). Nagcap is the residual of non-agriculture profits. Finally, transfers include both public and private transfers (Hertel et al. 2007a).

The remainder of the paper is organized as follows: Section II outlines the data cleaning procedure; Section III describes how the Cambodia and Lao PDR household data were linked to the GTAP data; and Section IV briefly discusses the methodology’s strengths and weaknesses. The succeeding sections illustrate the structure of poverty around the neighborhood of the poverty line, and provide some policy implications. The last section concludes.

2. “CLEANING” THE HOUSEHOLD DATASETS

This paper uses the Cambodia Household Socio-Economic Survey from 2003 to 2004 and the Lao Expenditure and Consumption Survey (LECS III) from 2002 to 2003. The Cambodia survey includes all 24 provinces, from which 900 villages (6.3%) were selected, with probability proportional to size. The Cambodia survey covers household socio-demographics such as age, educational attainment, occupation, industry, sector, and possession of durable goods. It also contains household income, household consumption, crop production, and household expenditure, time use, as well as social indicators such as health, fertility, HIV/AIDS,1 migration, and victims of violence. LECS III’s sampling frame comprises all 18 provinces, from which 540 villages (5%) were sampled with probability proportional to size (i.e., number of villages per province). LECS includes the following variables: age, educational attainment, industry, sector, possession of durable goods, time use, household income, household consumption, crop production, and household expenditure, as well as social indicators such as health and infrastructure.2

Both datasets were “cleaned” using the following procedure:

a. Observations with missing socio-demographic variables and household income were deleted, as there were no relevant information on which to base the imputation of values. The Cambodia dataset initially consisted of 14,984 households, but 11 households were deleted; therefore, only 14,973 households were used. As for Lao PDR, only one respondent was deleted, leaving 7,998 households for analysis.

---

1 Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
2 Details of the Cambodian survey are included as Appendix 1 and those for Lao PDR as Appendix 2.
b. Units of analysis across these spreadsheets were standardized at the household level. Some variables reported by all household members—such as wage, outputs, expenses, profits, property rents, dividends, and transfers—were thus aggregated into a single value representing the whole household.

c. Wages were imputed to self-employed income using the mean wage of respondents with the same set of characteristics (including age, education, skill, and industry of employment). For observations that did not match, education and industry were aggregated into larger classifications (Tables A1.3, A1.4, and A2.2). To illustrate, wages of employed respondents who were reported as 18 years old, seventh grader, unskilled, and farmers could not be used to impute wages for self-employed respondents who had similar characteristics—i.e., 18 years old, unskilled and farmer, but were eighth graders. To remedy this, all respondents who finished sixth to eighth grade were collapsed into one category called lower secondary; this allowed a match between self-employed respondents and wage earners who possessed a similar set of characteristics: 18 years old, unskilled, farmers, and lower secondary (that is, either sixth, seventh, or eighth graders). This procedure greatly increased the number of matched respondents.

d. Some missing industry data were filled using the information or clues provided by occupation. For example, for some respondents whose occupations were salespersons or security guards, it was assumed that the corresponding industry is services.

e. One concern about the Lao PDR dataset was that respondents were classified into agriculture and non-agriculture workers, but were not categorized as employed or self-employed. To separate the employed from the self-employed among the non-agriculture workers, the following approach was taken: based on the responses of the household-head to questions about family business, if a household owned a non-agriculture business, then he or she was self-employed. Also, if the other household members worked in the same industry as the household head, then they were assumed to be working in the family business, and classified as self-employed. Among the agriculture workers, based on the household heads’ responses to agriculture business-related questions in the questionnaire, if a household operated its own agriculture business, then he or she was considered self-employed. Households that did not run their own farm business were assumed to be employed by other people who ran an agricultural business.

f. For Cambodia, occupation was used to determine the skill level for each income category. However, the Lao PDR dataset did not report occupation. Thus, education (Table A2.2) was used as proxy indicator for skill in the Lao PDR data, since studies have shown that workers’ productivity or skill depends both on years of education and what is learned at school (Heckman, Layne-Farrar, and Todd 1995; Murnane, Willett, and Levy 1995 in Fasih 2008). Ninth graders and above were considered skilled, and the rest were categorized as unskilled.

g. Finally, for the Lao PDR dataset, 90% of crop price data were taken from the Food and Agriculture Organization Statistics (FAOSTAT) database.
3. LINKING REPORTED INCOME TO THE GTAP PRIMARY FACTORS

Household income was linked to the GTAP factors following the methodology in Ivanic (2004):

Assumption 1, Wage labor: Wages are received by employed household members, not by employers, or the self-employed. These include cash and in kind (with reported cost estimates provided in the respective questionnaire).

Assumption 2, Skilled labor: Reported and imputed wages were classified based on a person’s skill level as either skilled or unskilled. For Cambodia, GTAP’s definition was followed: all professional workers and managers were classified as skilled; unskilled otherwise. For Lao PDR, education was used as proxy (as described above).

Assumption 3, Transfers: Transfers include both government and private transfers.

Assumption 4, Property rents: Property rents are either agriculture or non-agriculture property rents. Agricultural property rents include rental payments for land, farming equipment, and other agricultural instruments. Non-agricultural property rents include rental payments for buildings, houses, non-agricultural equipment, and non-agricultural dividends. In the Cambodia dataset, agricultural property rents include rental payments for land and ponds, while non-agricultural property rents include dividends and rental payments for house and building space. In the Lao dataset, agricultural property rents include rental payments for land, while non-agricultural property rents include dividends and rental payments for house and building space.

Assumption 5, Agriculture vs. non-agriculture: Based on the definition in the Cambodia and Lao PDR questionnaires, farming, livestock, fishing, and forestry are considered agricultural, while mining, services, and manufacturing are non-agricultural.

Assumption 6, Imputation of capital: The value of capital is the residual of the reported business income less the estimated return to labor. This applies to both agriculture and non-agriculture sector.

Assumption 7, Estimated returns to labor: The imputed labor income for all household members involved in the business. The imputed labor income for a household member was determined as the average wage of all workers in the survey dataset that: (i) earned wage income only; and (ii) possessed an identical set of personal characteristics, i.e., age, education level, skill level, and industry of employment.

Assumption 8, Returns to Land: The value of returns to land is the GTAP-determined fixed ratio of capital returns in agriculture. Returns to land and capital were split from the sum of agricultural property rents and the residual of reported business income and imputed wage, using the factor payment shares from the GTAP database derived from econometric studies of cost shares in agriculture (Hertel, Ivanic, and Cranfield. 2004). For Asia, alpha is .88 (Table 1).

Assumption 9: Following the definition of business income in Ivanic (2004), agricultural business income includes imputed agricultural wage, returns to capital, and returns to land, while non-agricultural business income contains imputed non-agricultural wage, non-agricultural capital, and non-agricultural property income. Total household income includes all sources of household income; that is, the sum of all factor income: Agskl, AgUskl, Nagskl, NagUskl, Wgeskl, WgeUskl, Agcap, Land, Nagcap, and Transfers.
Table 1: Definition of Factor Income

<table>
<thead>
<tr>
<th>Factor return</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agri Skilled labor</td>
<td>Imputed agri skilled labor</td>
</tr>
<tr>
<td>Agri Unskilled labor</td>
<td>Imputed agri unskilled labor</td>
</tr>
<tr>
<td>Non-Agri Skilled labor</td>
<td>Imputed non-agri skilled labor</td>
</tr>
<tr>
<td>Non-Agri Unskilled labor</td>
<td>Imputed non-agri unskilled labor</td>
</tr>
<tr>
<td>Wage Skilled labor</td>
<td>Skilled labor wages</td>
</tr>
<tr>
<td>Wage Unskilled labor</td>
<td>Unskilled labor wages</td>
</tr>
<tr>
<td>Agri capital</td>
<td>Max(0,((1-α)((ba-aw)+pa))</td>
</tr>
<tr>
<td>Non-agri capital</td>
<td>Max(0,((bn-nw)+pn))</td>
</tr>
<tr>
<td>Land</td>
<td>Max(0,((ba-aw)+pa))</td>
</tr>
<tr>
<td>Transfers</td>
<td>Private transfers + public transfers</td>
</tr>
</tbody>
</table>

* α = 88%; ba = agricultural business income; bn = non-agricultural business income; aw = imputed agriculture labor; nw = imputed non-agriculture labor; pa = agricultural property rent; pn = non-agricultural property rent.

Table 2 is a revised version of the example in Ivanic (2004) of how business income is broken down, following the formulas in Table 1. For example, if a household reported a total of US$100 of agricultural business income, of which US$60 is imputed labor income from agricultural activities, profit is equal to US$100 less imputed wage; that is, US$40. The combined return to land and capital is equal to the profit plus reported property income. To obtain the returns to land, multiply this figure (US$70) with the GTAP determined alpha, 88%. In the non-agricultural business, the return to capital would be zero, as the imputed wage is equal to reported business income.

Table 2: Breakdown of Business Income

<table>
<thead>
<tr>
<th></th>
<th>Agricultural business income</th>
<th>Non-agricultural business income</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Reported business income</td>
<td>60 +40 =100</td>
<td>60+0=60</td>
</tr>
<tr>
<td>b) imputed wage</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>c) residual (a-b)</td>
<td>100-60 =40</td>
<td>60-60=0</td>
</tr>
<tr>
<td>d) reported property income</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>e) land +capital (c+d)</td>
<td>30+ 40</td>
<td>0</td>
</tr>
<tr>
<td>f) returns to land</td>
<td>70α</td>
<td>0</td>
</tr>
<tr>
<td>g) returns to capital</td>
<td>70(1-α)</td>
<td>0</td>
</tr>
</tbody>
</table>

4. STRENGTHS AND WEAKNESSES

While other poverty impact analysis methodologies like cross-section regressions show the impact of policy reforms on general poverty, their results hide the specific gainers and losers of such reforms. Applying this paper’s method, GTAP can utilize multi-poverty elasticities which capture the shape of income distribution for specific subgroups from the survey data, and thus determine the mobility and distributional welfare of these subgroups in different simulations (Hertel, Keeney, and Winters 2007b).

Compared to national accounts data, survey data better reflect labor force classification without significant sampling bias. However, the real size of economic activities may be understated; some households may underreport their incomes, and it is likely that the richest households are underrepresented. To address this issue, Ivanic (2004) added the residual of the GTAP totals and the survey factor returns to the survey data. It is important that surveys are properly designed in order to minimize the discrepancy.
Imputation of labor income to self-employed individuals decreases the variance, as values in this variable tend to lump together towards the mean. In order to better capture the true variability across labor income values, future household surveys can include questions on the actual income of household members who participate in the household business. Also, this methodology can be improved by utilizing surveys that have better coverage than the Cambodia (6.3%) and Lao PDR (5%) surveys. In sum, the methodology can be readily extended to other developing countries’ survey data, provided that they have representative coverage, sound sampling design, good quality, and timely data.

5. STRUCTURE OF POVERTY

The entire population was characterized from poorest to richest. Applying the World Bank’s US$1 and US$2 poverty headcounts, 33.8% (ADB 2007) and 77.7% (WDI 2007) of the Cambodian households are below the US$1/day and US$2/day poverty lines, respectively. As for Lao PDR, 28% of the population is below the US$1 poverty line (ADB 2003); while 74% is below the US$2 poverty line (WDI 2007). These poverty lines apply to all subsequent procedures in this paper.

The poverty income levels were taken back into the household strata to give an estimate of the headcount by stratum. Cross-tabulation of the variables strata and households obtained poverty rate per stratum, poverty headcount share in total poverty, and poverty headcount share in total population. Table 3 shows that in Cambodia, poverty is largely concentrated in the rural diversified followed by the agriculture sectors; in Lao PDR, the poorest are in agriculture, followed by the rural diversified sectors. The frequency tables for occupation and industry in the Cambodia and Lao PDR datasets (Tables A1.5 and A2.3, respectively) substantiate these figures.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Agriculture</th>
<th>Non-Agriculture</th>
<th>Urban Labor</th>
<th>Rural Labor</th>
<th>Transfers</th>
<th>Urban Diversified</th>
<th>Rural Diversified</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia: US$1/day</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poverty rate in stratum</td>
<td>48.5</td>
<td>16.3</td>
<td>26.6</td>
<td>34.2</td>
<td>76.3</td>
<td>17.8</td>
<td>31.8</td>
<td>33.8</td>
</tr>
<tr>
<td>Share in total poverty</td>
<td>39.3</td>
<td>3.2</td>
<td>2.0</td>
<td>2.1</td>
<td>1.1</td>
<td>6.3</td>
<td>46.1</td>
<td>100.0</td>
</tr>
<tr>
<td>Share in total population</td>
<td>13.3</td>
<td>1.1</td>
<td>0.7</td>
<td>0.7</td>
<td>0.4</td>
<td>2.1</td>
<td>15.6</td>
<td>33.8</td>
</tr>
<tr>
<td>Lao PDR: US$1/day</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poverty rate in stratum</td>
<td>34.81</td>
<td>23.94</td>
<td>20.74</td>
<td>28.00</td>
<td>85.71</td>
<td>15.06</td>
<td>14.84</td>
<td>28.0</td>
</tr>
<tr>
<td>Share in total poverty</td>
<td>77.03</td>
<td>4.02</td>
<td>1.25</td>
<td>0.31</td>
<td>0.80</td>
<td>5.36</td>
<td>11.22</td>
<td>100.0</td>
</tr>
<tr>
<td>Share in total population</td>
<td>21.56</td>
<td>1.13</td>
<td>0.35</td>
<td>0.09</td>
<td>0.23</td>
<td>1.50</td>
<td>3.14</td>
<td>28.0</td>
</tr>
<tr>
<td>Cambodia: US$2/day</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poverty rate in stratum</td>
<td>90.7</td>
<td>59.9</td>
<td>59.4</td>
<td>72.6</td>
<td>86.8</td>
<td>57.3</td>
<td>78.8</td>
<td>77.7</td>
</tr>
<tr>
<td>Share in total poverty</td>
<td>32.0</td>
<td>5.1</td>
<td>1.9</td>
<td>1.9</td>
<td>0.6</td>
<td>8.8</td>
<td>49.8</td>
<td>100.0</td>
</tr>
<tr>
<td>Share in total population</td>
<td>24.9</td>
<td>4.0</td>
<td>1.5</td>
<td>1.5</td>
<td>0.4</td>
<td>6.8</td>
<td>38.7</td>
<td>77.7</td>
</tr>
<tr>
<td>Lao PDR: US$2/day</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poverty rate in stratum</td>
<td>82.76</td>
<td>50.53</td>
<td>71.85</td>
<td>64.00</td>
<td>90.48</td>
<td>54.20</td>
<td>62.92</td>
<td>74.0</td>
</tr>
<tr>
<td>Share in total poverty</td>
<td>69.27</td>
<td>3.21</td>
<td>1.64</td>
<td>0.27</td>
<td>0.32</td>
<td>7.30</td>
<td>17.98</td>
<td>100.0</td>
</tr>
<tr>
<td>Share in total population</td>
<td>51.25</td>
<td>2.38</td>
<td>1.21</td>
<td>0.20</td>
<td>0.24</td>
<td>5.40</td>
<td>13.30</td>
<td>74.0</td>
</tr>
</tbody>
</table>
5.1 Earnings Share at the Poverty Line

Similarly, poverty income levels were taken back into the strata to estimate the average factor income shares in total household income, in the neighborhood of the poverty line. This was done by taking 10% of the population around the poverty line—5% below and 5% above the poverty line—for each stratum, and computing the average factor earnings shares in the total household income. To illustrate, 72% of the total income of the agriculture households around the US$1/day poverty line comes from unskilled agricultural labor, while for Lao PDR the number is closer to 58%. The trends in Table 4 show that households depend highly on (imputed) unskilled labor income.

Table 4: Average Factor Income Shares Using 10% of Stratum HH around the Poverty Line, per Stratum and Country

<table>
<thead>
<tr>
<th>Strata</th>
<th>AgSkl</th>
<th>AgUnskl</th>
<th>Nag</th>
<th>NagUnskl</th>
<th>WgSkl</th>
<th>WgUnskl</th>
<th>AgCap</th>
<th>Land</th>
<th>NagCap</th>
<th>Transfer</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia: US$1/day</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agriculture</td>
<td>0.00</td>
<td>0.72</td>
<td>0.00</td>
<td>0.04</td>
<td>0.00</td>
<td>0.03</td>
<td>0.02</td>
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5.2 Poverty Arc Elasticity

Poverty elasticity is usually computed by shocking income by one percent and calculating the change in poverty. However, if there is a gap between income levels at the poverty line and the households’ income below such a level, then such an approach may underestimate
actual poverty impacts. Taking the arc elasticity solves this problem by focusing on the changes in the neighborhood of the poverty line, and increasing the range over which impacts can be measured. Arc elasticity is obtained by computing the change in poverty headcount with respect to the change in the real income of households around the poverty line; this can be approximated by the following formula:

\[
E_{cs} = -\frac{dF_{cs}(\bar{y}_c^p) / dy^p_{cs}}{F_{cs}(\bar{y}_c^p) / y^p_{cs}}
\]

where \( F_{cs}(\bar{y}_c^p) \) is the cumulative distribution function that computes poverty headcount ratio when \( \bar{y}_c^p \) is the poverty income level in country \( c \).

Lining up the stratum population from poorest to richest, poverty arc elasticities can be computed directly off the slope of the cumulative distribution function in the neighborhood of the poverty line (Hertel, et.al, 2007a). For example, 48% of the population in the Agriculture stratum in Cambodia falls within 5% (above and below) of the US$1/day poverty level. A 32% change in income results in a 21% decrease in the poverty headcount, implying a poverty elasticity of -0.64 (Table 5). The table also shows that, as expected, elasticities diminish from US$1/day to US$2/day as the density of poor households around the poverty line increases. This trend is more prevalent in Cambodia than in Lao PDR.

**Table 5: Poverty Elasticities Using the 10% of Stratum Population, per stratum and country**

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<tr>
<th>Strata</th>
<th>Poverty count below poverty line</th>
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<th>Percent change in poverty headcount</th>
<th>Percent change in income</th>
<th>Poverty arc elasticity</th>
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6. POLICY IMPLICATIONS

Knowing the number of people who actually move out of poverty is helpful for any policy initiative. However, it is the variation among the different income groups that informs the entire policy process, and can most effectively assist in designing programs that seek to permanently alleviate poverty. This information can also highlight which groups need special attention, and provide guidance on what kind of assistance may be most appropriate.

As Table 5 shows, different income groups exhibit varying levels of sensitivity to changes in income. For instance, Cambodia’s non-agricultural workers and Lao PDR’s rural diversified workers earning US$1/day or less show the highest sensitivity to income changes. This is to be expected, as these groups are often made up of casual and/or seasonal workers. Policies aimed at permanent reductions in poverty may be directed at providing more stable market conditions to create more permanent work opportunities. In contrast, and not surprisingly, all groups receiving transfer payments have the least sensitivity to income changes, showing that there has been an historical reliance on this source of income. It also implies that, given the recent decline in remittances, households that rely heavily on transfer payments may experience greater perceptions of hardship, if they lose this dependable flow of funds; moving this particular group out of poverty may not be easy.

Looking across these groups (US$1/day versus US$2/day) it is the rural workers in Lao PDR and the agricultural workers in Cambodia that experience the largest changes. In Lao PDR, for instance, for every 1% increase in income at the US$1/day level, there is a 0.62% decline in the number of rural laborers in poverty. However, at US$2/day, the number is almost half that amount, at 0.34%. Thus, policies that impact on the income of the very poor may be more effective for rural laborers in terms of absolute numbers moved out of poverty than, say, for non-agriculture workers. The number of rural laborers at the US$2/day level is going to be more difficult to change. This implies the need for long term support for this group, and a mechanism to provide for lasting change.

In Cambodia, the differences in elasticity across the US$1/day and US$2/day level are larger across the board, with rural workers in general (laborers and diversified) seeing the biggest difference. Thus, the impacts of changes in income between these two groups are more severe in Cambodia, implying the possibility of having a larger, more entrenched group of working poor.

7. CONCLUSIONS

The paper has shown that by using household survey data, more precise measures of the poverty impacts of various programs can be obtained. This methodology allows information from the Lao People’s Democratic republic (PDR) and Cambodian household surveys to be made consistent with the outputs of the GTAP general equilibrium model, providing a consistent platform for translating policy changes to changes in poverty headcount across income strata. Thus, changes in sector outcomes arising from policy reforms or major investments (such as infrastructure projects) can be traced through changes in factor incomes. From there, a connection can be drawn between improvements in sector-specific outcomes and movements of people in and out of poverty. Governments need to understand that different segments of the poor require specific programs, if the goal is to permanently move people out of poverty. Governments must be in a position to anticipate the differential impacts of any given policy, and respond accordingly. Given the constraints on fiscal budgets, the information outlined in this paper should provide much needed guidance and feedback for more effective policy design.
### APPENDIX 1: CODES IN THE CAMBODIA DATASET

**Table A1.1: Occupation codes**

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<th>Code</th>
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<td>Mixed-animal producers: Helper, aid, assistant</td>
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<td></td>
<td>671</td>
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</tr>
<tr>
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<td>672</td>
<td>Forestry/charcoal workers: Operator, mainly subsistence</td>
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<tr>
<td></td>
<td>Operator, mainly market</td>
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<td></td>
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<td></td>
<td>Operator, mainly subsistence</td>
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<td></td>
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<td>Forestry/charcoal workers: Helper, aid, assistant</td>
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<td>Worker, experienced adult</td>
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<td></td>
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<tr>
<td>614</td>
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<td>Fishery workers: Operator, mainly subsistence</td>
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<td>Tree and shrub crop growers: Operator</td>
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<td>Fishery workers: Worker, experienced adult</td>
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<td>experienced adult</td>
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<td></td>
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<tr>
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<td>Tree and shrub crop growers: Helper,</td>
<td>691</td>
<td>Hunters and trappers: Operator, mainly market</td>
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<td>aid, assistant</td>
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<td>Gardeners, horticultural and nursery</td>
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<td>Hunters and trappers: Operator, mainly subsistence</td>
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<td>growers: Operator, main</td>
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<td></td>
</tr>
<tr>
<td>632</td>
<td>Gardeners, horticultural and nursery</td>
<td>693</td>
<td>Hunters and trappers: Worker, experienced adult</td>
</tr>
<tr>
<td></td>
<td>growers: Operator, main</td>
<td></td>
<td></td>
</tr>
<tr>
<td>633</td>
<td>Gardeners, horticultural and nursery</td>
<td>694</td>
<td>Hunters and trappers: Helper, aid, assistant</td>
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<tr>
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<td>growers: Worker, experience</td>
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<td></td>
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<td>634</td>
<td>Gardeners, horticultural and nursery</td>
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<td>Extraction and building trade workers</td>
</tr>
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<td></td>
<td>growers: Helper, aid</td>
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<td></td>
</tr>
<tr>
<td>635</td>
<td>Market-oriented animal producers and related</td>
<td>720</td>
<td>Metal, machinery and related trades workers</td>
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<td>730</td>
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<td>740</td>
<td>Other craft and related trades workers</td>
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### Table A1.1: Occupation codes (cont’d.)

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<th>Label</th>
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<tr>
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<td>930</td>
<td>Laborers in mining, construction,</td>
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<td></td>
<td></td>
<td></td>
<td>manufacturing and transportation</td>
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<tr>
<td>820</td>
<td>Machine operators and assemblers</td>
<td>991</td>
<td>Armed forces</td>
</tr>
<tr>
<td>830</td>
<td>Drivers and mobile plant operators</td>
<td>997</td>
<td>Other occupation not classified elsewhere</td>
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<tr>
<td>910</td>
<td>Sales and services elementary occupations</td>
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<td>Respondents don't know the occupation</td>
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<tr>
<td>920</td>
<td>Agricultural, fishery and related laborers</td>
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Table A1.2: Industry Codes

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<td>Growing of cereals and other crops n.e.c.</td>
<td>25</td>
<td>Manufacture of rubber and plastic products</td>
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<td>1</td>
<td>Growing of vegetables, horticultural specialties and nursery</td>
<td>26</td>
<td>Manufacture of other non-metallic mineral products</td>
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<tr>
<td>2</td>
<td>Growing of fruit, nuts, beverage and spice crops</td>
<td>27</td>
<td>Manufacture of basic metals</td>
</tr>
<tr>
<td>3</td>
<td>Farming of cattle, sheep, goats, horses, asses, mules and hi</td>
<td>28</td>
<td>Manufacture of fabricated metal products, except machinery a</td>
</tr>
<tr>
<td>4</td>
<td>Other animal farming; production of animal products n.e.c.</td>
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<td>Manufacture of machinery and equipment NEC</td>
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<tr>
<td>5</td>
<td>Growing of crops combined with farming of animals (mixed far)</td>
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<td>Manufacture of office, accounting and computing machinery</td>
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<tr>
<td>6</td>
<td>Agricultural and animal husbandry service activities, except</td>
<td>31</td>
<td>Manufacture of electrical machinery and apparatus NEC</td>
</tr>
<tr>
<td>7</td>
<td>Hunting, trapping and game propagation including related ser</td>
<td>32</td>
<td>Manufacture of radio, television and communication equipment</td>
</tr>
<tr>
<td>8</td>
<td>Forestry, logging and related service activities</td>
<td>33</td>
<td>Manufacture of medical, precision and optical instruments, w</td>
</tr>
<tr>
<td>9</td>
<td>Fishing, operation of fish hatcheries and fish farms; services</td>
<td>34</td>
<td>Manufacture of motor vehicles, trailers and semi-trailers</td>
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<tr>
<td>10</td>
<td>Mining of coal and lignite; extraction of peat</td>
<td>35</td>
<td>Manufacture of other transport equipment</td>
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<tr>
<td>11</td>
<td>Extraction of crude petroleum and natural gas; service activities</td>
<td>36</td>
<td>Manufacture of furniture; manufacturing NEC</td>
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<tr>
<td>12</td>
<td>Mining of uranium and thorium ores</td>
<td>37</td>
<td>Recycling</td>
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<td>13</td>
<td>Mining of metal ores</td>
<td>40</td>
<td>Electricity, gas, steam and hot-water supply</td>
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<td>14</td>
<td>Other mining and quarrying</td>
<td>41</td>
<td>Collection, purification and distribution of water</td>
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<td>15</td>
<td>Manufacture of food products and beverages</td>
<td>45</td>
<td>Construction</td>
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<td>16</td>
<td>Manufacture of tobacco products</td>
<td>50</td>
<td>Sale, maintenance and repair of motor vehicles and motorcycl</td>
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<td>17</td>
<td>Manufacture of textiles</td>
<td>51</td>
<td>Wholesale trade and commission trade, except of motor vehicl</td>
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<td>18</td>
<td>Manufacture of wearing apparel; dressing and dyeing of fur</td>
<td>52</td>
<td>Retail trade, except of motor vehicles and motorcycles; repa</td>
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<td>19</td>
<td>Tanning and dressing of leather; manufacture of luggage,</td>
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<td>Hotels and restaurants</td>
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<tr>
<td>20</td>
<td>Manufacture of wood and of products of wood and cork, except</td>
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<td>Land transport; transport via pipelines</td>
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<td>21</td>
<td>Manufacture of paper and paper products</td>
<td>61</td>
<td>Water transport</td>
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<td>22</td>
<td>Publishing, printing and reproduction of recorded media</td>
<td>62</td>
<td>Air transport</td>
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<td>Manufacture of coke, refined petroleum products and nuclear</td>
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<td>Supporting and auxiliary transport activities; activities of</td>
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<td>24</td>
<td>Manufacture of chemicals and chemical products</td>
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<td>64</td>
<td>Post and telecommunications</td>
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<tr>
<td></td>
<td></td>
<td>65</td>
<td>Financial intermediation, except insurance and pension funding</td>
</tr>
<tr>
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<td></td>
<td>66</td>
<td>Insurance and pension funding, except compulsory social security</td>
</tr>
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<td></td>
<td></td>
<td>67</td>
<td>Activities auxiliary to financial intermediation</td>
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<td></td>
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<td>70</td>
<td>Real estate activities</td>
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<td></td>
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<td>71</td>
<td>Renting of machinery and equipment without operator and of p</td>
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<td></td>
<td></td>
<td>72</td>
<td>Computer and related activities</td>
</tr>
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<td></td>
<td></td>
<td>73</td>
<td>Research and development</td>
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<td>74</td>
<td>Other business activities</td>
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<td>75</td>
<td>Public administration and defense; compulsory social security</td>
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<tr>
<td></td>
<td></td>
<td>Code</td>
<td>Label</td>
</tr>
<tr>
<td></td>
<td></td>
<td>68</td>
<td>Post and telecommunications</td>
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<td>69</td>
<td>Financial intermediation, except insurance and pension funding</td>
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<td>76</td>
<td>Insurance and pension funding, except compulsory social security</td>
</tr>
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<td>77</td>
<td>Activities auxiliary to financial intermediation</td>
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<td>Real estate activities</td>
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<td>Renting of machinery and equipment without operator and of p</td>
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<td>81</td>
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<td>82</td>
<td>Sewage and refuse disposal, sanitation and similar activities</td>
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<td>83</td>
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<td>84</td>
<td>Recreational, cultural and sporting activities</td>
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<td>85</td>
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<td>86</td>
<td>Private households with employed persons</td>
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<td>Extra-territorial organizations and bodies</td>
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Table A1.3: Education codes

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<td>1</td>
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<td>12</td>
<td>Class twelve</td>
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<td>13</td>
<td>Secondary school certificate</td>
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<td>Class three</td>
<td>14</td>
<td>Technical/vocational pre-secondary diploma/certificate</td>
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<td>4</td>
<td>Class four</td>
<td>15</td>
<td>Technical/vocational pre-secondary diploma/certificate</td>
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<td>5</td>
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<td>16</td>
<td>College/university undergraduate</td>
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<td>7</td>
<td>Class seven</td>
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<td>Class eight</td>
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Table A1.4: Recoded Variables

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<td>Forestry</td>
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<td>9</td>
<td>3</td>
<td>Fishing</td>
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<td>Manufacturing</td>
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<td>40–97</td>
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<td>Services</td>
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<td>Agri or non-agri (from new industry codes)</td>
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<td>Agriculture</td>
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<td>Non-agriculture</td>
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<td>3</td>
<td>-some senior hs- HS graduate</td>
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<td>Vocational</td>
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<td>16–17</td>
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<td>Some college-College graduate</td>
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<td>6</td>
<td>Post graduate</td>
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<tr>
<td>19,90,98,99,</td>
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<td>attended school but discontinued</td>
</tr>
<tr>
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<td>20</td>
<td>never attended school</td>
</tr>
</tbody>
</table>

*Cambodia follows a 12-year educational system: elementary or primary education (class 1 to 6), junior high school (class 7 to 9), and senior high school (class 10 to 12)

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<th>Occupations</th>
<th>Frequencies</th>
<th>Valid percent</th>
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<td>Legislators and senior officials</td>
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<td>Corporate managers</td>
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<td>Physical, mathematical and engineering science professionals</td>
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<td>Life science and health professionals</td>
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<td>1.6</td>
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<td>Other professionals</td>
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<td>1.3</td>
</tr>
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<td>Life science and health associate professionals</td>
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<td>0.0</td>
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<tr>
<td>Other associate professionals</td>
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<tr>
<td>Customer service clerks</td>
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<tr>
<td>Personal and protective services workers</td>
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<td>1.4</td>
</tr>
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<td>Models, salespersons and demonstrators</td>
<td>4876</td>
<td>11.5</td>
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<td>23.5</td>
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<td>3.5</td>
</tr>
<tr>
<td>Field/vegetable/mixed crop growers: Helper, aid, assistant</td>
<td>6537</td>
<td>15.4</td>
</tr>
<tr>
<td>Tree and shrub crop growers: Operator, mainly market</td>
<td>258</td>
<td>.6</td>
</tr>
<tr>
<td>Tree and shrub crop growers: Operator, mainly subsistence</td>
<td>4</td>
<td>0.0</td>
</tr>
<tr>
<td>Tree and shrub crop growers: Worker, experienced adult</td>
<td>3</td>
<td>0.0</td>
</tr>
<tr>
<td>Tree and shrub crop growers: Helper, aid, assistant</td>
<td>3</td>
<td>0.0</td>
</tr>
<tr>
<td>Gardeners, horticultural and nursery growers: Operator, main</td>
<td>10</td>
<td>0.0</td>
</tr>
<tr>
<td>Gardeners, horticultural and nursery growers: Operator, main</td>
<td>31</td>
<td>0.1</td>
</tr>
<tr>
<td>Gardeners, horticultural and nursery growers: Worker, experience</td>
<td>2</td>
<td>0.0</td>
</tr>
<tr>
<td>Market-oriented animal producers and related workers</td>
<td>1</td>
<td>0.0</td>
</tr>
<tr>
<td>Dairy/livestock/poultry producers: Operator, mainly market</td>
<td>667</td>
<td>1.6</td>
</tr>
<tr>
<td>Dairy/livestock/poultry producers: Operator, mainly subsistence</td>
<td>736</td>
<td>1.7</td>
</tr>
<tr>
<td>Dairy/livestock/poultry producers: Worker, experienced adult</td>
<td>31</td>
<td>0.1</td>
</tr>
<tr>
<td>Dairy/livestock/poultry producers: Helper, aid, assistant</td>
<td>819</td>
<td>1.9</td>
</tr>
<tr>
<td>Apiarists and sericulturists: Operator, mainly market</td>
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</tr>
<tr>
<td>Apiarists and sericulturists: Helper, aid, assistant</td>
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<td>0.0</td>
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<tr>
<td>Mixed-animal producers: Operator, mainly market</td>
<td>1928</td>
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Table A1.5: Occupations in the Cambodia dataset (cont’d.)

<table>
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<th>Occupation</th>
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<tr>
<td>Mixed-animal producers:</td>
<td>105</td>
<td>.2</td>
</tr>
<tr>
<td>Operator, mainly subsistence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixed-animal producers: Worker, experienced adult</td>
<td>9</td>
<td>.0</td>
</tr>
<tr>
<td>Forestry/charcoal workers:</td>
<td>249</td>
<td>.6</td>
</tr>
<tr>
<td>Operator, mainly market</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forestry/charcoal workers: Operator, mainly subsistence</td>
<td>617</td>
<td>1.5</td>
</tr>
<tr>
<td>Worker, experienced adult</td>
<td>27</td>
<td>.1</td>
</tr>
<tr>
<td>Mixed-animal producers: Helper, aid, assistant</td>
<td>546</td>
<td>1.3</td>
</tr>
<tr>
<td>Forestry/charcoal workers: Helper, aid, assistant</td>
<td>116</td>
<td>.3</td>
</tr>
<tr>
<td>Fishery workers: Operator, mainly market</td>
<td>708</td>
<td>1.7</td>
</tr>
<tr>
<td>Fishery workers: Operator, mainly subsistence</td>
<td>902</td>
<td>2.1</td>
</tr>
<tr>
<td>Fishery workers: Worker, experienced adult</td>
<td>84</td>
<td>.2</td>
</tr>
<tr>
<td>Fishery workers: Helper, aid, assistant</td>
<td>307</td>
<td>.7</td>
</tr>
<tr>
<td>Hunters and trappers: Operator, mainly market</td>
<td>6</td>
<td>.0</td>
</tr>
<tr>
<td>Hunters and trappers: Operator, mainly subsistence</td>
<td>3</td>
<td>.0</td>
</tr>
<tr>
<td>Extraction and building trade workers</td>
<td>346</td>
<td>.8</td>
</tr>
<tr>
<td>Metal, machinery and related trades workers</td>
<td>305</td>
<td>.7</td>
</tr>
<tr>
<td>Precision, handicraft, printing and related trades workers</td>
<td>157</td>
<td>.4</td>
</tr>
<tr>
<td>Other craft and related trades workers</td>
<td>1652</td>
<td>3.9</td>
</tr>
<tr>
<td>Stationary plant and related operators</td>
<td>62</td>
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</tr>
<tr>
<td>Machine operators and assemblers</td>
<td>1381</td>
<td>3.2</td>
</tr>
<tr>
<td>Drivers and mobile plant operators</td>
<td>876</td>
<td>2.1</td>
</tr>
<tr>
<td>Sales and services elementary occupations</td>
<td>1880</td>
<td>4.4</td>
</tr>
<tr>
<td>Agricultural, fishery and related laborers</td>
<td>46</td>
<td>.1</td>
</tr>
<tr>
<td>Laborers in mining, construction, manufacturing and transportation</td>
<td>1494</td>
<td>3.5</td>
</tr>
<tr>
<td>Armed forces</td>
<td>315</td>
<td>.7</td>
</tr>
<tr>
<td>Other occupation not classified elsewhere</td>
<td>77</td>
<td>.2</td>
</tr>
<tr>
<td>Respondents don't know the occupation</td>
<td>2</td>
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<tr>
<td>Total</td>
<td>4249</td>
<td>100.0</td>
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## APPENDIX 2: CODES IN LAO PDR DATASET

### Table A2.1: Industry Codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Label</th>
<th>Code</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Agriculture, hunting and forestry</td>
<td>31</td>
<td>Manufacture of electrical machinery and apparatus n.e.c.</td>
</tr>
<tr>
<td>01</td>
<td>Agriculture, hunting and related service activities</td>
<td>32</td>
<td>Manufacture of radio, television and communication equipment and apparatus</td>
</tr>
<tr>
<td>02</td>
<td>Forestry, logging and related service activities</td>
<td>33</td>
<td>Manufacture of medical, precision and optical instruments, watches and clocks</td>
</tr>
<tr>
<td>B</td>
<td>Fishing</td>
<td>34</td>
<td>Manufacture of motor vehicles, trailers and semi-trailers</td>
</tr>
<tr>
<td>03</td>
<td>Fishing, aquaculture and service activities incidental to fishing</td>
<td>35</td>
<td>Manufacture of other transport equipment</td>
</tr>
<tr>
<td>C</td>
<td>Mining and quarrying</td>
<td>36</td>
<td>Manufacture of furniture; manufacturing n.e.c.</td>
</tr>
<tr>
<td>10</td>
<td>Mining of coal and lignite; extraction of peat</td>
<td>37</td>
<td>Recycling</td>
</tr>
<tr>
<td>11</td>
<td>Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction, excluding surveying</td>
<td>40</td>
<td>Electricity, gas, steam and hot water supply</td>
</tr>
<tr>
<td>12</td>
<td>Mining of uranium and thorium ores</td>
<td>41</td>
<td>Collection, purification and distribution of water</td>
</tr>
<tr>
<td>13</td>
<td>Mining of metal ores</td>
<td>45</td>
<td>Construction</td>
</tr>
<tr>
<td>14</td>
<td>Other mining and quarrying</td>
<td>46</td>
<td>Construction</td>
</tr>
<tr>
<td>D</td>
<td>Manufacturing</td>
<td>47</td>
<td>Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods</td>
</tr>
<tr>
<td>15</td>
<td>Manufacture of food products and beverages</td>
<td>50</td>
<td>Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel</td>
</tr>
<tr>
<td>16</td>
<td>Manufacture of tobacco products</td>
<td>51</td>
<td>Wholesale trade and commission trade, except of motor vehicles and motorcycles</td>
</tr>
<tr>
<td>17</td>
<td>Manufacture of textiles</td>
<td>52</td>
<td>Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods</td>
</tr>
<tr>
<td>18</td>
<td>Manufacture of wearing apparel; dressing and dyeing of fur</td>
<td>55</td>
<td>Hotels and restaurants</td>
</tr>
<tr>
<td>19</td>
<td>Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear</td>
<td>56</td>
<td>Transport, storage and communications</td>
</tr>
<tr>
<td>20</td>
<td>Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials</td>
<td>57</td>
<td>Land transport; transport via pipelines</td>
</tr>
<tr>
<td>21</td>
<td>Manufacture of paper and paper products</td>
<td>60</td>
<td>Water transport</td>
</tr>
<tr>
<td>22</td>
<td>Publishing, printing and reproduction of recorded media</td>
<td>61</td>
<td>Air transport</td>
</tr>
<tr>
<td>23</td>
<td>Manufacture of coke, refined petroleum products and nuclear fuel</td>
<td>62</td>
<td>Supporting and auxiliary transport activities; activities of travel agencies</td>
</tr>
<tr>
<td>24</td>
<td>Manufacture of chemicals and chemical products</td>
<td>64</td>
<td>Post and telecommunications</td>
</tr>
<tr>
<td>25</td>
<td>Manufacture of rubber and plastics products</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Manufacture of other non-metallic mineral products</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Manufacture of basic metals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Manufacture of fabricated metal products, except machinery and equipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Manufacture of machinery and equipment n.e.c.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Manufacture of office, accounting and computing machinery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Code</td>
<td>Label</td>
<td>Code</td>
<td>Label</td>
</tr>
<tr>
<td>------</td>
<td>--------------------------------------------------------------</td>
<td>------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>J</td>
<td><strong>Financial intermediation</strong></td>
<td>N</td>
<td><strong>Health and social work</strong></td>
</tr>
<tr>
<td>65</td>
<td>Financial intermediation, except insurance and pension funding</td>
<td>85</td>
<td>Health and social work</td>
</tr>
<tr>
<td>66</td>
<td>Insurance and pension funding, except compulsory social security</td>
<td>O</td>
<td><strong>Other community, social and personal service activities</strong></td>
</tr>
<tr>
<td>67</td>
<td>Activities auxiliary to financial intermediation</td>
<td>90</td>
<td>Sewage and refuse disposal, sanitation and similar activities</td>
</tr>
<tr>
<td>K</td>
<td><strong>Real estate, renting and business activities</strong></td>
<td>91</td>
<td>Activities of membership organizations n.e.c.</td>
</tr>
<tr>
<td>70</td>
<td>Real estate activities</td>
<td>92</td>
<td>Recreational, cultural and sporting activities</td>
</tr>
<tr>
<td>71</td>
<td>Renting of machinery and equipment without operator and of personal and household goods</td>
<td>93</td>
<td>Other service activities</td>
</tr>
<tr>
<td>72</td>
<td>Computer and related activities</td>
<td>P</td>
<td><strong>Activities of private households as employers and undifferentiated production activities of private households</strong></td>
</tr>
<tr>
<td>73</td>
<td>Research and development</td>
<td>95</td>
<td>Activities of private households as employers of domestic staff</td>
</tr>
<tr>
<td>74</td>
<td>Other business activities</td>
<td>96</td>
<td>Undifferentiated goods-producing activities of private households for own use</td>
</tr>
<tr>
<td>L</td>
<td><strong>Public administration and defense; compulsory social security</strong></td>
<td>97</td>
<td>Undifferentiated service-producing activities of private households for own use</td>
</tr>
<tr>
<td>75</td>
<td>Public administration and defense; compulsory social security</td>
<td>Q</td>
<td><strong>Extraterritorial organizations and bodies</strong></td>
</tr>
<tr>
<td>M</td>
<td>Education</td>
<td>99</td>
<td>Extraterritorial organizations and bodies</td>
</tr>
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</table>

Source: Lao National Statistical Center Committee for Planning and Investment. 2003
### Table A2.2: Recoded Variables

<table>
<thead>
<tr>
<th>Old codes</th>
<th>New code</th>
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<tbody>
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<td>Industry codes</td>
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<td>1–3</td>
<td>1</td>
<td>Agriculture</td>
</tr>
<tr>
<td>10–99</td>
<td>2</td>
<td>Non-agriculture</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>Class</td>
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</tr>
<tr>
<td>0–never attended school</td>
<td>0-2</td>
<td>Unskilled</td>
</tr>
<tr>
<td>1–Primary</td>
<td>1-5</td>
<td>1-Primary</td>
</tr>
<tr>
<td>2–Lower secondary</td>
<td>1-3</td>
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<tr>
<td>3–Upper secondary</td>
<td>1-3</td>
<td>3-Upper secondary</td>
</tr>
<tr>
<td>4–Vocational</td>
<td>1-3</td>
<td>4-Vocational</td>
</tr>
<tr>
<td>5–University</td>
<td>1-5</td>
<td>5-University</td>
</tr>
<tr>
<td>6–Post grad</td>
<td>1-5</td>
<td>6-Post graduate</td>
</tr>
<tr>
<td>Skill</td>
<td>Skill codes</td>
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</tr>
<tr>
<td>0–never attended school</td>
<td>0-2</td>
<td>Unskilled</td>
</tr>
<tr>
<td>1–Primary</td>
<td>3-6</td>
<td>3-6 Skilled</td>
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### Table A2.3: Industries in the Lao PDR Dataset

<table>
<thead>
<tr>
<th>Industries</th>
<th>Frequency</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture, hunting and related service activities</td>
<td>18914</td>
<td>67.4</td>
</tr>
<tr>
<td>Forestry logging and related services</td>
<td>1460</td>
<td>5.2</td>
</tr>
<tr>
<td>Fishing, operation of fish hatcheries and fish farming</td>
<td>1221</td>
<td>4.4</td>
</tr>
<tr>
<td>Coal mining</td>
<td>10</td>
<td>.0</td>
</tr>
<tr>
<td>Extraction of crude petroleum and natural gas; service activities</td>
<td>2</td>
<td>.0</td>
</tr>
<tr>
<td>Mining of uranium and thorium ores</td>
<td>7</td>
<td>.0</td>
</tr>
<tr>
<td>Other mining and quarrying</td>
<td>9</td>
<td>.0</td>
</tr>
<tr>
<td>Manufacture of food products and beverages</td>
<td>262</td>
<td>.9</td>
</tr>
<tr>
<td>Manufacture of tobacco products</td>
<td>8</td>
<td>.0</td>
</tr>
<tr>
<td>Manufacture of textiles</td>
<td>518</td>
<td>1.8</td>
</tr>
<tr>
<td>Manufacture of wearing apparel; dressing and dyeing of fur</td>
<td>141</td>
<td>.5</td>
</tr>
<tr>
<td>Manufacture of wood and of products of wood and cork</td>
<td>451</td>
<td>1.6</td>
</tr>
<tr>
<td>Manufacture of paper and paper products</td>
<td>7</td>
<td>.0</td>
</tr>
<tr>
<td>Publishing, printing and reproduction of recorded media</td>
<td>3</td>
<td>.0</td>
</tr>
<tr>
<td>Manufacture of coke, refined petroleum products and nuclear</td>
<td>3</td>
<td>.0</td>
</tr>
<tr>
<td>Manufacture of chemicals and chemical products</td>
<td>4</td>
<td>.0</td>
</tr>
<tr>
<td>Manufacture of rubber and plastics products</td>
<td>8</td>
<td>.0</td>
</tr>
<tr>
<td>Manufacture of other non-metallic mineral products</td>
<td>16</td>
<td>.1</td>
</tr>
<tr>
<td>Manufacture of fabricated metal products, except machinery a</td>
<td>17</td>
<td>.1</td>
</tr>
<tr>
<td>Manufacture of machinery and equipment n.e.c.</td>
<td>1</td>
<td>.0</td>
</tr>
<tr>
<td>Manufacture of office, accounting and computing machinery</td>
<td>1</td>
<td>.0</td>
</tr>
<tr>
<td>Manufacture of electrical machinery and apparatus n.e.c.</td>
<td>5</td>
<td>.0</td>
</tr>
<tr>
<td>Manufacture of radio, television and communication equipment</td>
<td>1</td>
<td>.0</td>
</tr>
<tr>
<td>Manufacture of medical, precision and optical instruments</td>
<td>2</td>
<td>.0</td>
</tr>
<tr>
<td>Manufacture of motor vehicles, trailers and semi-trailers</td>
<td>1</td>
<td>.0</td>
</tr>
<tr>
<td>Manufacture of other transport equipment</td>
<td>4</td>
<td>.0</td>
</tr>
<tr>
<td>Manufacture of furniture; manufacturing n.e.c.</td>
<td>43</td>
<td>.2</td>
</tr>
<tr>
<td>Recycling</td>
<td>2</td>
<td>.0</td>
</tr>
<tr>
<td>Electricity, gas, steam and hot water supply</td>
<td>18</td>
<td>.1</td>
</tr>
<tr>
<td>Collection, purification and distribution of water</td>
<td>6</td>
<td>.0</td>
</tr>
<tr>
<td>Construction</td>
<td>602</td>
<td>2.1</td>
</tr>
<tr>
<td>Sale, maintenance and repair of motor vehicles and motorcycle</td>
<td>69</td>
<td>.2</td>
</tr>
<tr>
<td>Wholesale trade and commission trade, except of motor vehicle</td>
<td>13</td>
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</tr>
<tr>
<td>Retail trade, except of motor vehicles and motorcycles; repair</td>
<td>2334</td>
<td>8.3</td>
</tr>
<tr>
<td>Hotels and restaurants</td>
<td>56</td>
<td>.2</td>
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</tbody>
</table>
Table A2.3: Industries in the Lao PDR Dataset (cont’d.)

<table>
<thead>
<tr>
<th>Industry</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land transport; transport via pipelines</td>
<td>96</td>
<td>.3</td>
</tr>
<tr>
<td>Water transport</td>
<td>20</td>
<td>.1</td>
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<tr>
<td>Air transport</td>
<td>1</td>
<td>.0</td>
</tr>
<tr>
<td>Supporting and auxiliary transport activities; activities of</td>
<td>154</td>
<td>.5</td>
</tr>
<tr>
<td>Post and telecommunications</td>
<td>3</td>
<td>.0</td>
</tr>
<tr>
<td>Financial intermediation, except insurance and pension funding</td>
<td>17</td>
<td>.1</td>
</tr>
<tr>
<td>Activities auxiliary to financial intermediation</td>
<td>20</td>
<td>.1</td>
</tr>
<tr>
<td>Real estate activities</td>
<td>2</td>
<td>.0</td>
</tr>
<tr>
<td>Renting of machinery and equipment without operator</td>
<td>3</td>
<td>.0</td>
</tr>
<tr>
<td>Research and development</td>
<td>2</td>
<td>.0</td>
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<tr>
<td>Other business activities</td>
<td>94</td>
<td>.3</td>
</tr>
<tr>
<td>Public administration and defense; compulsory social security</td>
<td>583</td>
<td>2.1</td>
</tr>
<tr>
<td>Education</td>
<td>176</td>
<td>.6</td>
</tr>
<tr>
<td>Health and social work</td>
<td>54</td>
<td>.2</td>
</tr>
<tr>
<td>Sewage and refuse disposal, sanitation and similar activities</td>
<td>18</td>
<td>.1</td>
</tr>
<tr>
<td>Activities of membership organizations n.e.c.</td>
<td>4</td>
<td>.0</td>
</tr>
<tr>
<td>Recreational, cultural and sporting activities</td>
<td>6</td>
<td>.0</td>
</tr>
<tr>
<td>Other service activities</td>
<td>536</td>
<td>1.9</td>
</tr>
<tr>
<td>Activities of private households as employers</td>
<td>37</td>
<td>.1</td>
</tr>
<tr>
<td>Total</td>
<td>28045</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Lao National Statistical Center Committee for Planning and Investment. 2003
REFERENCES


