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Abstract

This paper adds to the literature on the crowding out effect of tobacco expenditure in two ways. Firstly, the paper uses expenditure data from a low income sub-Saharan African country, Zambia, where most households are poor. Secondly, unlike previous studies, we relax the exclusion restriction and allow the standard instrumental variable used in the literature, the adult sex ratio, to be correlated with the error term. We consider the relaxation of this restriction to be reasonable given what we know about the effects of household structure on households' expenditure decisions. Our results confirm some findings in the literature. For example, we find that smoking households allocate less expenditure towards food, schooling, clothing, transportation and equipment maintenance. We also find evidence suggesting that the crowding out of food is more severe for poorer households. But unlike previous studies, we do not find instances of crowding in whereby tobacco leads households to allocate more expenditure towards a particular commodity. In sum, our results show that a broader accounting of tobacco's costs in Zambia should include the costs associated with under nutrition and under investment in education by households.

Keywords: Crowding out; imperfect instrumental variables; household expenditure.

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1 Introduction

Tobacco use is the leading cause of premature death in the world. According to the World Health Organization, nearly 6 million people per annum die from tobacco related deaths (WHO, 2014) including about 600,000 from passive smoking (Oberg, et al., 2010). There is another aspect to the cost of tobacco use that is separate from the mortality and morbidity costs, namely that tobacco expenditure tends to crowd out the consumption of other commodities within the household. This paper adds to the literature on the crowding out effect of tobacco expenditure in two ways. Firstly, the paper uses expenditure data from a low income sub-Saharan African country, Zambia, where most of the households are poor. Aside from the work by Koch and Tshiswaka-Kashalala (2008) on South Africa, we are unaware of studies that investigate this issue in the context of sub-Sahara Africa. Secondly, in identifying the causal impact of tobacco expenditure we use the standard instrumental variable from the literature, the adult sex ratio, but unlike previous work, we allow for this instrument to be correlated with the error term. We consider this approach to be more plausible given that household structure, of which the adult sex ratio is one measure, does have an influence on how resources are allocated within the household (Deaton, et al, 1989; Deaton, 1997). Therefore, excluding the adult sex ratio from structural demand equations is likely to result in biased estimates of the impact of tobacco expenditure on household decision making. Our results confirm many of the findings in the literature. For instance, we find that households with at least one smoker allocate less expenditure towards food, schooling, clothing and water. Other expenditure categories that are crowded out include transportation, equipment maintenance, entertainment and remittances. We also find suggestive evidence that the crowding out of food is more pronounced for poorer households. But unlike previous studies we do not find that spending on tobacco leads households to allocate more expenditure towards certain goods and services. For instance, Wang et al (2006) and Koch and Tshiswaka-Kashalala (2008) find that tobacco expenditure crowds in expenditure on alcohol while John (2008) finds that crowding in occurs for health, clothing and fuels. Our empirical analysis, which is based on less restrictive assumptions on the instrumental variable, leads us to conclude that the positive associations between tobacco and other expenditure categories found in previous work are more likely to be correlations than causal relationships. Our work shows that the costs of tobacco consumption in Zambia are likely to be more than the direct costs associated with mortality and morbidity. We agree with Wang et al (2006), Webb and Block (2009) and John et al (2012) who conclude that by displacing expenditure categories like food, which can affect the cognitive development of children, education and the maintenance of agricultural equipment, households in poor countries are likely to be trapped in a cycle of poverty.

Our interest in studying the impact of tobacco consumption on household decision making in Zambia is motivated by the fact that per capita cigarette consumption has recently started rising after declining over much of the 1990s

(Chelwa, 2012). For the period 1990 to 2001, per capita cigarette consumption declined by 75%. From 2002 to 2009, per capita cigarette consumption increased by 37% (ibid). There is an expectation that per capita cigarette consumption will continue to increase in the current decade (ERC, 2010). This suggests that tobacco is increasingly becoming an important part of the expenditure decisions of most households in Zambia. Given that households in general face a budget constraint, it therefore becomes important to investigate which goods and services tobacco displaces, if at all any, in the household's budget.

The rest of the paper is structured as follows: Section 2 gives an overview of the relevant literature. Section 3 discusses the conceptual framework of how crowding out might occur. Section 4 discusses our empirical strategy and the data is described in section 5. We present the empirical results in section 6 and section 7 concludes.

2 Relevant Literature

The costs associated with household tobacco consumption are often conceptualised in one of two ways: (1) costs on the macroeconomy attributed to smoking via death, increased healthcare expenditure and lost productivity (Chaloupka and Warner, 2000; Kang et al, 2003; Max et al, 2004; Liu et al, 2006) and those related to the displacement of some commodities by tobacco in the household. Our review of the literature focusses on the latter as it bears directly on the focus of our paper.

Efroymson, et al (2001) was one of the first studies to highlight the potential crowding out effect of tobacco consumption using several datasets from Bangladesh. Theirs was not so much an econometric study as a simple comparison of the expenditure profiles of smoking versus non-smoking households. One of the study's main findings was that male cigarette smokers spent more than twice as much on cigarettes as on clothing, housing, health and education combined. Further, the typical smoker could add more than 500 calories to the diet of one or two children with the money spent on cigarette purchases. Since their analysis was not econometric in nature, it did not account for observable confounders, variables that were likely, alongside tobacco, to influence expenditure allocations between the two types of households. Further, Efroymson et al did not account for the possibility that the decision to allocate expenditure towards tobacco might be determined endogenously within the household. If observable and unobservable confounders are not controlled for, then it is not clear that reducing a smoking household's expenditure on tobacco will elevate that household's consumption profile to match that of a non-smoking household.

Busch et al (2004) and Wang et al (2006) added to the literature by estimating demand systems that adequately controlled for social, demographic and geographic variables likely to impact expenditure decisions. The former estimated an Almost Ideal Demand System (AIDS) using the Consumption and Expenditure Survey from the US and found that tobacco crowded out food and clothing. The latter used data from rural China and found that tobacco crowded out expenditure on education, agriculture equipment maintenance and savings. Wang et al also found that tobacco smoking households were likely to spend more money on alcohol, further exacerbating the negative expenditure impact of smoking.

The next generation of studies in this literature attempted to address the issue of endogeneity which had not been adequately dealt with up until that point. John (2008), using data from India's National Sample Survey was the first to use instrumental variables techniques to account for the possible endogeneity of tobacco use in the demand system. His choice of instrument was the adult-sex ratio motivated by the fact that smoking in India is mainly a male affair. In addition, John's analysis controlled for possible preference differences between smoking and non-smoking households using a method introduced by Vermeulen (2003). John found that tobacco expenditure crowded out food, education and entertainment while crowding in expenditure on health, clothing and fuels. Pu et al (2008) using John's (2008) method and expenditure data from Taiwan found that tobacco crowded out clothing, medical care and transportation amongst others. Pu et al's contribution was to treat alcohol and tobacco as complements in the demand system, which allowed them to separately study the impact of both on household expenditure decisions. Koch and Tshiswaka-Kashalala (2008) added to the literature by using a different instrument for tobacco expenditure. Their preferred instrument was a composite smoking prevalence measure based on prevalence estimates for South Africa computed in Van Walbeek (2002). Their results showed that tobacco crowded out expenditure on education, fuel, clothing, healthcare and transportation for the full sample of smoking households. On the other hand, spending on tobacco was associated with increased expenditure on housing, food, entertainment and alcohol in some data specifications.

More recently Block and Webb (2009), lacking appropriate instrumental variables, have used an indirect approach to identify the causal impact of tobacco expenditure on household's expenditure decisions. The authors estimate a series of reduced form equations for food, tobacco and child height against a common set of covariates. The basic idea is that if a set of common covariates reduces the allocation to food and reduces child height but at the same time increases the allocation to tobacco, then this is suggestive of crowding out. Their indirect empirical strategy "demonstrate[s] that the same exogenous covariates that are associated with improved dietary quantity and quality are also associated with reduced allocation of household resources to tobacco" (ibid, p. 18).

Our approach in this paper is closely aligned with the most recent generation of empirical studies on the crowding out impact of tobacco consumption. This paper's main contribution is to use the standard instrumental variable used in the literature, the adult sex ratio, while making less stringent assumptions about the behaviour of this instrument.

3 Conceptual Framework

Following the theoretical framework laid out in John (2008), we assume that each household seeks to maximize a single utility function in the manner made precise in Samuelson (1956) and Becker (1974, 1981). The need to make this assumption is driven by the limitations in our dataset that make it difficult to incorporate intra-household interactions in the analysis. The household's utility maximization problem results, in general, in a set of n household Marshallian demand functions of the form $x_i(p_{i...,p_n};Y;\mathbf{a})$,where x_i is the quantity purchased of the ith commodity, p_i is the price of the ith commodity,$\mathbf{a}$ is a vector of household characteristics and Y is total household income.

The model assumes that a household that spends on tobacco, in the sense that at least one household member is a smoker, first decides on the quantity of tobacco to be purchased before deciding on the quantities of the other commodities. In such a situation, the household's utility maximization problem results in a set of conditional demand functions of the form $x_i = g_i(p_{i...}, p_n; M; \mathbf{a}; d)$, where d is an indicator variable for whether the household spends on tobacco and M is the remainder of household income after spending on tobacco. That is, the household's demand for commodity i is conditional on the household's smoking status. Pollak (1969) formally introduced and discussed the properties of conditional demand functions and showed that they obeyed the theory of demand.

In this paper we seek to estimate and compare Marshallian demand functions for non-smoking households with conditional demand functions for households with at least one smoker for a common set of commodities. If, on average, the quantity demanded of a commodity for the typical non-smoking household is less than the quantity demanded of the same commodity for a typical smoking household, then the difference can be attributed, *ceteris paribus*, to tobacco.

4 Empirical Strategy

We conduct our empirical analysis in two parts. In the first part, we compare the mean expenditure shares for various commodities between smoking and non-smoking households. In particular, the comparisons are conducted for the following commodities: food, alcohol, healthcare, schooling, water, housing, electricity, alternative energy sources, transportation, transport equipment maintenance (boats, cars, motor bikes and bicycles), telephone usage, entertainment, house care, personal care and "other".[1]

The second part of our empirical strategy formally tests the crowding out hypothesis of tobacco expenditure for the commodities listed in the previous paragraph. To do so we estimate Engel curves using the Quadratic Almost Ideal Demand System (QUAIDS) developed by Banks, et al (1997). The QUAIDS has

[1] This category contains goods and services that are difficult to classify or too small to stand alone. The category contains expenditure shares on postage stamps, house repairs, batteries, laundry service and candles.

the advantage of not only being consistent with utility theory but also nesting the popular Almost Ideal Demand System (AIDS) of Deaton and Muellbauer (1980) and further allows commodities to be modelled as luxuries at some income levels and necessities at others. John (2008), Pu et al (2008), Koch and Tshiswaka-Kashalala (2008) and John et al (2012) have used the QUAIDS model to conduct similar analyses. We assume that the household is a single utility maximizer and therefore estimate a system of household-level Engel curves with each one taking the following form:

$$w_{ij} = \alpha_{1i} + \alpha_{2i} d_j + \alpha_{3i} \ln M_j + \alpha_{4i} (\ln M)^2_j + \alpha_{5i} FE + \gamma_i \mathbf{a}_j + u_{ij} \qquad (1)$$

where w_{ij} is the monthly expenditure share of expenditure category i in household j after deducting the expenditure on tobacco. d_j is a dummy variable that takes the value of 1 if household j reports positive monthly expenditure on tobacco and zero otherwise. InM_j is the natural logarithm of total monthly expenditure (in Zambian Kwacha) in household j excluding the expenditure on tobacco. $(\ln M)^2_j$ is the square of $\ln M$ in household j.

Equation (1) is the empirical implementation of the Marshallian and conditional demand functions discussed in Section (3).

Ordinarily, Engel curves are estimated with prices as explanatory variables. In the absence of price data, we augment the Engel curves with cluster-level fixed effects (FE) under the assumption that households within the same cluster face the "same" price (or face the same relative prices). This assumption has empirical support especially in developing countries where transportation costs are significant determinants of prices and the isolated nature of markets prevents the exploitation of arbitrage opportunities (see Deaton, 1988, 1989, 1990, 1997; Deaton and Grimard 1992). FE is exogenous in our specification because an individual household's demand is too small to influence the determination and structure of cluster-level prices. In addition, FE controls for tastes which are likely to vary across clusters.

$\mathbf{a}_j$ is a vector of household-specific characteristics that includes the natural logarithms of household size, age of household head, average age of adults in a household, average age of children in a household, years of schooling of the household head and years of schooling of the most educated member of the household. Other household characteristics in $\mathbf{a}$ include the proportion of adults in a household (household structure), the number of employed persons in the household and a dummy variable for whether the household head receives a wage income or not. We define adults as those who are 18 years old or older. $\mathbf{a}$ also includes a number of indicator variables for the type of household as classified by the local authority in which the household is located. In some data specifications namely those that span both rural and urban households, we include a dummy variable in $\mathbf{a}$ for whether the household is located in urban or rural areas. We also include in $\mathbf{a}$ a dummy variable for the tobacco growing status of the household. The controls in $\mathbf{a}$ are the standard ones used in the literature on the crowding out effect of tobacco (John, 2008; Pu et al 2008;

John et al 2012).u_{ij} is the usual error term which is assumed to be normally distributed with mean zero. We conduct the analysis on the full sample, urban households, rural households and by expenditure category. Crowding out is established if α_{2i} (the coefficient on d) in equation (1) is negative and statistically significant.

$d, \ln M$ and $(\ln M)^2$ in equation (1) are likely endogenous, in the sense that they are each correlated with the error term u_{ij}. Such a situation would preclude our giving a causal interpretation to the regression coefficients in our demand system. In this case, it is desirable to use instrumental variables to ensure consistent and unbiased estimates. John (2008) and Pu et al (2008) instrument tobacco expenditure with the adult sex ratio in a household. We follow their approach and instrument for d using the adult sex ratio. This choice of instrument is motivated by the fact that adult males are more likely than adult females to consume tobacco in Zambia. According to the most recent round of the Zambia Demographic and Health Survey (ZDHS, 2007), smoking prevalence among adult males was estimated at 24% while among adult women it was estimated at 0.7% (for the 2002 round of the survey, adult male and adult female smoking prevalence was estimated at 15% and 0.5% respectively). The fact that adult males are more likely to smoke than adult females has also been shown by Pampel (2008). We expect the adult sex ratio to explain a sizable proportion of the variation in d (we formally test this assertion in Section 6.22). We also assume that the adult sex ratio is not correlated with unobservables that are contained in the error term u_{ij}.It is almost impossible to test this assumption in a just-identified case, such as we have here, where the number of instruments is equal to the number of endogenous regressors. We believe, however, that any determinants of w_{ij} that are not contained in our specification of equation (1) are unlikely to be correlated in a significant way with our choice of instrument for d.[2] In any case, we relax this assumption, the exclusion restriction, in Section 6.2.3.

We instrument for $\ln M$ and $(\ln M)^2$ using the logarithm of the value of total household assets and the square of this logarithm respectively. We expect that these two variables explain a significant proportion of the variation in $\ln M$ and $(\ln M)^2$ (we formally test this assertion in Section 6.2.2). In addition, the value of total household assets satisfies the exclusion restriction, the assumption of no correlation with the error term, since demand functions are rarely specified with the value of total household assets as an explanatory variable.

Since d is dichotomous, the first-stage regression relationship between d and its instrument is likely to be non-linear best estimated by, for example, a probit.

[2] Following Koch and Tshiswaka-Kashalala (2008), we constructed a cluster-level tobacco prevalence estimate calculated from the previous round of the Living Conditions Monitoring Survey as a possible instrument for household's tobacco smoking status in 2006. This is an attractive instrument because it is unlikely to be correlated with the error term in the individual households since it is calculated at the cluster level using the previous round's cross-sectional survey (the probability that a household appears in two consecutive cross-sectional surveys is very small). Whereas the direction of the relationship between this instrument and d was positive, the relationship was not strong enough to overcome the problem of identification with weak instruments (Stock, et al, 2002).

In addition, estimating a first-stage probit ensures that the predicted values for d, $\hat{d}$,are bounded between zero and one. This is not assured with a linear estimation. Estimating a first-stage probit, however, introduces the complication of the so-called forbidden regression (Wooldridge, 2002) whereby predicted values from a non-linear first-stage are directly applied to a linear second-stage regression. Doing so would risk a non-zero correlation between the first-stage residuals and $\hat{d}$ (Angrist and Pischke, 2009). A way around this is to use the predicted values from the first-stage probit regression, $\hat{d}$ in our case, as an instrument for d (Heckman, 1978; Wooldridge, 2002; Angrist and Pischke, 2009). This is the approach we adopt in this paper.

To implement the instrumenting technique outlined above, we estimate the system in equation (1) by Three Stage Least Squares (3SLS) combined with Seemingly Unrelated Regression (SURE)[3]. The SURE allows us to account for any within-household correlation of error terms by exploiting the structure of the covariance matrix of the errors (see Zellner, 1962). In addition in estimating the system by 3SLS/SURE, one is required to arbitrarily drop one of the demand equations in the system otherwise the covariance matrix of error terms is singular and therefore not invertible (Takada, et al, 1995). We opt to drop the equation for "other" goods[4]. Where possible we estimate the system using the *ireg* optional command in STATA which provides maximum likelihood estimates and ensures that our estimated coefficients are not sensitive to the choice of equation that is dropped.

5 Description of the data

The data for this paper comes from the 2006 round of the Living Conditions Monitoring Survey (LCMS) conducted by the Central Statistical Office (CSO) in Zambia. The survey was nationally representative and used a two-stage stratified cluster sample design whereby 988 clusters were selected in the first stage. The second stage saw the selection of 18,662 households from the 988 clusters distributed as 9,530 households in urban areas and 9,132 households in rural areas. The urban households were classified as low-cost, medium-cost or high-cost according to the local authority's classification of residential areas. In rural areas, households were classified as either small-scale, medium-scale, large-scale or non-agriculture households. The survey collects a rich set of data on the living conditions of households in the areas of education, health, economic activities and employment, child nutrition, death in the households, income sources, income levels, food production, household consumption expenditure, access to

[3]In effect, the demand system we estimate is a four-stage least squares procedure since the first two stages involve estimating a probit function for d and using this function to generate predicted values, $\hat{d}$, which are in turn used as instruments for d in the third-stage. The fourth stage corrects the standard errors associated with our regression coefficients for within-household correlation of error terms using the SURE method.

[4]John (2008), Put et al (2008) and John et al (2012) use a similar procedure.

clean water and more.[5] The household expenditure section of the survey asks each household to recall and report on the total expenditure allocated to a particular commodity over a reference period. In most cases the reference period is the month prior to the survey but for some commodities, such as expenditure on health care or schooling, the recall period is a year. In such cases, the annual expenditure is converted to monthly expenditure by dividing it by 12. As stated in section 4, we focus on the following commodities: food, alcohol, healthcare, schooling, water, housing, electricity, alternative energy sources, transportation, transport equipment maintenance, telephone usage, entertainment, house care, personal care and "other". Table 1 shows some summary statistics from the sample.

9% of households in the sample report spending on tobacco in the month prior to the survey. This crude measure of prevalence also exhibits regional and expenditure category differences: rural households and those in the bottom 50% have a higher prevalence than those in urban areas and the top 50% respectively. The average smoking household reports spending USD2.83 per month on tobacco products. This also has a regional and expenditure category profile: urban households and households in the top 50% spend on average five times as much on tobacco products than rural and households in the bottom 50% respectively.

The most important expenditure item in the sample is food, which was allocated 50% of total monthly expenditure for the sample as a whole. Poorer households and those in rural areas allocate more to food than richer and urban households respectively.

6 Empirical Results

We present the results of our empirical analysis in two parts: part one conducts difference of means tests for expenditure shares between smoking and non-smoking households. In the second part, we present the results of the econometric implementation of equation (1).

6.1 Differences in expenditure shares

Table 2 contains our motivation for investigating whether the decision to spend on tobacco influences households' spending decisions. The table reports differences in expenditure shares between smoking and non-smoking households expressed as percentage points. A positive percentage point difference implies that smoking households on average allocate a greater share to that category than non-smoking households. While a negative percentage point difference implies that smoking households allocate a smaller share. The actual expenditure

[5] Additional information on the Survey can be accessed here: http://catalog.ihsn.org/index.php/catalog/2258

shares from which the differences are calculated are reported in the appendix as table A1.

Table 2 shows that there are statistically significant differences in expenditure allocations between smoking and non-smoking households. For the two types of households, **food** constitutes the biggest expenditure item. The table shows that on average, non-smoking households allocate a greater share of expenditure towards food than smoking households with the differences being statistically significant. Richer households[6] are the exception: the difference between the two types of households is not statistically different from zero. Differences between the two types of households are largest for rural and poorer households; non-smoking households spend between 5 and 7 percentage points more on food than smoking households. This pattern combined with the geographic nature of poverty noted in table 1 is suggestive of the binding constraints faced by poorer households.

Non-smoking households spend 2 percentage points more on **schooling** than smoking households. The data on **telephone** expenses and expenditure on **personal care** shows that non-smoking households allocate significantly more towards those expenditure categories than smoking households.

The other expenditure categories exhibit a mixed pattern. For instance, for the full, urban and richer samples, non-smoking households allocate more towards **housing** than smoking households. The differences are not significant for rural and poorer households. This is not a surprising finding as rural and poorer households are unlikely to pay explicit rentals as they mostly reside in their own houses. The same is true for expenditure on **electricity**: for the full, urban and richer samples, non-smoking households allocate more to electricity than smoking households. Poorer and rural smoking households allocate more of their monthly expenditure towards **alternative energy** sources (kerosene and firewood) which are cheaper than electricity.

Non-smoking households allocate significantly more of their monthly budget towards **water** than smoking households. This is true in all data specifications except rural areas. This is not surprising since rural households are more likely than not to obtain their water "free of charge" from streams and water wells. The data on **house care** shows statistically significant differences in favour of non-smoking households with the exception of rural and poorer households where the differences are not statistically significant.

On the other hand, smoking households spend significantly more on **alcohol** than non-smoking households. In all the five categorisations of the data, smoking households allocate between 5 and 7 percentage points more towards alcohol than non-smoking households. Smoking households allocate more of their monthly expenditure towards **entertainment** in all five data specifications. The differences, however, are only statistically significant for rural households and poorer households. There are no statistically significant differences in **health** expenditures between the two types of households.

[6] In the rest of this paper, we refer to the top 50% of households in terms of household expenditure as "richer" households and the bottom 50% as "poorer" households.

In summary, the information in table 2 shows that there are differences in the way that smoking and non-smoking households allocate their monthly expenditure. In the rest of the paper, we interrogate whether the patterns in table 2 are in any way related to the tobacco smoking status of a household

6.2 Econometric results

This section investigates whether the differences discussed in 6.1 can be given a causal interpretation. That is, are the expenditure share differences between smoking and non-smoking households *caused* by a household allocating expenditure to tobacco?

6.3 Ordinary least squares (OLS)

It is possible that the expenditure share patterns we observe in table 2 are the result of confounding variables. That is, there might be some characteristics of the household other than tobacco smoking status, such as household structure or the household's socio-economic status that influences the results in table 2. We can control for possible confounders by using OLS to regress expenditure shares on the household's smoking status and a number of control variables representing household structure and measures of a household's socio-economic status. In essence, this involves estimating equation (1) by OLS. We report the result of such an exercise in table 3. (The table only reports the results of the coefficient on d in equation (1). The full sets of results for the OLS estimation are contained in tables A2 to A6 in the appendix).

In table 3, a negative coefficient on d implies that smoking households allocate less expenditure to the category in question when compared with non-smoking households after controlling for other variables. The table largely replicates the results in table 2 at least in a qualitative sense. Food is given a smaller expenditure allocation by smoking households in all data specifications excluding richer households (although the difference for urban households is only statistically significant at 10%). And the expenditure differences for food between smoking and non-smoking households are largest for poorer and rural households, a pattern we noted in table 2. Similarly, the coefficient on the schooling variable is negative in all specifications. The findings with regards to housing and water are similar to those in table 2: smoking households in the full and richer samples allocate a smaller share to the two expenditure categories than non-smoking households. The findings on electricity and personal care are also largely replicated: smoking households allocate a smaller share to those two categories than non-smoking households.

The coefficients on d in the alcohol equation in table 3 also show the same pattern as those in table 2, namely smoking households allocate a larger expenditure share to alcohol than non-smoking households even after controlling for other variables that might confound the analysis. The magnitudes of the expenditure differences for alcohol are similar to those in table 2.

For most of the remaining expenditure categories, the patterns in table 2 do not hold out after accounting for the effects of other variables. For instance, whereas table 2 shows statistically significant differences in share allocation for telephone expenses in all 5 data specifications, table 3 shows that the differences are only statistically significant in 2 subsamples (rural and poorer households) and only at the 10% level.

6.4 Three-stage least squares (3SLS)

As highlighted in Section 4, it is likely that d in equation (1) is endogenous. For example, a household might only decide to spend on tobacco after other household expenses have been made. Alternatively, some other variable, not explicitly specified in equation (1) and therefore contained in the error term might simultaneously influence a household's decision to spend on tobacco and the decision to spend on other commodities. The OLS procedure in the previous section assumes that d is exogenous, i.e. d and the error term are not correlated Further, $\ln M$ and $(\ln M)^2$ are also likely to be endogenous in a similar manner Previous work (Vermeulen, 2003; John, 2008; Pu et al, 2008) has shown that the decision to spend on tobacco and, as a consequence, the residual expenditure $\ln M$ (and $(\ln M)^2$) are endogenous. Failure to account for the endogeneity of these variables might result in biased and inconsistent coefficient estimates in our demand system. This section uses the method of instrumental variables to account for the possible endogeneity of d, $\ln M$ and $(\ln M)^2$) in equation (e1). The method proceeds in a series of steps: In the first step, we estimate the first-stage (or reduced form) regressions involving the endogenous variables and the candidate instruments. Recall that we use the adult sex ratio as the instrument for d and the logarithm of the value of assets within a household and its square as the instrument for $\ln M$ and $(\ln M)^2$ respectively. In the second stage, the predicted values from the first stage regression are substituted for the endogenous variables in an OLS estimation of equation (1).

The first-stage probit results for the regression of d on the adult sex ratio (the instrumental variable) alongside the other covariates for all five data sets are reported in table A7 in the appendix. In all the five data specifications, the instrumental variable is a strong predictor of whether a household reports spending on tobacco or not after controlling for other variables. The F statistics associated with the coefficient on this variable are equal to 78, 50, 27, 26 and 44 in the full, urban, rural, rich and poor samples respectively. These F statistics satisfy the standard rule of thumb that an instrument be considered "strong" if its associated F statistic is equal to or greater than 10 (Stock, et al, 2002). Tables A8 and A9 repeat this exercise for $\ln M$ and $(\ln M)^2$ using the logarithm of household assets and its square, respectively, as instruments. We find that the two instruments explain a substantial proportion of the variation in $\ln M$ and $(\ln M)^2$. The F statistics associated with the coefficient on the instrumental variable for $\ln M$ (the logarithm of the value of household assets) are equal to 3364, 1971, 1127, 1444 and 560 in the full, urban, rural, rich and poor samples respectively. For $(\ln M)^2$, the corresponding F statistics are 3136, 1866, 1444, 2162 and 697.

Table 4 presents the results of the three-stage least squares (3SLS) implementation of equation (1). The table only reports estimates of the coefficient on d (the full set of the 3LS results are reported in tables A10 to A14 in the appendix). A negative coefficient on d implies that smoking households allocate a smaller percentage of household expenditure to that particular category after accounting for observable confounders and the endogeneity of d, $\ln M$ and $(\ln M)^2$.

The 3SLS procedure confirms the OLS estimates for food namely that smoking households spend a smaller proportion of their expenditure on food. The results are significant for the entire, rural and poorer samples at 1% and marginally so for richer households but not for urban households. The 3SLS estimates for food are generally larger in absolute terms implying that OLS underestimates the difference in expenditure allocations for food between the two types of households.[7]

The 3SLS estimates in the **schooling** equation are in general larger than the OLS estimates. For the full, urban and poor samples, smoking households allocate significantly less expenditure to schooling than non-smoking households. For urban households, the difference is only statistically significant at the 10% level In the OLS regression, the differences in expenditure allocation between the two types of households were statistically significant in all five samples. For **water**, the qualitative pattern of the coefficient estimates in table 4 is similar to that in table 3,namely that smoking households allocate less expenditure than non-smoking households. Further, the 3SLS estimates are larger in absolute terms.

The 3SLS coefficient estimates for clothing, housing and alternative energy tell a different story to the OLS estimates presented in table 3. In table 3 the expenditure allocations to **clothing** were not significantly different between smoking and non-smoking households. In table 4, the 3SLS estimates show that non-smoking households (other than richer households) allocate significantly more expenditure to clothing. For **housing**, significant differences in expenditure allocations are only observed for rich and poor households using the 3SLS procedure: for rich households, non-smoking households allocate significantly more and the reverse is true for poor households. With **alternative energy**, significant differences in expenditure allocations exist for four of the five data specifications. For the full, rural and poorer samples, smoking households allocate more to alternative energy than non-smoking households whereas the reverse is true for richer households. This again suggests some sort of substitution where poorer smokers substitute cheaper energy sources for more expensive

[7] The 3SLS estimates for food are numerically smaller implying that OLS causes an upward bias in the coefficient estimates. For instance, -5.076, which is the 3SLS estimate for the full sample, is smaller than the corresponding OLS estimate which is -2.100. This suggests that d and the error term u are likely to be positively correlated in the food equation. This can be deduced from the OLS bias formula:

$E(\hat{\beta}\backslash d) = \beta + \frac{Cov(d,u)}{Var(d)'}$, where $\hat{\beta}$ is the OLS estimate of the true β and E is the expectation operator (see Auld, 2014).

energy sources.

The qualitative patterns with **alcohol** in tables 2 and 3 are replicated in table 4 with the 3SLS estimates being larger than the OLS estimates.[8] Other categories that result in smoking households allocating a larger share of their expenditure are **telephone** and **remittances.** For the two categories, the 3SLS estimates are, in almost all cases, the direct opposite of the OLS estimates. For the full, urban and rich households, smoking households allocate a significantly larger share of expenditure towards the two categories than non-smoking households.

6.5 Relaxing the exclusion restriction

The previous section utilised the method of instrumental variables (IV) to identify the causal impact of household tobacco smoking status on expenditure decisions within the household. One important requirement underpinning the IV procedure is that the instrumental variable should not be correlated with the error term in equation (1).[9] In other words, the instrument can only influence the outcome through its influence on the endogenous variable. Unfortunately it is difficult to ascertain whether this requirement, referred to as the exclusion restriction in the IV literature, holds especially in the just-identified case such as we have in this paper.[10] In the just-identified case, the researcher needs to motivate that the exclusion restriction holds. Whereas we are confident that the total value of household assets, the instrument for the residual expenditure, satisfies the exclusion restriction, we are less so about our other instrument, the adult sex ratio Empirical and theoretical work on household decision making often points to the importance of household structure in influencing expenditure outcomes (Deaton, et al, 1989; Deaton, 1997). Although empirical specifications of demand in this literature often employ broader conceptions of household structure (such as the ratio of adults to children or the proportion of household occupants in different age groups), one can make a case that the adult sex ratio, in some way, also captures some aspect of household structure. This section of the paper uses the method introduced by Nevo and Rosen (2012) to test the robustness of our 3SLS estimates by allowing the adult sex ratio to be correlated with the error term. In other words, Nevo and Rosen's method allows for the instrument to be imperfect and thus imposes a less restrictive assumption than the standard IV approach.

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[8] Since the coefficient on d in the alcohol equation is positive, the implication of the 3SLS results is that OLS leads to a downward bias. The OLS bias formula in footnote 7 would suggest a negative correlation between d

and the error term u in the alcohol equation.

[9] Another requirement is that the instrumental variable be relevant. That is, the instrumental variable should explain a substantial proportion of the variation in the endogenous regressor. We believe that our instrumental variables satisfy this requirement based on the results in tables A7 to A9 and the discussion in the previous section.

[10] In the just-identified case, the number of instruments is equal to the number of endogenous variables. In the alternative case where the number of instruments is greater than the number of endogenous variables, one can perform a test of over-identifying restrictions, such as the Sargan test, to check whether the exclusion restriction holds.

The method in Nevo and Rosen (2012) relies on two assumptions. The first assumption is that the direction of correlation between the imperfect instrument and the error term should be the same as that between the error term and the endogenous variable.[11] We are confident that this assumption holds in our set-up since our instrument is positively correlated with the endogenous variable (see the results in table A7). Therefore, the direction of correlation with the error term must be the same for the two variables. The second assumption requires that the magnitude of the correlation between the error term and the endogenous variable, in absolute terms, be greater than that between the imperfect instrument and the error term.[12] In other words, this assumption requires the imperfect instrument to be "less endogenous" than the endogenous regressor. This assumption likely holds in our set-up for the following reasons: One of the variables that we suspect to be in the error term is the rate of time preference as measured by the discount rate. Field experiments show that smokers have higher discount rates than non-smokers (Chabris et al, 2008; Harrison et al, 2010). In addition, there is evidence that the discount rate influences expenditure decisions on some of the goods and services on the left-hand side (Fersterer, 2003; Chabris et al, 2008). On the other hand, there appears to be no significant differences in discount rates between men and women (Harrison et al., 2002; Harrison et al., 2005; Andersen, et al., 2010). To the extent that one can define a household-level discount rate, consistent with our assumption of a unitary model of household decision making, then the foregoing suggests that the correlation between d and u is likely to be at least greater than the correlation between the adult sex ratio and u.

One possible challenge to this assumption is that not all goods and services on the left-hand side are influenced by the discount rate. For instance, how might the discount rate, *ceteris paribus,* influence a household's expenditure on water? Whereas there might be some goods and services where the relationship is not obvious, we believe that the discount rate is important in most of the goods and services that we study (at least those that we consider important such as food and schooling) to give credence to this assumption.

Nevo and Rosen (2012) propose a synthetic instrumental variable, V, formally defined as $V\ (\lambda) = \sigma_d Z - \lambda\sigma_z d$,where Z is the imperfect instrument and d is the endogenous regressor; σ_d and σ_z are respectively the standard deviations of d and Z ;and λ is some parameter. For $\lambda^*, V(\lambda^*)$ satisfies the exclusion restriction allowing us to consistently identify the causal impact of d on households' spending decisions. We do not, however, observe λ^* but given the assumptions above, we know that it must lie in the [0,1] interval.[13] By varying λ in the [0,1] interval, we can construct bounds within which the true causal

[11] Formally, letting Z denote the imperfect instrument, this assumption can be represented as: $Corr(Z,u)Corr(d,u) \geq 0$ (i.e. the product of the two correlations should be positive).

[12] Formally, using the notation in footnote 11, this assumption requires: $|Corr(d,u),| \geq| Corr(Z,u)|$.

[13] $\lambda = \frac{Corr(Z,u)}{Corr(d,u)}$. For $Corr(Z,u) = 0, \lambda = 0$. For $Corr(Z,u) = Corr(d,u), \lambda = 1$.

impact lies given the presence of endogeneity and an imperfect instrument.[14] Nevo and Rosen further show that one can only compute one-sided bounds if the correlation between the imperfect instrument and endogenous regressor is positive such as we have here (otherwise one can obtain two-sided bounds). The choice of bound (whether it is the causal impact associated with Z or with V) and whether the bound is an upper or lower bound depends on the assumptions made about the direction of correlation between the error term and the endogenous regressor[15] (we motivate below why we think this correlation is positive). The method of constructing bounds in this way has been used recently to shed light on empirical debates around the causal impact of teen pregnancy on school completion rates (Reinhold and Woutersen, 2011) and on whether increasing homeownership levels benefit urban neighbourhoods (Kortelainen and Saarimaa, forthcoming).

As stated in the previous paragraph, whether the bound is a lower or upper bound depends on the assumption made about the correlation between d and the error term, u.We assume that this correlation is positive in all equations in our demand system.[16] This assumption follows quite naturally from the discussion above on the experimental and laboratory evidence on the relationship between smoking and the rate of time preference (the discount rate). This assumption implies upper-bound estimates for the causal impact of d on households' spending decisions and by consequence a lower bound of ∞ (see footnote 15). Table 5, therefore, reports upper bound estimates for the causal impact of d in all the five data specifications that we consider. For the purposes of making inference, bounds that do not overlap zero imply that the underlying causal effect is statistically significant.[17] Such bounds are in bold in Table 5.

After relaxing the exclusion restriction, we end up with the finding that in no expenditure category do tobacco smoking households allocate a greater share of total household expenditure. This is also true for alcohol which in tables 2 to 4 showed a strong positive association with the tobacco smoking status of a household. This association is more likely a correlation than a causal one.

By and large, most of the qualitative findings in table 4 hold up with some differences. For instance, smoking households allocate a smaller share of expenditure to food in all data samples with the exception urban and rich households.

[14] To see this, note that if $\lambda = 0, V$ is equal to the imperfect instrument Z multiplied by a scalar. Whereas if $\lambda = 1, V = \sigma_d Z - \sigma_z d$. The fact that V ranges in this way results in the construction of a set within which the true causal impact must lie.

[15] Formally, proposition 2 in Nevo and Rosen (2012) states: if $Corr(d, u) < 0$,then $\beta \geq \max\{\beta_z, \beta_v\}$ and if , $Corr(d, u)$ >0, then $\beta \leq \min\{\beta_z, \beta_v\}$. β is the true effect, β_z is the coefficient associated with the imperfect instrument and β_v is the coefficient associated with the synthetic instrument evaluated at $\lambda = 1$.

[16] This seems to contradict footnote 8 where we concluded that the correlation between d and u in the alcohol equation is likely negative. But the conclusion made there is only correct to the extent that the IV procedure in section 6.2.2 is valid. The discussion in this section suggests otherwise.

[17] Technically, the upper bounds in table 5 are the bootstrapped upper bounds of a 95% confidence interval around either β_z or β_v. This is a much more stringent approach to making inferences than just looking at β_z or β_v (Reinhold and Woutersen, 2011 and Kortelainen and Saarimaa, forthcoming use a similar procedure for making inferences).

This is suggestive of the fact that budget constraints are more likely to be binding for poorer households given the geographic nature of poverty documented in table 1. With regards to schooling, in only the full, rich and poor households do smoking households allocate a smaller and statistically significant share. As for clothing, the results are in line with those in table 4, namely smoking households significantly allocate less expenditure in all data specifications except for richer households. The qualitative results for water are also replicated: smoking households allocate a smaller share to water for the full, urban and rich samples. For electricity and alternative energy, the differences are only statistically significant in one of the data subsamples: urban households for electricity and richer households for alternative energy. In either case, the differences were statistically significant in more than one subsample with the 3SLS procedure.

The findings that are entirely different to those in table 4 are for daily transportation, equipment maintenance, entertainment and remittances. For daily transportation, smoking households allocate less expenditure than non-smoking households in all samples excluding rural and poor households were transportation is unlikely to be a major component of expenditure. For the rest, the findings in table 5 point in the opposite direction to those reported in table 4, namely smoking households allocate significantly less expenditure. For equipment maintenance the pattern is observed for the full, rural and poor samples; for entertainment it is in the urban and richer households and for remittances it is in the full, rural and richer households.

7 Summary and conclusion

This paper adds to the literature on the crowding-out effect of tobacco expenditure in two ways. In the first instance we use data from a low income sub-Sahara African country, Zambia, where most of the households are poor. Secondly, in identifying the causal impact of tobacco expenditure, we use the method of instrumental variables, which is the standard method in the literature, but instead use less stringent assumptions on the behaviour of the instrument. Our econometric analysis shows that tobacco expenditure negatively impacts household expenditure on food, schooling, clothing and water. Other expenditure categories that are negatively impacted include transportation, equipment repair, entertainment and remittances. Our analysis shows that the patterns and the magnitudes of crowding out are in some instances related to the household's geographical location and/or socio-economic status. For instance food is more likely to be displaced by tobacco in poorer households than richer households. Transportation is more likely to be displaced in richer households where it is an important component of household expenditure. We therefore confirm many of the findings in the literature. On the other hand, unlike previous studies, we are unable to identify goods and services whose expenditure is positively impacted by tobacco. For instance Wang et al (2006) and Koch and Tshiswaka-Kashalala (2008) find that tobacco expenditure crowds in expenditure on alcohol. John (2008) finds that expenditure on healthcare, clothing and fuels is positively impacted by spending on tobacco in India. Our econometric analysis, supported by what we consider to be plausible assumptions on the instrumental variable, leads us to conclude that the positive associations between tobacco and other expenditure categories found in the literature are more likely to be correlations than causal relationships.

Our paper's main limitation is that it uses cross-sectional data where, with an exhaustive list of controls, one can compare the expenditure profiles of two households that are identical in every respect except for tobacco smoking status. Unfortunately, there are unmeasurable sources of heterogeneity between the two types of households that cannot be accounted for making it difficult to draw definitive causal conclusions. Panel datasets are ideal in the sense that they are allow for one to compare the expenditure profile of the same household at different points in time and in this way controls for fixed unobserved heterogeneity. Unfortunately Zambia does not as yet collect panel data. In any case, using instrumental variables can substitute for some advantages of panel data.

Our work shows that a broader accounting of tobacco's consumption costs in Zambia should, for example, include the costs associated with under nutrition and under investment in education by households. As pointed out by Wang et al (2006), Block and Webb (2009) and John et al (2012), under nutrition, which can affect the cognitive development of children, under investment in education and underinvestment in the maintenance of agricultural equipment are likely to trap households in a cycle of poverty.

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Table 1: Sample summary statistics

Line No.	Statistic	Full Sample	Urban	Rural	Top 50%	Bottom 50%
1	Number of households	18 662	9 530	9 132	9 331	9 331
2	Percentage of households in Urban areas	51.00%	100.00%	N/A	81.00%	21.00%
3	Percentage of households in Rural areas	49.00%	N/A	100.00%	19.00%	79.00%
4	Average monthly tobacco expenditure[1]	USD 2.83	USD 5.00	USD 1.60	USD 5.00	USD 1.12
5	Percent. of households reporting positive tobacco expenditure	9.00%	7.00%	12.00%	8.00%	11.00%
6	Tobacco share among tobacco spending households	4.50%	3.81%	4.95%	3.34%	6.38%
7	Monthly household expenditure	USD 121.00	USD 217.00	USD 45.00	USD 221.00	USD 22.00
8	Percentage of adult females	53.00%	52.00%	54.00%	51.00%	55.00%
9	Average household size	5.20	5.30	5.20	5.70	4.74
10	Percentage of adults in household	56.00%	59.00%	54.00%	57.00%	56.00%
11	Average age of household head	42.00	40.00	43.00	40.00	42.00
12	Average age of adults in household	34.00	33.00	36.00	33.00	36.00
13	Average age of children in household	8.50	8.90	8.20	9.00	8.00
14	Average years of schooling for household head	8.90	10.00	7.00	11.00	6.80
15	Average schooling years for most educated household member	9.50	11.00	8.00	11.00	7.40
16	Average number of employed people in household	1.50	1.40	1.60	1.50	1.50
17	Percentage of household heads with wage(regular) income	30.00%	50.00%	11.00%	53.00%	8.34%
18	Percentage of small-scale agriculture households	37.00%	N/A	75.00%	11.00%	62.00%
19	Percentage of medium-scale agricultural households	5.14%	N/A	11.00%	4.00%	6.00%
20	Percentage of large-scale agricultural households	0.20%	N/A	0.42%	0.32%	0.09%
21	Percentage of fish farming households	7.00%	N/A	14.00%	3.00%	11.00%
22	Percentage of non-Agriculture households	34.00%	67.00%	N/A	51.00%	18.00%
23	Percentage of low-cost households	10.00%	19.00%	N/A	17.00%	2.00%
24	Percentage of medium cost households	7.00%	14.00%	N/A	13.00%	1.00%
Line No.	**Average Budget Share of Non-Tobacco Expenditure**	**Full Sample**	**Urban**	**Rural**	**Top 50%**	**Bottom 50%**
25	Food	50.00%	47.00%	50.00%	45.00%	56.00%
25	Alcohol	2.00%	2.00%	2.00%	2.00%	2.00%
27	Health	1.00%	0.80%	1.31%	0.80%	1.25%
28	School	5.72%	6.14%	5.29%	7.12%	4.32%
29	Clothing	9.20%	6.17%	12.37%	6.65%	11.76%
30	Housing	3.02%	5.70%	0.20%	5.42%	0.60%
31	Water	1%	1.79%	0.14%	1.60%	0.40%
32	Electricity	1.31%	2.40%	0.20%	2.48%	0.10%
33	Alternative Energy	4.36%	4.17%	4.55%	3.27%	5.45%
34	Daily Transport	1.79%	2.75%	0.8%	3.30%	0.30%
35	Other Transport	1.95%	1.99%	1.90%	2.78%	1.10%
36	Equipment Maintenance	0.70%	0.4%	1.03%	0.60%	0.80%
37	Entertainment	0.50%	0.90%	0.20%	0.90%	0.08%
38	Telephone	2.15%	3.57%	0.70%	4.08%	0.20%
39	Remittance	0.70%	0.90%	0.50%	1.10%	0.30%
40	House Care	0.90%	1.43%	0.30%	1.56%	0.20%
41	Personal Care	10.92%	9.81%	12.08%	9.81%	12.03%
42	Other	2.09%	1.93%	2.25%	1.73%	2.44%

[1] Zambian Kwacha converted to United States Dollar using the end-of-year exchange rate in 2006 obtained from www.oanda.com which was ZMK 4,200 to USD 1.

Table 2: Differences in mean expenditure shares between smoking and non-smoking households

Share on:	Full Sample	Urban	Rural	Top 50%	Bottom 50%
Food	-3.46***	-1.97***	-5.99***	-0.40	-7.62***
Alcohol	5.99***	5.19***	6.64***	5.10***	6.68***
Health	0.04	0.05	-0.08	-0.04	0.04
School	-2.15***	-2.30***	-1.88***	-2.19***	-1.69***
Clothing	0.07	-0.02	-1.29***	0.02	-0.72*
Housing	-1.43***	-1.70***	0.00	-2.35***	0.02
Water	-0.49***	-0.59***	-0.05	-0.69***	-0.14**
Electricity	-0.81***	-1.15***	-0.07	-1.26***	-0.10*
Alternative Energy	0.14	0.49**	-0.18	0.46***	-0.46*
Daily Transport	-0.54***	-0.32	-0.24	-0.43	-0.14
Other Transport	0.03	0.21	-0.08	0.36	0.05
Equipt Maintenance	0.16**	0.11	0.05	0.19*	0.10
Entertainment	0.03	0.12	0.12**	0.04	0.15***
Telephone	-0.82***	-0.66***	-0.27***	-0.91***	-0.13**
Remittances	-0.15**	-0.09	-0.13	-0.13	-0.04
House Care	-0.25***	-0.31***	0.05	-0.35***	0.05
Personal Care	-1.05***	-1.37***	-1.36***	-1.22***	-1.29***
Other	0.20**	0.50***	-0.07	0.48***	-0.11

Notes: The numbers reported in the table are differences in mean expenditure shares between smoking and non-smoking households expressed as percentage points. A positive percentage point difference implies that smoking households report a higher expenditure share than non-smoking households. The actual shares from which the differences in the table are calculated are reported in the appendix as table A1. *, **, *** implies that the percentage point difference is statistically significant at the 10%, 5% and 1% significance level respectively.

Table 3: Ordinary least squares (OLS) estimates for the coefficient on d

Coefficient on *d* in:	Full Sample	Urban	Rural	Top 50%	Bottom 50%
Food	-2.100***	-1.226*	-2.614***	-0.399	-3.565***
	(0.479)	(0.638)	(0.708)	(0.608)	(0.742)
Alcohol	5.817***	4.841***	6.496***	5.026***	6.499***
	(0.163)	(0.219)	(0.242)	(0.211)	(0.251)
Health	-0.058	-0.021	-0.080	-0.128	-0.001
	(0.010)	(0.121)	(0.157)	(0.106)	(0.172)
School	-1.698***	-1.374***	-1.980***	-1.391***	-1.898***
	(0.259)	(0.374)	(0.364)	(0.389)	(0.343)
Clothing	-0.177	0.205	-0.496	-0.271	-0.124
	(0.254)	(0.274)	(0.415)	(0.269)	(0.435)
Housing	-0.683***	-1.583***	-0.062	-1.538***	0.107
	(0.208)	(0.431)	(0.065)	(0.388)	(0.122)
Water	-0.181**	-0.352**	-0.042	-0.365***	0.030
	(0.078)	(0.162)	(0.033)	(0.137)	(0.072)
Electricity	-0.329***	-0.673***	-0.039	-0.496***	-0.040
	(0.104)	(0.206)	(0.071)	(0.191)	(0.071)
Alt. Energy	0.125	0.203	0.064	-0.006	0.063
	(0.163)	(0.224)	(0.235)	(0.185)	(0.268)
Daily Tport	-0.133	-0.143	-0.175	-0.235	-0.172*
	(0.175)	(0.306)	(0.190)	(0.326)	(0.104)
Other Tport	0.065	0.492**	-0.206	0.293	-0.129
	(0.187)	(0.244)	(0.280)	(0.300)	(0.219)
Equipt.	0.069	0.171*	-0.023	0.163	-0.055
	(0.082)	(0.102)	(0.127)	(0.123)	(0.109)
Entertain.	0.107	0.104	0.075	0.105	0.060
	(0.080)	(0.160)	(0.051)	(0.152)	(0.039)
Telephone	-0.144	0.015	-0.233*	0.004	-0.141*
	(0.136)	(0.253)	(0.127)	(0.253)	(0.086)
Remittance	-0.081	0.021	-0.153	-0.050	-0.109
	(0.076)	(0.114)	(0.102)	(0.127)	(0.080)
House Care	0.004	-0.135	0.098	-0.106	0.119**
	(0.065)	(0.122)	(0.060)	(0.120)	(0.048)
Personal	-0.807***	-1.032***	-0.617	-0.866***	-0.718*
	(0.264)	(0.339)	(0.402)	(0.312)	(0.431)
Obs	**13,679**	**7,275**	**6,404**	**7,501**	**6,178**

Notes: The results shown above are only for the coefficient on d in equation (1). The full set of OLS results are contained in tables A2 to A6 in the appendix. Standard errors are reported in parentheses. *, **, *** implies that the coefficient on d is statistically significant at the 10%, 5% and 1% significance levels respectively.

Table 4: Three stage least squares (3LS) estimates for the coefficient on d

Coefficient on *d* in:	Full Sample	Urban	Rural	Top 50%	Bottom 50%
Food	-5.076***	-0.728	-7.086***	-4.275*	-6.315***
	(1.634)	(2.543)	(2.250)	(2.504)	(2.234)
Alcohol	9.696***	8.656***	10.060***	8.672***	8.989***
	(0.668)	(1.019)	(0.928)	(1.068)	(0.956)
Health	0.012	0.267	-0.064	0.769*	-0.113
	(0.337)	(0.434)	(0.507)	(0.447)	(0.505)
School	-1.975**	-2.925*	-1.662	-0.735	-2.096**
	(0.863)	(1.523)	(1.084)	(1.608)	(0.935)
Clothing	-2.665***	-2.751**	-2.836**	0.661	-3.174**
	(0.890)	(1.194)	(1.328)	(1.143)	(1.411)
Housing	-0.366	-1.829	0.134	-2.760*	0.571**
	(0.675)	(1.666)	(0.177)	(1.611)	(0.269)
Water	-0.795***	-2.228***	-0.119	-2.187***	-0.095
	(0.273)	(0.679)	(0.111)	(0.600)	(0.209)
Electricity	-0.479	-2.164***	0.132	-1.684*	0.114
	(0.341)	(0.813)	(0.221)	(0.874)	(0.083)
Alt. Energy	1.788***	1.251	2.205***	-3.045***	2.204***
	(0.554)	(0.943)	(0.733)	(0.843)	(0.774)
Daily Tport	0.177	0.256	0.305	0.388	-0.325
	(0.586)	(1.264)	(0.563)	(1.363)	(0.227)
Other Tport	-0.661	-0.249	-0.761	0.191	1.504**
	(0.652)	(1.032)	(0.884)	(1.269)	(0.635)
Equipt.	0.405	1.038**	0.195	1.949***	-1.136***
	(0.294)	(0.449)	(0.423)	(0.520)	(0.373)
Entertain.	0.398	0.817	0.220	0.451	0.174
	(0.260)	(0.620)	(0.157)	(0.636)	(0.134)
Telephone	0.687	2.099*	0.061	3.861***	-0.218
	(0.487)	(1.111)	(0.410)	(1.199)	(0.338)
Remittance	0.627**	1.490***	0.279	2.050***	0.196
	(0.261)	(0.497)	(0.303)	(0.573)	(0.226)
House Care	0.213	-0.417	0.390**	-1.114**	0.464***
	(0.222)	(0.492)	(0.192)	(0.522)	(0.155)
Personal	-1.566*	-1.788	-1.116	-3.148**	-0.518
	(0.872)	(1.310)	(1.227)	(1.246)	(1.318)
Obs.	**8,555**	**4,545**	**4,010**	**4,092**	**3,212**

Notes: The results shown above are only for the coefficient on d in equation (1). The full set of 3LS results are contained in tables A10 to A14 in the appendix. Standard errors are reported in parentheses. *, **, *** signifies that the coefficient on d is statistically significant at the 10%, 5% and 1% significance levels respectively.

Table 5: Estimates of bounds for the causal effect of d

Category	Full Sample	Urban	Rural	Top 50%	Bottom 50%
Food	**(-∞, -1.958)**	(-∞, 0.305)	**(-∞, -2.677)**	(-∞, 0.633)	**(-∞, -0.194)**
Alcohol	(-∞, 5.389)	(-∞, 4.435)	(-∞, 6.280)	(-∞, 4.50)	(-∞, 6.472)
Health	(-∞, 0.263)	(-∞, 0.043)	(-∞, 0.928)	**(-∞, -0.037)**	(-∞, 0.877)
School	**(-∞, -0.284)**	(-∞, 0.060)	(-∞, 0.462)	**(-∞, -0.010)**	**(-∞, -0.263)**
Clothing	**(-∞, -0.920)**	**(-∞, -0.412)**	**(-∞, -0.233)**	(-∞, 0.256)	**(-∞, -0.408)**
Housing	(-∞, 0.958)	(-∞, 1.437)	(-∞, 0.263)	(-∞, 0.398)	(-∞, 0.444)
Water	**(-∞, -0.261)**	**(-∞, -0.898)**	(-∞, 0.098)	**(-∞, -1.010)**	(-∞, 0.314)
Electricity	(-∞ , 0.189)	**(-∞, -0.571**	(-∞, 0.221)	(-∞, 0.028)	(-∞, 0.186)
Alternative	(-∞, 0.610)	(-∞, 1.044)	(-∞, 0.424)	**(-∞, -1.393)**	(-∞, 0.621)
Daily Transport	**(-∞,-0.023)**	**(-∞, -0.262)**	(-∞, 0.338)	**(-∞, -0.277)**	(-∞, 0.120)
Other Transport	(-∞, 0.616)	(-∞, 1.177)	(-∞, 0.972)	(-∞, 2.679)	(-∞, 0.430)
Equipt Maintenance	**(-∞, -0.125)**	(-∞, 0.198)	**(-∞, -0.255)**	(-∞, 0.145)	**(-∞, -0.405)**
Entertain.	(-∞, 0.026)	**(-∞, -0.089)**	(-∞, 0.185)	**(-∞, -0.022)**	(-∞, 0.124)
Telephone	(-∞, 0.070)	(-∞, 0.518)	(-∞, 0.160)	(-∞, 0.584)	(-∞, 0.443)
Remittance	**(-∞, -0.092)**	(-∞, 0.068)	**(-∞, -0.050)**	**(-∞, -0.036)**	(-∞, 0.078)
House Care	(-∞, 0.303)	(-∞, 0.547)	(-∞, 0.264)	**(-∞, -0.090)**	(-∞, 0.252)
Personal Care	(-∞, 0.142)	(-∞, 0.780)	(-∞, 1.290)	**(-∞, -0.707)**	(-∞, 2.066)

Notes: The table shows estimates of bounds for the causal effect of d using the method in Nevo and Rosen (2012). Bounds in bold imply that the causal effect of d is statistically significant since the bound does not overlap zero.

Appendix

Table A1: Mean expenditure shares in percentages between smoking and non-smoking households

Share on:	Full Sample	Urban	Rural	Top 50%	Bottom 50%
Food	(50.67, 47.21)	(47.29, 45.32)	(54.41, 48.42)	(44.56, 44.13)	(57.05, 49.43)
Alcohol	(1.35, 7.34)	(1.43, 6.61)	(1.26, 7.80)	(1.52, 6.62)	(1.17, 7.86)
Health	(1.03, 1.08)	(0.78, 0.82)	(1.32, 1.24)	(0.83,0.79)	(1.24, 1.29)
School	(5.93, 3.78)	(6.30, 4.00)	(5.51, 3.63)	(7.29, 5.10)	(4.51, 2.83)
Clothing	(9.19, 9.26)	(6.17, 6.15)	(12.52, 11.22)	(6.65, 6.67)	(11.84, 11.12)
Housing	(3.15, 1.72)	(5.83, 4.12)	(0.20, 0.20)	(5.60, 3.25)	(0.60, 0.62)
Water	(1.03, 0.54)	(1.83, 1.25)	(0.14, 0.10)	(1.66, 0.97)	(0.38, 0.24)
Electricity	(1.38, 0.57)	(2.49, 1.34)	(0.16, 0.08)	(2.59, 1.32)	(0.13, 0.03)
Alternative	(4.34, 4.48)	(4.14, 4.62)	(4.57, 4.39)	(3.24, 3.70)	(5.50, 5.04)
Daily Transport	(1.84, 1.30)	(2.77, 2.46)	(0.81, 0.57)	(3.33, 2.90)	(2.85, 0.15)
Other Transport	(1.95, 1.97)	(1.97, 2.18)	(1.91, 1.84)	(2.76, 3.12)	(1.10, 1.15)
Equipt Maintenance	(0.71, 0.86)	(0.42, 0.53)	(1.02, 1.07)	(0.61, 0.80)	(0.81, 0.91)
Entertainment	(0.50, 0.53)	(0.84, 0.97)	(0.13, 0.26)	(0.93, 0.97)	(0.06, 0.21)
Telephone	(2.23, 1.41)	(3.62, 2.96)	(0.70, 0.43)	(4.15, 3.24)	(0.23, 0.10)
Remittance	(0.71, 0.56)	(0.86, 0.77)	(0.55, 0.42)	(1.11, 0.97)	(0.30, 0.26)
House Care	(0.89, 0.64)	(1.45, 1.14)	(0.27, 0.33)	(1.58, 1.24)	(0.17, 0.21)
Personal Care	(11.02, 9.97)	(9.91, 8.54)	(12.24, 10.87)	(9.91, 8.69)	(12.17, 10.88)
Other	(2.07, 2.27)	(1.89, 2.40)	(2.26, 2.19)	(1.70, 2.18)	(2.45, 2.34)

Notes: The pairs in each cell refer to the mean expenditure shares in percentages reported by smoking and non-smoking households. In each pair, the mean expenditure share for non-smoking households is reported first followed by that of the smoking households. The figures in this table are used to construct the percentage point differences reported in table 2.

Table A2: Ordinary least squares (OLS) results, Full sample

Variable	Food	Alc	Health	Sch	Clothing	Housing	Water	Electricity	Alt. Energ	Daily Tprt	Other Tprt	Equpt	Ent	Tele	Remit	Hse Care	Pers. Cre
d	-2.100***	5.817***	-0.0577	-1.698***	-0.177	-0.683***	-0.181**	-0.329***	0.125	-0.133	0.0649	0.0685	0.107	-0.144	-0.0811	0.00449	-0.807***
	(0.479)	(0.163)	(0.0999)	(0.259)	(0.254)	(0.208)	(0.0781)	(0.104)	(0.163)	(0.175)	(0.187)	(0.0823)	(0.0799)	(0.136)	(0.0756)	(0.0653)	(0.264)
LnM	45.20***	0.614	-1.082***	-4.690***	-11.31***	-3.786***	0.319	-0.546	4.565***	-17.07***	1.639***	-2.767***	-4.557***	-4.033***	-1.356***	-2.384***	-1.027
	(1.564)	(0.533)	(0.326)	(0.847)	(0.828)	(0.679)	(0.255)	(0.341)	(0.532)	(0.572)	(0.610)	(0.269)	(0.261)	(0.445)	(0.247)	(0.213)	(0.863)
LnM2	-2.000***	-0.00970	0.0431***	0.212***	0.391***	0.196***	-0.0113	0.0334**	-0.239***	0.781***	-0.00983	0.123***	0.204***	0.213***	0.0726***	0.115***	-0.00760
	(0.0631)	(0.0215)	(0.0132)	(0.0342)	(0.0334)	(0.0274)	(0.0103)	(0.0138)	(0.0215)	(0.0231)	(0.0246)	(0.0109)	(0.0105)	(0.0180)	(0.00996)	(0.00861)	(0.0348)
Adult prop	-1.082	0.900**	0.284	0.670	0.000281	-0.901*	0.606***	0.970***	-0.442	0.558	-1.090**	0.388*	-0.200	0.437	-0.781***	0.120	-0.780
	(1.222)	(0.417)	(0.255)	(0.662)	(0.648)	(0.531)	(0.199)	(0.267)	(0.416)	(0.447)	(0.477)	(0.210)	(0.204)	(0.348)	(0.193)	(0.167)	(0.674)
loghhsize	-1.642***	-0.159	0.186*	3.715***	1.146***	-1.997***	0.0731	0.259**	0.100	-0.0840	-0.874***	0.525***	-0.262***	-0.123	-0.365***	-0.302***	-0.260
	(0.506)	(0.173)	(0.106)	(0.274)	(0.268)	(0.220)	(0.0826)	(0.110)	(0.172)	(0.185)	(0.198)	(0.0870)	(0.0844)	(0.144)	(0.0799)	(0.0690)	(0.279)
Head Sch	-0.251	-0.219	-0.203*	0.855***	-0.00185	0.132	0.159**	0.322***	-0.292*	-0.201	-0.246	0.143*	-0.0465	0.278**	-0.0629	0.0184	-0.357
	(0.497)	(0.169)	(0.104)	(0.269)	(0.263)	(0.216)	(0.0811)	(0.109)	(0.169)	(0.182)	(0.194)	(0.0855)	(0.0830)	(0.142)	(0.0785)	(0.0678)	(0.274)
Head wage	-0.792**	0.170	-0.246***	0.225	-0.406**	1.834***	-0.145**	0.120	-0.480***	-0.887***	-0.603***	-0.513***	0.0866	0.659***	0.182***	0.0790	1.068***
	(0.355)	(0.121)	(0.0741)	(0.192)	(0.188)	(0.154)	(0.0579)	(0.0775)	(0.121)	(0.130)	(0.139)	(0.0610)	(0.0592)	(0.101)	(0.0560)	(0.0484)	(0.196)
Hhold Emp	-0.00192	0.137**	0.0247	-0.875***	0.246***	-0.0911	-0.0683**	-0.184***	0.0542	0.135**	0.0404	0.0330	0.0540*	0.0951*	0.116***	0.0542**	0.170*
	(0.172)	(0.0587)	(0.0359)	(0.0932)	(0.0912)	(0.0748)	(0.0281)	(0.0376)	(0.0586)	(0.0630)	(0.0672)	(0.0296)	(0.0287)	(0.0490)	(0.0272)	(0.0235)	(0.0949)
Adult Age	2.805**	0.719*	0.932***	-8.238***	0.457	0.905*	-0.120	-0.438	0.657	0.952**	-0.0371	0.548**	0.283	0.459	0.0999	0.359**	-0.587
	(1.253)	(0.427)	(0.262)	(0.679)	(0.664)	(0.544)	(0.204)	(0.273)	(0.427)	(0.458)	(0.489)	(0.215)	(0.209)	(0.357)	(0.198)	(0.171)	(0.691)
Child age	-0.493**	-0.184**	0.00162	2.413***	-0.474***	-0.380***	0.0336	0.193***	-0.288***	-0.0974	-0.123	-0.0359	-0.0125	0.0553	-0.0989***	0.0359	-0.385***
	(0.227)	(0.0774)	(0.0474)	(0.123)	(0.120)	(0.0987)	(0.0371)	(0.0496)	(0.0773)	(0.0831)	(0.0886)	(0.0390)	(0.0379)	(0.0647)	(0.0358)	(0.0310)	(0.125)
Head Age	-2.294**	-1.145***	-0.454*	10.08***	-2.683***	-2.175***	0.641***	0.888***	-0.182	-0.799*	0.651	-0.599***	-0.323*	-0.823**	-0.145	-0.253*	-0.0499
	(1.123)	(0.383)	(0.235)	(0.609)	(0.595)	(0.488)	(0.183)	(0.245)	(0.382)	(0.411)	(0.438)	(0.193)	(0.187)	(0.320)	(0.177)	(0.153)	(0.620)
Most Edu	-2.080***	-0.207	-0.0995	0.463	0.639*	-0.195	0.0938	0.453***	-0.271	-0.431*	-0.127	-0.131	0.00717	0.505***	0.312***	0.181**	0.731**
	(0.640)	(0.218)	(0.134)	(0.347)	(0.339)	(0.278)	(0.104)	(0.140)	(0.218)	(0.234)	(0.250)	(0.110)	(0.107)	(0.182)	(0.101)	(0.0873)	(0.353)
2.stratum	-3.033***	-0.801***	0.105	1.503***	0.985***	0.119	-0.233**	-0.348**	-0.139	1.236***	0.0573	0.519***	-0.192*	0.214	0.143	0.129	-0.404
	(0.642)	(0.219)	(0.134)	(0.348)	(0.340)	(0.279)	(0.105)	(0.140)	(0.218)	(0.235)	(0.250)	(0.110)	(0.107)	(0.183)	(0.101)	(0.0875)	(0.354)
3.stratum	-3.471	-2.146**	-0.394	0.384	-1.739	0.254	-0.434	-0.497	0.906	5.951***	-3.688***	2.389***	-0.600	3.409***	1.554***	0.913**	-2.859*
	(2.861)	(0.975)	(0.597)	(1.550)	(1.515)	(1.243)	(0.467)	(0.624)	(0.974)	(1.046)	(1.116)	(0.492)	(0.477)	(0.815)	(0.452)	(0.390)	(1.578)
4.stratum	6.328***	-0.778***	0.340**	-0.901**	-2.239***	-0.889***	0.107	0.0499	0.245	0.0818	0.411	-0.562***	-0.120	-0.0261	-0.173*	-0.00383	-1.655***
	(0.655)	(0.223)	(0.137)	(0.355)	(0.347)	(0.285)	(0.107)	(0.143)	(0.223)	(0.240)	(0.256)	(0.113)	(0.109)	(0.187)	(0.103)	(0.0893)	(0.361)
5.stratum	1.121*	0.425**	0.180	-0.702**	-4.297***	0.519**	-1.365***	-1.231***	2.425***	1.324***	1.086***	-0.176*	0.0489	0.0265	-0.420***	-1.149***	-0.924***
	(0.602)	(0.205)	(0.126)	(0.326)	(0.211)	(0.262)	(0.0829)	(0.131)	(0.136)	(0.220)	(0.235)	(0.104)	(0.0847)	(0.172)	(0.0630)	(0.0822)	(0.332)
6.stratum	0.658	0.0332	0.157	0.212	-4.223***	0.691**	Omitted	-0.192	1.558***	0.169	0.823***	-0.282**		-0.0441	-0.722***	-1.073***	-0.266
	(0.677)	(0.231)	(0.141)	(0.367)	(0.312)	(0.294)		(0.148)	(0.201)	(0.248)	(0.264)	(0.116)		(0.193)	(0.0931)	(0.0923)	(0.373)
7.stratum	Omitted	Omitted	Omitted	Omitted	-4.400***	Omitted	-0.272**	Omitted	1.898***	Omitted	Omitted	Omitted	0.815***	Omitted	-0.666***	Omitted	Omitted
					(0.366)		(0.110)		(0.236)				(0.113)		(0.109)		
Cluster	0.000732	-0.000280	0.000107	0.00184***	0.000261	0.000119	6.70e-05	-0.000537***	-0.00126***	0.000139	-0.000373*	-0.000322***	0.000135	0.000482***	0.000127	-0.000189***	-0.00141***
	(0.000501)	(0.000171)	(0.000105)	(0.000271)	(0.000265)	(0.000217)	(8.17e-05)	(0.000109)	(0.000170)	(0.000183)	(0.000195)	(8.61e-05)	(8.35e-05)	(0.000143)	(7.90e-05)	(6.83e-05)	(0.000276)
2.region	2.795***	-1.155***	-0.344**	-0.986***	Omitted	2.372***	2.505***	2.151***	Omitted	-1.958***	-2.784***	-0.797***	-0.279***	0.338*	Omitted	1.301***	-0.545
	(0.692)	(0.236)	(0.144)	(0.375)		(0.301)	(0.0962)	(0.151)		(0.253)	(0.270)	(0.119)	(0.0984)	(0.197)		(0.0944)	(0.382)
Tobacco	-1.263	-0.286	0.0909	0.450	1.806*	0.0753	-0.108	-0.517	-0.617	0.269	-0.482	0.563*	0.711**	-0.378	-0.0581	-0.215	-0.106
	(1.879)	(0.640)	(0.392)	(1.018)	(0.995)	(0.816)	(0.306)	(0.410)	(0.640)	(0.687)	(0.733)	(0.323)	(0.313)	(0.535)	(0.297)	(0.256)	(1.036)
Cons	-193.5***	-1.703	6.415***	10.51*	96.85***	26.84***	-4.794***	-1.876	-15.28***	93.29***	-14.94***	16.07***	25.92***	17.86***	6.921***	12.01***	29.00***
	(10.11)	(3.445)	(2.110)	(5.475)	(5.353)	(4.390)	(1.649)	(2.206)	(3.441)	(3.697)	(3.944)	(1.738)	(1.686)	(2.879)	(1.595)	(1.378)	(5.575)
Obs.	13,679	13,679	13,679	13,679	13,679	13,679	13,679	13,679	13,679	13,679	13,679	13,679	13,679	13,679	13,679	13,679	13,679
R-squared	0.204	0.098	0.012	0.199	0.176	0.177	0.130	0.147	0.102	0.197	0.037	0.053	0.092	0.185	0.046	0.153	0.037

Table A3: Ordinary least squares (OLS) results, Urban sample

Variable	Food	Alc	Health	Sch	Clothing	Housing	Water	Electricity	Alt. Energ	Daily Tprt	Other Tprt	Equpt	Ent	Tele	Remit	Hse Care	Pers. Cre
d	-2.100***	5.817***	-0.0577	-1.698***	-0.177	-0.683***	-0.181**	-0.329***	0.125	-0.133	0.0649	0.0685	0.107	-0.144	-0.0811	0.00449	-0.807***
	(0.479)	(0.163)	(0.0999)	(0.259)	(0.254)	(0.208)	(0.0781)	(0.104)	(0.163)	(0.175)	(0.187)	(0.0823)	(0.0799)	(0.136)	(0.0756)	(0.0653)	(0.264)
LnM	45.20***	0.614	-1.082***	-4.690***	-11.31***	-3.786***	0.319	-0.546	4.565***	-17.07***	1.639***	-2.767***	-4.557***	-4.033***	-1.356***	-2.384***	-1.027
	(1.564)	(0.533)	(0.326)	(0.847)	(0.828)	(0.679)	(0.255)	(0.341)	(0.532)	(0.572)	(0.610)	(0.269)	(0.261)	(0.445)	(0.247)	(0.213)	(0.863)
LnM2	-2.000***	-0.00970	0.0431***	0.212***	0.391***	0.196***	-0.0113	0.0334**	-0.239***	0.781***	-0.00983	0.123***	0.204***	0.213***	0.0726***	0.115***	-0.00760
	(0.0631)	(0.0215)	(0.0132)	(0.0342)	(0.0334)	(0.0274)	(0.0103)	(0.0138)	(0.0215)	(0.0231)	(0.0246)	(0.0109)	(0.0105)	(0.0180)	(0.00996)	(0.00861)	(0.0348)
Adult prop	-1.082	0.900**	0.284	0.670	0.000281	-0.901*	0.606***	0.970***	-0.442	0.558	-1.090**	0.388*	-0.200	0.437	-0.781***	0.120	-0.780
	(1.222)	(0.417)	(0.255)	(0.662)	(0.648)	(0.531)	(0.199)	(0.267)	(0.416)	(0.447)	(0.477)	(0.210)	(0.204)	(0.348)	(0.193)	(0.167)	(0.674)
loghhsize	-1.642***	-0.159	0.186*	3.715***	1.146***	-1.997***	0.0731	0.259**	0.100	-0.0840	-0.874***	0.525***	-0.262***	-0.123	-0.365***	-0.302***	-0.260
	(0.506)	(0.173)	(0.106)	(0.274)	(0.268)	(0.220)	(0.0826)	(0.110)	(0.172)	(0.185)	(0.198)	(0.0870)	(0.0844)	(0.144)	(0.0799)	(0.0690)	(0.279)
Head Sch	-0.251	-0.219	-0.203*	0.855***	-0.00185	0.132	0.159**	0.322***	-0.292*	-0.201	-0.246	0.143*	-0.0465	0.278**	-0.0629	0.0184	-0.357
	(0.497)	(0.169)	(0.104)	(0.269)	(0.263)	(0.216)	(0.0811)	(0.109)	(0.169)	(0.182)	(0.194)	(0.0855)	(0.0830)	(0.142)	(0.0785)	(0.0678)	(0.274)
Head w age	-0.792**	0.170	-0.246***	0.225	-0.406**	1.834***	-0.145**	0.120	-0.480***	-0.887***	-0.603***	-0.513***	0.0866	0.659***	0.182***	0.0790	1.068***
	(0.355)	(0.121)	(0.0741)	(0.192)	(0.188)	(0.154)	(0.0579)	(0.0775)	(0.121)	(0.130)	(0.139)	(0.0610)	(0.0592)	(0.101)	(0.0560)	(0.0484)	(0.196)
Hhold Emp	-0.00192	0.137**	0.0247	-0.875***	0.246***	-0.0911	-0.0683**	-0.184***	0.0542	0.135**	0.0404	0.0330	0.0540*	0.0951*	0.116***	0.0542**	0.170*
	(0.172)	(0.0587)	(0.0359)	(0.0932)	(0.0912)	(0.0748)	(0.0281)	(0.0376)	(0.0586)	(0.0630)	(0.0672)	(0.0296)	(0.0287)	(0.0490)	(0.0272)	(0.0235)	(0.0949)
Adult Age	2.805**	0.719*	0.932***	-8.238***	0.457	0.905*	-0.120	-0.438	0.657	0.952**	-0.0371	0.548**	0.283	0.459	0.0999	0.359**	-0.587
	(1.253)	(0.427)	(0.262)	(0.679)	(0.664)	(0.544)	(0.204)	(0.273)	(0.427)	(0.458)	(0.489)	(0.215)	(0.209)	(0.357)	(0.198)	(0.171)	(0.691)
Child age	-0.493**	-0.184**	0.00162	2.413***	-0.474***	-0.380***	0.0336	0.193***	-0.288***	-0.0974	-0.123	-0.0359	-0.0125	0.0553	-0.0989***	0.0359	-0.385***
	(0.227)	(0.0774)	(0.0474)	(0.123)	(0.120)	(0.0987)	(0.0371)	(0.0496)	(0.0773)	(0.0831)	(0.0886)	(0.0390)	(0.0379)	(0.0647)	(0.0358)	(0.0310)	(0.125)
Head Age	-2.294**	-1.145***	-0.454*	10.08***	-2.683***	-2.175***	0.641***	0.888***	-0.182	-0.799*	0.651	-0.599***	-0.323*	-0.823**	-0.145	-0.253*	-0.0499
	(1.123)	(0.383)	(0.235)	(0.609)	(0.595)	(0.488)	(0.183)	(0.245)	(0.382)	(0.411)	(0.438)	(0.193)	(0.187)	(0.320)	(0.177)	(0.153)	(0.620)
Most Edu	-2.080***	-0.207	-0.0995	0.463	0.639*	-0.195	0.0938	0.453***	-0.271	-0.431*	-0.127	-0.131	0.00717	0.505***	0.312***	0.181**	0.731**
	(0.640)	(0.218)	(0.134)	(0.347)	(0.339)	(0.278)	(0.104)	(0.140)	(0.218)	(0.234)	(0.250)	(0.110)	(0.107)	(0.182)	(0.101)	(0.0873)	(0.353)
2.stratum	-3.033***	-0.801***	0.105	1.503***	0.985***	0.119	-0.233**	-0.348**	-0.139	1.236***	0.0573	0.519***	-0.192*	0.214	0.143	0.129	-0.404
	(0.642)	(0.219)	(0.134)	(0.348)	(0.340)	(0.279)	(0.105)	(0.140)	(0.218)	(0.235)	(0.250)	(0.110)	(0.107)	(0.183)	(0.101)	(0.0875)	(0.354)
3.stratum	-3.471	-2.146**	-0.394	0.384	-1.739	0.254	-0.434	-0.497	0.906	5.951***	-3.688***	2.389***	-0.600	3.409***	1.554***	0.913**	-2.859*
	(2.861)	(0.975)	(0.597)	(1.550)	(1.515)	(1.243)	(0.467)	(0.624)	(0.974)	(1.046)	(1.116)	(0.492)	(0.477)	(0.815)	(0.452)	(0.390)	(1.578)
4.stratum	6.328***	-0.778***	0.340**	-0.901**	-2.239***	-0.889***	0.107	0.0499	0.245	0.0818	0.411	-0.562***	-0.120	-0.0261	-0.173*	-0.00383	-1.655***
	(0.655)	(0.223)	(0.137)	(0.355)	(0.347)	(0.285)	(0.107)	(0.143)	(0.223)	(0.240)	(0.256)	(0.113)	(0.109)	(0.187)	(0.103)	(0.0893)	(0.361)
5.stratum	1.121*	0.425**	0.180	-0.702**	-4.297***	0.519**	-1.365***	-1.231***	2.425***	1.324***	1.086***	-0.176*	0.0489	0.0265	-0.420***	-1.149***	-0.924***
	(0.602)	(0.205)	(0.126)	(0.326)	(0.211)	(0.262)	(0.0829)	(0.131)	(0.136)	(0.220)	(0.235)	(0.104)	(0.0847)	(0.172)	(0.0630)	(0.0822)	(0.332)
6.stratum	0.658	0.0332	0.157	0.212	-4.223***	0.691**	Omitted	-0.192	1.558***	0.169	0.823***	-0.282**		-0.0441	-0.722***	-1.073***	-0.266
	(0.677)	(0.231)	(0.141)	(0.367)	(0.312)	(0.294)		(0.148)	(0.201)	(0.248)	(0.264)	(0.116)		(0.193)	(0.0931)	(0.0923)	(0.373)
7.stratum	Omitted	Omitted	Omitted	Omitted	-4.400***	Omitted	-0.272**	Omitted	1.898***	Omitted	Omitted	Omitted	0.815***	Omitted	-0.666***	Omitted	Omitted
					(0.366)		(0.110)		(0.236)				(0.113)		(0.109)		
Cluster	0.000732	-0.000280	0.000107	0.00184***	0.000261	0.000119	6.70e-05	-0.000537***	-0.00126***	0.000139	-0.000373*	-0.000322***	0.000135	0.000482***	0.000127	-0.000189***	-0.00141***
	(0.000501)	(0.000171)	(0.000105)	(0.000271)	(0.000265)	(0.000217)	(8.17e-05)	(0.000109)	(0.000170)	(0.000183)	(0.000195)	(8.61e-05)	(8.35e-05)	(0.000143)	(7.90e-05)	(6.83e-05)	(0.000276)
2.region	2.795***	-1.155***	-0.344**	-0.986***	Omitted	2.372***	2.505***	2.151***	Omitted	-1.958***	-2.784***	-0.797***	-0.279***	0.338*	Omitted	1.301***	-0.545
	(0.692)	(0.236)	(0.144)	(0.375)		(0.301)	(0.0962)	(0.151)		(0.253)	(0.270)	(0.119)	(0.0984)	(0.197)		(0.0944)	(0.382)
Tobacco	-1.263	-0.286	0.0909	0.450	1.806*	0.0753	-0.108	-0.517	-0.617	0.269	-0.482	0.563*	0.711**	-0.378	-0.0581	-0.215	-0.106
	(1.879)	(0.640)	(0.392)	(1.018)	(0.995)	(0.816)	(0.306)	(0.410)	(0.640)	(0.687)	(0.733)	(0.323)	(0.313)	(0.535)	(0.297)	(0.256)	(1.036)
Cons	-193.5***	-1.703	6.415***	10.51*	96.85***	26.84***	-4.794***	-1.876	-15.28***	93.29***	-14.94***	16.07***	25.92***	17.86***	6.921***	12.01***	29.00***
	(10.11)	(3.445)	(2.110)	(5.475)	(5.353)	(4.390)	(1.649)	(2.206)	(3.441)	(3.697)	(3.944)	(1.738)	(1.686)	(2.879)	(1.595)	(1.378)	(5.575)
Obs.	13,679	13,679	13,679	13,679	13,679	13,679	13,679	13,679	13,679	13,679	13,679	13,679	13,679	13,679	13,679	13,679	13,679
R-squared	0.204	0.098	0.012	0.199	0.176	0.177	0.130	0.147	0.102	0.197	0.037	0.053	0.092	0.185	0.046	0.153	0.037

Table A4: Ordinary least squares (OLS) results, Rural sample

Variable	Food	Alc	Health	Sch	Clothing	Housing	Water	Electricity	Alt. Energ	Daily Tprt	Other Tprt	Equpt	Ent	Tele	Remit	Hse Care	Pers. Cre
d	-2.614***	6.496***	-0.0801	-1.980***	-0.496	-0.0617	-0.0420	-0.0393	0.0641	-0.175	-0.206	-0.0232	0.0747	-0.233*	-0.153	0.0980	-0.617
	(0.708)	(0.242)	(0.157)	(0.364)	(0.415)	(0.0653)	(0.0328)	(0.0714)	(0.235)	(0.190)	(0.280)	(0.127)	(0.0508)	(0.127)	(0.102)	(0.0600)	(0.402)
LnM	47.84***	1.145	-0.455	-5.487***	-7.228***	-0.707**	-0.227	-2.660***	1.188	-14.84***	-6.296***	-2.753***	-0.645***	-6.657***	-2.479***	-1.727***	1.703
	(3.010)	(1.026)	(0.665)	(1.545)	(1.765)	(0.277)	(0.139)	(0.303)	(0.999)	(0.806)	(1.189)	(0.539)	(0.216)	(0.538)	(0.433)	(0.255)	(1.707)
LnM2	-2.103***	-0.0350	0.0143	0.253***	0.203***	0.0366***	0.0124**	0.125***	-0.0862**	0.694***	0.350***	0.126***	0.0321***	0.322***	0.123***	0.0836***	-0.135*
	(0.130)	(0.0444)	(0.0288)	(0.0669)	(0.0764)	(0.0120)	(0.00603)	(0.0131)	(0.0432)	(0.0349)	(0.0514)	(0.0233)	(0.00934)	(0.0233)	(0.0187)	(0.0110)	(0.0739)
Adult prop	-6.025***	0.634	0.376	2.634**	2.347*	0.226	0.169*	0.317	0.232	0.131	-1.223	0.748**	-0.0171	0.746**	-0.715**	0.347*	-1.798
	(2.113)	(0.720)	(0.467)	(1.085)	(1.239)	(0.195)	(0.0978)	(0.213)	(0.701)	(0.566)	(0.835)	(0.379)	(0.152)	(0.378)	(0.304)	(0.179)	(1.199)
loghhsize	-6.287***	-0.201	0.279	4.642***	2.400***	-0.100	0.0187	-0.0572	-0.0168	0.359	-1.017***	0.905***	0.0270	0.0815	-0.183	-0.100	-0.931*
	(0.844)	(0.288)	(0.187)	(0.433)	(0.495)	(0.0778)	(0.0391)	(0.0851)	(0.280)	(0.226)	(0.333)	(0.151)	(0.0606)	(0.151)	(0.121)	(0.0715)	(0.479)
Head Sch	-0.0733	-0.180	-0.106	0.866**	-0.142	-0.0418	0.0159	0.0895	0.183	-0.0787	-0.440	0.133	0.0230	0.0828	-0.0843	0.132**	-0.572
	(0.713)	(0.243)	(0.158)	(0.366)	(0.418)	(0.0658)	(0.0330)	(0.0719)	(0.237)	(0.191)	(0.282)	(0.128)	(0.0512)	(0.127)	(0.103)	(0.0605)	(0.405)
Head w age	0.948	-0.0647	-0.342*	-0.0772	-0.963**	0.775***	0.0376	0.199**	-0.286	-1.068***	-1.078***	-0.944***	0.194***	0.736***	0.281**	0.237***	1.711***
	(0.812)	(0.277)	(0.179)	(0.417)	(0.476)	(0.0749)	(0.0376)	(0.0819)	(0.270)	(0.218)	(0.321)	(0.146)	(0.0583)	(0.145)	(0.117)	(0.0688)	(0.461)
Hhold Emp	0.373	0.0469	0.0467	-1.026***	0.0679	-0.0187	-0.0378***	-0.0198	0.114	0.0538	0.0370	-0.0134	0.00522	-0.0670	0.0609	0.0185	0.360**
	(0.270)	(0.0922)	(0.0597)	(0.139)	(0.159)	(0.0249)	(0.0125)	(0.0273)	(0.0897)	(0.0724)	(0.107)	(0.0484)	(0.0194)	(0.0483)	(0.0389)	(0.0229)	(0.153)
Adult Age	2.085	0.520	1.029**	-9.334***	1.740	0.0271	-0.00345	0.0757	0.637	0.941*	-0.0974	0.908**	0.0644	0.318	0.120	0.0696	0.582
	(2.043)	(0.696)	(0.451)	(1.049)	(1.198)	(0.188)	(0.0945)	(0.206)	(0.678)	(0.547)	(0.807)	(0.366)	(0.147)	(0.365)	(0.294)	(0.173)	(1.159)
Child age	-0.418	-0.262**	0.0764	2.476***	-0.792***	0.0920***	0.00859	0.0905**	-0.267**	-0.199**	-0.0838	-0.0720	-0.0263	0.0350	-0.126**	0.0654**	-0.365*
	(0.377)	(0.129)	(0.0834)	(0.194)	(0.221)	(0.0348)	(0.0175)	(0.0381)	(0.125)	(0.101)	(0.149)	(0.0676)	(0.0271)	(0.0674)	(0.0543)	(0.0320)	(0.214)
Head Age	-0.923	-0.789	-0.730*	11.26***	-4.551***	-0.303*	-0.0351	-0.0370	-0.740	-0.568	0.476	-1.041***	-0.0410	-0.606*	-0.196	-0.0583	-0.802
	(1.854)	(0.632)	(0.410)	(0.952)	(1.087)	(0.171)	(0.0858)	(0.187)	(0.615)	(0.497)	(0.732)	(0.332)	(0.133)	(0.331)	(0.267)	(0.157)	(1.052)
Most Edu	-1.833**	-0.137	-0.340*	0.0643	1.108**	0.101	-0.0569	0.0346	0.0497	-0.437*	0.0473	-0.0838	-0.0491	0.192	0.221*	-0.0989	1.027**
	(0.900)	(0.307)	(0.199)	(0.462)	(0.528)	(0.0829)	(0.0416)	(0.0907)	(0.299)	(0.241)	(0.355)	(0.161)	(0.0645)	(0.161)	(0.129)	(0.0762)	(0.510)
2.stratum	-2.105***	-0.712***	0.167	1.021***	1.193***	-0.177**	-0.0936***	-0.0986	-0.447*	1.021***	-0.448	0.382***	-0.113**	0.240*	0.0572	0.161**	0.0479
	(0.754)	(0.257)	(0.167)	(0.387)	(0.442)	(0.0695)	(0.0349)	(0.0760)	(0.250)	(0.202)	(0.298)	(0.135)	(0.0541)	(0.135)	(0.108)	(0.0639)	(0.427)
3.stratum	-1.328	-1.968*	-0.191	-0.780	-0.877	0.547*	-0.237	-0.230	-0.153	5.730***	-5.850***	2.010***	0.0555	3.054***	1.209**	1.088***	-1.385
	(3.319)	(1.131)	(0.733)	(1.704)	(1.946)	(0.306)	(0.154)	(0.335)	(1.101)	(0.889)	(1.311)	(0.595)	(0.238)	(0.593)	(0.477)	(0.281)	(1.883)
4.stratum	5.349***	-0.720***	0.383**	-0.699*	-2.116***	0.148**	0.0199	-0.0359	-0.0207	0.187	0.249	-0.502***	-0.0164	-0.0376	-0.196*	0.0424	-1.724***
	(0.758)	(0.258)	(0.167)	(0.389)	(0.444)	(0.0698)	(0.0351)	(0.0764)	(0.252)	(0.203)	(0.299)	(0.136)	(0.0544)	(0.135)	(0.109)	(0.0642)	(0.430)
Cluster	0.00152*	-0.000153	9.15e-05	0.00157***	-0.000110	0.000110	0.000202***	5.90e-05	-0.00196***	0.000536**	-0.000643**	-0.000664***	4.31e-05	2.13e-05	-1.22e-05	7.57e-06	-0.00108**
	(0.000823)	(0.000281)	(0.000182)	(0.000423)	(0.000483)	(7.59e-05)	(3.81e-05)	(8.30e-05)	(0.000273)	(0.000220)	(0.000325)	(0.000148)	(5.91e-05)	(0.000147)	(0.000118)	(6.98e-05)	(0.000467)
Tobacco	-0.158	-0.148	0.0981	0.409	1.670	-0.119	-0.0643	-0.167	-0.750	-0.600	-0.557	0.295	0.396**	-0.409	-0.0628	-0.0660	0.181
	(2.249)	(0.767)	(0.497)	(1.155)	(1.319)	(0.207)	(0.104)	(0.227)	(0.747)	(0.602)	(0.888)	(0.403)	(0.161)	(0.402)	(0.323)	(0.191)	(1.276)
Cons	-204.8***	-4.899	3.656	12.35	74.71***	4.092**	1.125	13.48***	3.934	77.84***	29.71***	15.32***	3.198**	34.24***	13.36***	8.666***	14.05
	(18.03)	(6.145)	(3.983)	(9.255)	(10.57)	(1.661)	(0.834)	(1.818)	(5.982)	(4.827)	(7.119)	(3.230)	(1.293)	(3.221)	(2.592)	(1.528)	(10.23)
Obs.	6,404	6,404	6,404	6,404	6,404	6,404	6,404	6,404	6,404	6,404	6,404	6,404	6,404	6,404	6,404	6,404	6,404
R-squared	0.099	0.111	0.008	0.199	0.069	0.052	0.012	0.046	0.031	0.140	0.057	0.037	0.015	0.140	0.040	0.054	0.025

Table A5: Ordinary least squares (OLS) results, Top 50%

Variable	Food	Alc	Health	Sch	Clothing	Housing	Water	Electricity	Alt. Energ	Daily Tprt	Other Tprt	Equpt	Ent	Tele	Remit	Hse Care	Pers. Cre
d	-0.399	5.026***	-0.128	-1.391***	-0.271	-1.538***	-0.365***	-0.496***	-0.00643	-0.235	0.293	0.163	0.105	0.00432	-0.0501	-0.106	-0.866***
	(0.608)	(0.211)	(0.106)	(0.389)	(0.269)	(0.388)	(0.137)	(0.191)	(0.185)	(0.326)	(0.300)	(0.123)	(0.152)	(0.253)	(0.127)	(0.120)	(0.312)
LnM	18.50***	7.110***	-0.459	-6.857*	-6.134**	15.34***	4.250***	20.89***	-16.59***	-44.25***	3.527	-8.044***	-14.89***	21.53***	2.608**	-0.0103	12.48***
	(6.251)	(2.172)	(1.092)	(3.999)	(2.770)	(3.988)	(1.407)	(1.960)	(1.905)	(3.350)	(3.086)	(1.261)	(1.563)	(2.600)	(1.311)	(1.233)	(3.203)
LnM2	-1.055***	-0.238***	0.0195	0.283*	0.208**	-0.490***	-0.158***	-0.751***	0.531***	1.787***	-0.0884	0.321***	0.583***	-0.720***	-0.0690	0.0276	-0.490***
	(0.226)	(0.0785)	(0.0395)	(0.144)	(0.100)	(0.144)	(0.0508)	(0.0708)	(0.0689)	(0.121)	(0.112)	(0.0456)	(0.0565)	(0.0940)	(0.0474)	(0.0446)	(0.116)
Adult prop	-0.721	0.372	0.492**	0.146	-1.332**	-0.607	0.972***	1.303***	-0.420	1.077	-1.052	0.294	-0.441	0.420	-1.141***	0.0889	0.283
	(1.402)	(0.487)	(0.245)	(0.897)	(0.621)	(0.895)	(0.316)	(0.440)	(0.427)	(0.751)	(0.692)	(0.283)	(0.351)	(0.583)	(0.294)	(0.277)	(0.718)
loghhsize	1.332**	-0.371*	0.00119	3.729***	0.118	-3.008***	0.0870	0.272	0.262	-0.0581	-1.022***	0.349***	-0.457***	-0.282	-0.630***	-0.530***	0.206
	(0.589)	(0.205)	(0.103)	(0.377)	(0.261)	(0.376)	(0.133)	(0.185)	(0.180)	(0.316)	(0.291)	(0.119)	(0.147)	(0.245)	(0.124)	(0.116)	(0.302)
Head Sch	-0.392	-0.604**	-0.516***	1.958***	-0.446	0.368	0.218	0.529**	-0.772***	-0.280	0.0499	0.192	-0.0484	0.483*	-0.0832	-0.0136	-0.372
	(0.683)	(0.237)	(0.119)	(0.437)	(0.303)	(0.436)	(0.154)	(0.214)	(0.208)	(0.366)	(0.337)	(0.138)	(0.171)	(0.284)	(0.143)	(0.135)	(0.350)
Head w age	-0.514	0.176	-0.169***	0.223	0.0818	1.767***	-0.197**	-0.179	-0.375***	-0.635***	-0.839***	-0.458***	0.218**	0.313**	0.107	0.00597	0.839***
	(0.361)	(0.126)	(0.0632)	(0.231)	(0.160)	(0.231)	(0.0813)	(0.113)	(0.110)	(0.194)	(0.178)	(0.0729)	(0.0904)	(0.150)	(0.0758)	(0.0713)	(0.185)
Hhold Emp	-0.190	0.148**	0.0278	-0.878***	0.221**	-0.0969	-0.0915**	-0.237***	0.101	0.137	0.0770	0.0634	0.0607	0.225***	0.182***	0.0825**	0.0937
	(0.204)	(0.0710)	(0.0357)	(0.131)	(0.0906)	(0.130)	(0.0460)	(0.0641)	(0.0623)	(0.110)	(0.101)	(0.0413)	(0.0511)	(0.0850)	(0.0429)	(0.0403)	(0.105)
Adult Age	2.597*	0.461	1.146***	-9.039***	0.623	0.524	0.270	0.207	0.583	1.390*	0.0605	0.503*	0.109	0.319	-0.0468	0.497*	-0.472
	(1.502)	(0.522)	(0.263)	(0.961)	(0.666)	(0.958)	(0.338)	(0.471)	(0.458)	(0.805)	(0.742)	(0.303)	(0.376)	(0.625)	(0.315)	(0.296)	(0.770)
Child age	-0.830***	-0.325***	-0.0416	2.596***	-0.350***	-0.616***	0.0627	0.254***	-0.117	-0.0512	-0.113	0.00317	0.0104	0.0421	-0.141**	0.0131	-0.253*
	(0.278)	(0.0966)	(0.0486)	(0.178)	(0.123)	(0.177)	(0.0626)	(0.0872)	(0.0848)	(0.149)	(0.137)	(0.0561)	(0.0696)	(0.116)	(0.0583)	(0.0549)	(0.143)
Head Age	-3.247**	-0.956**	-0.158	10.71***	-0.886	-3.438***	1.005***	1.157***	-0.185	-1.419**	0.696	-0.249	-0.278	-1.328**	-0.0817	-0.299	-0.801
	(1.314)	(0.456)	(0.230)	(0.840)	(0.582)	(0.838)	(0.296)	(0.412)	(0.400)	(0.704)	(0.649)	(0.265)	(0.328)	(0.546)	(0.275)	(0.259)	(0.673)
Most Edu	-1.662*	-0.264	0.490***	0.250	0.245	-1.179**	0.413**	1.116***	-0.771***	-0.886*	-0.680	-0.276	0.219	1.163***	0.598***	0.581***	0.510
	(0.934)	(0.325)	(0.163)	(0.598)	(0.414)	(0.596)	(0.210)	(0.293)	(0.285)	(0.501)	(0.461)	(0.189)	(0.234)	(0.389)	(0.196)	(0.184)	(0.479)
2.stratum	-4.975***	-0.729**	0.149	1.627***	1.039***	0.728	-0.399**	-0.535*	-0.459*	3.275***	-0.541	1.035***	-0.200	0.538	0.0523	0.309*	-0.770*
	(0.881)	(0.306)	(0.154)	(0.564)	(0.390)	(0.562)	(0.198)	(0.276)	(0.269)	(0.472)	(0.435)	(0.178)	(0.220)	(0.367)	(0.185)	(0.174)	(0.451)
3.stratum	-6.651**	-2.088**	-0.300	-0.0955	-1.303	1.535	-0.490	-0.467	0.401	7.923***	-4.971***	3.380***	-0.540	4.099***	1.797***	1.344**	-3.486**
	(2.785)	(0.968)	(0.487)	(1.782)	(1.234)	(1.777)	(0.627)	(0.873)	(0.849)	(1.493)	(1.375)	(0.562)	(0.696)	(1.159)	(0.584)	(0.549)	(1.427)
4.stratum	4.105***	-0.396	0.0523	-2.788***	-0.818	-1.526**	0.138	-0.111	0.526	0.145	1.234**	-0.0887	-0.105	0.100	-0.240	0.0966	-0.721
	(1.155)	(0.401)	(0.202)	(0.739)	(0.512)	(0.737)	(0.260)	(0.362)	(0.352)	(0.619)	(0.570)	(0.233)	(0.289)	(0.480)	(0.242)	(0.228)	(0.592)
5.stratum	3.348***	0.487**	0.242**	-2.477***	-3.722***	3.671***	1.106***	-1.319***	1.808***	1.865***	-2.754***	-0.669***	0.0829	-0.122	-0.647***	-0.0590	-0.373
	(0.544)	(0.192)	(0.0967)	(0.348)	(0.241)	(0.347)	(0.122)	(0.174)	(0.166)	(0.297)	(0.269)	(0.110)	(0.118)	(0.230)	(0.114)	(0.0931)	(0.284)
6.stratum	3.822***	-0.00836	0.137	-1.885***	-3.596***	3.795***	2.401***	-0.389**	1.054***	0.596*	-2.851***	-0.843***	Omitted	-0.346	-0.985***	Omitted	0.0346
	(0.660)	(0.213)	(0.107)	(0.422)	(0.293)	(0.421)	(0.149)	(0.192)	(0.201)	(0.328)	(0.326)	(0.133)		(0.254)	(0.138)		(0.313)
7.stratum	3.106***	Omitted	Omitted	-1.790***	-3.881***	3.183***	2.287***	Omitted	1.255***	Omitted	-3.556***	-0.642***	0.693***	Omitted	-0.919***	1.124***	Omitted
	(0.732)			(0.468)	(0.324)	(0.467)	(0.165)		(0.223)		(0.361)	(0.148)	(0.153)		(0.154)	(0.121)	
Cluster	-0.000783	-0.000152	8.49e-05	0.00188***	5.79e-05	0.000501	-0.000132	-0.000841***	6.47e-05	0.000200	-0.000530*	0.000121	0.000216	0.000865***	0.000307**	-0.000197*	-0.00175***
	(0.000593)	(0.000206)	(0.000104)	(0.000380)	(0.000263)	(0.000379)	(0.000134)	(0.000186)	(0.000181)	(0.000318)	(0.000293)	(0.000120)	(0.000148)	(0.000247)	(0.000124)	(0.000117)	(0.000304)
Tobacco	-0.101	-1.347	0.0435	0.176	1.254	1.011	-0.279	-0.946	-0.877	0.703	-0.280	0.459	1.083*	-0.403	-0.211	-0.388	0.0650
	(2.615)	(0.909)	(0.457)	(1.673)	(1.159)	(1.668)	(0.588)	(0.820)	(0.797)	(1.401)	(1.291)	(0.528)	(0.654)	(1.088)	(0.548)	(0.516)	(1.340)
Cons	-5.952	-45.76***	-0.0315	25.79	56.72***	-96.77***	-34.65***	-152.8***	131.1***	277.0***	-24.62	49.86***	96.13***	-156.0***	-20.27**	-4.952	-63.85***
	(43.11)	(14.98)	(7.534)	(27.58)	(19.10)	(27.50)	(9.701)	(13.52)	(13.14)	(23.10)	(21.28)	(8.700)	(10.78)	(17.93)	(9.040)	(8.504)	(22.09)
Obs.	7,501	7,501	7,501	7,501	7,501	7,501	7,501	7,501	7,501	7,501	7,501	7,501	7,501	7,501	7,501	7,501	7,501
R-squared	0.259	0.089	0.014	0.200	0.077	0.125	0.093	0.099	0.164	0.191	0.035	0.079	0.092	0.087	0.043	0.100	0.023

Table A6: Ordinary least squares (OLS) results, Bottom 50%

Variable	Food	Alc	Health	Sch	Clothing	Housing	Water	Electricity	Alt. Energ	Daily Tprt	Other Tprt	Equpt	Ent	Tele	Remit	Hse Care	Pers. Cre
d	-3.564***	6.499***	-0.00107	-1.898***	-0.124	0.107	0.0304	-0.0402	0.0625	-0.172*	-0.129	-0.0549	0.0599	-0.141*	-0.109	0.119**	-0.719*
	(0.742)	(0.251)	(0.172)	(0.343)	(0.435)	(0.122)	(0.0718)	(0.0714)	(0.268)	(0.104)	(0.219)	(0.109)	(0.0388)	(0.0855)	(0.0795)	(0.0475)	(0.431)
LnM	32.58***	-0.111	-2.847**	-7.516***	-8.352***	-3.350***	-0.101	-0.196	0.628	-2.195***	-4.528***	2.160***	-0.208	-2.283***	-0.738	-0.0921	1.788
	(5.237)	(1.771)	(1.212)	(2.420)	(3.068)	(0.864)	(0.507)	(0.504)	(1.887)	(0.734)	(1.547)	(0.767)	(0.274)	(0.603)	(0.561)	(0.335)	(3.041)
LnM2	-1.383***	0.0217	0.128**	0.343***	0.251*	0.166***	0.00749	0.00787	-0.0605	0.114***	0.255***	-0.101***	0.0121	0.114***	0.0409	0.00731	-0.139
	(0.240)	(0.0812)	(0.0556)	(0.111)	(0.141)	(0.0396)	(0.0232)	(0.0231)	(0.0866)	(0.0337)	(0.0709)	(0.0352)	(0.0125)	(0.0277)	(0.0257)	(0.0154)	(0.139)
Adult prop	-2.989	1.797**	0.0202	1.039	2.510**	-0.538	0.0126	0.476**	-0.453	-0.203	-0.957	0.519*	0.0790	0.429*	-0.262	0.169	-2.150*
	(2.133)	(0.721)	(0.493)	(0.985)	(1.249)	(0.352)	(0.206)	(0.205)	(0.769)	(0.299)	(0.630)	(0.312)	(0.111)	(0.246)	(0.228)	(0.136)	(1.238)
loghhsize	-5.553***	0.137	0.341*	3.678***	2.454***	-0.442***	-0.0577	0.137	-0.180	-0.0415	-0.650**	0.719***	0.0425	0.0998	0.00317	0.00234	-0.833*
	(0.869)	(0.294)	(0.201)	(0.401)	(0.509)	(0.143)	(0.0841)	(0.0836)	(0.313)	(0.122)	(0.257)	(0.127)	(0.0454)	(0.100)	(0.0930)	(0.0556)	(0.504)
Head Sch	-0.167	0.0340	-0.0381	0.131	0.217	-0.00205	0.0328	-0.00532	0.166	-0.00624	-0.378*	0.131	0.00505	0.0790	-0.0253	0.0240	-0.411
	(0.730)	(0.247)	(0.169)	(0.337)	(0.427)	(0.120)	(0.0706)	(0.0702)	(0.263)	(0.102)	(0.216)	(0.107)	(0.0381)	(0.0840)	(0.0781)	(0.0467)	(0.424)
Head w age	-0.523	0.114	-0.429**	-0.108	-1.812***	0.915***	-0.0815	0.0995	0.401	0.0349	-0.327	-0.237*	0.0113	0.177*	0.137	0.0984*	1.329***
	(0.877)	(0.297)	(0.203)	(0.405)	(0.514)	(0.145)	(0.0849)	(0.0844)	(0.316)	(0.123)	(0.259)	(0.128)	(0.0458)	(0.101)	(0.0939)	(0.0561)	(0.509)
Hhold Emp	0.173	0.127	0.0194	-0.852***	0.285*	-0.0951**	-0.0216	-0.0595**	-0.0146	0.0232	0.0418	-0.0172	0.00518	-0.00216	0.0393	0.0148	0.305*
	(0.287)	(0.0971)	(0.0664)	(0.133)	(0.168)	(0.0473)	(0.0278)	(0.0276)	(0.103)	(0.0402)	(0.0848)	(0.0420)	(0.0150)	(0.0331)	(0.0307)	(0.0184)	(0.167)
Adult Age	3.123	0.873	0.826*	-7.094***	1.161	-0.0984	-0.145	-0.459**	0.883	-0.0938	0.0700	0.677**	0.154	0.476**	0.136	0.105	-0.796
	(2.094)	(0.708)	(0.484)	(0.967)	(1.227)	(0.345)	(0.203)	(0.201)	(0.755)	(0.293)	(0.618)	(0.307)	(0.109)	(0.241)	(0.224)	(0.134)	(1.216)
Child age	-0.0610	-0.0351	0.0508	2.211***	-0.535**	-0.219***	-0.00228	0.0870**	-0.403***	-0.0744	-0.190*	-0.0477	-0.00874	-0.0176	-0.0687*	0.0469**	-0.565***
	(0.365)	(0.124)	(0.0846)	(0.169)	(0.214)	(0.0603)	(0.0354)	(0.0352)	(0.132)	(0.0512)	(0.108)	(0.0535)	(0.0191)	(0.0421)	(0.0391)	(0.0234)	(0.212)
Head Age	-1.819	-1.354**	-0.719	9.143***	-4.677***	-0.345	0.200	0.340*	-0.233	0.433	0.448	-0.886***	-0.149	-0.421*	-0.178	-0.102	0.684
	(1.909)	(0.646)	(0.442)	(0.882)	(1.118)	(0.315)	(0.185)	(0.184)	(0.688)	(0.267)	(0.564)	(0.280)	(0.0997)	(0.220)	(0.204)	(0.122)	(1.108)
Most Edu	-1.776*	-0.289	-0.427**	0.744*	0.570	0.0377	-0.0355	0.128	0.0458	-0.00513	-0.0206	0.0148	-0.0523	0.0684	0.105	-0.0547	0.881*
	(0.914)	(0.309)	(0.212)	(0.422)	(0.536)	(0.151)	(0.0885)	(0.0880)	(0.330)	(0.128)	(0.270)	(0.134)	(0.0478)	(0.105)	(0.0979)	(0.0585)	(0.531)
2.stratum	-1.899**	-0.758**	0.136	0.911**	1.308**	0.0233	-0.0680	-0.0541	-0.342	0.00552	-0.0807	0.292**	-0.0465	0.0162	0.136	0.0965	0.243
	(0.964)	(0.326)	(0.223)	(0.445)	(0.565)	(0.159)	(0.0933)	(0.0927)	(0.347)	(0.135)	(0.285)	(0.141)	(0.0504)	(0.111)	(0.103)	(0.0617)	(0.560)
3.stratum	3.787	-1.351	0.0881	-0.639	0.329	0.119	-0.166	-0.0910	0.348	-0.495	-1.791	-0.742	-0.163	0.942	0.0209	-0.139	0.681
	(7.409)	(2.506)	(1.714)	(3.423)	(4.341)	(1.222)	(0.717)	(0.713)	(2.670)	(1.038)	(2.189)	(1.085)	(0.387)	(0.853)	(0.793)	(0.474)	(4.303)
4.stratum	6.561***	-0.833***	0.455**	-0.422	-2.546***	-0.167	0.0444	0.0265	-0.0239	0.264**	0.00468	-0.683***	-0.0381	-0.0839	-0.149	0.0144	-1.944***
	(0.856)	(0.289)	(0.198)	(0.395)	(0.501)	(0.141)	(0.0828)	(0.0823)	(0.308)	(0.120)	(0.253)	(0.125)	(0.0447)	(0.0985)	(0.0916)	(0.0547)	(0.497)
5.stratum	5.386***	-0.243	-0.261	0.00160	-0.589	0.737*	-1.723***	-0.689***	0.811	0.120	-0.213	0.0666	-0.00719	-0.0608	-0.169	0.0973	-8.009***
	(1.815)	(0.614)	(0.420)	(1.204)	(1.527)	(0.430)	(0.176)	(0.175)	(0.654)	(0.254)	(0.536)	(0.266)	(0.136)	(0.209)	(0.279)	(0.116)	(1.513)
6.stratum	Omitted	Omitted	Omitted	4.094***	-1.703	0.215	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	-0.0635	Omitted	-0.339	Omitted	-6.728***
				(1.419)	(1.800)	(0.507)							(0.161)		(0.329)		(1.784)
7.stratum	-4.032	0.257	-0.420	Omitted	Omitted	Omitted	-2.031***	0.551*	1.345	-0.204	-0.173	0.0507	Omitted	-0.0926	Omitted	0.216	Omitted
	(3.072)	(1.039)	(0.711)				(0.297)	(0.296)	(1.107)	(0.430)	(0.907)	(0.450)		(0.354)		(0.197)	
Cluster	0.00244***	-0.000454	0.000176	0.00173***	0.000500	-0.000224	0.000337***	-0.000123	-0.00285***	5.54e-05	-0.000242	-0.000834***	5.11e-05	4.83e-05	-8.60e-05	-0.000137**	-0.00108**
	(0.000834)	(0.000282)	(0.000193)	(0.000385)	(0.000489)	(0.000138)	(8.07e-05)	(8.03e-05)	(0.000301)	(0.000117)	(0.000246)	(0.000122)	(4.36e-05)	(9.61e-05)	(8.93e-05)	(5.34e-05)	(0.000484)
Tobacco	-2.090	0.431	0.132	0.481	2.248	-0.225	0.0588	-0.0396	-0.787	-0.272	-0.663	0.572	0.402***	-0.243	0.0522	-0.0783	-0.0155
	(2.719)	(0.920)	(0.629)	(1.256)	(1.593)	(0.448)	(0.263)	(0.262)	(0.980)	(0.381)	(0.803)	(0.398)	(0.142)	(0.313)	(0.291)	(0.174)	(1.579)
Cons	-128.4***	1.298	16.89**	25.97*	82.68***	19.82***	0.0166	0.899	5.747	9.452**	20.55**	-10.50**	0.849	10.55***	3.651	0.166	13.48
	(28.93)	(9.785)	(6.695)	(13.37)	(16.95)	(4.771)	(2.800)	(2.784)	(10.43)	(4.054)	(8.546)	(4.237)	(1.512)	(3.332)	(3.098)	(1.851)	(16.80)
Obs.	6,178	6,178	6,178	6,178	6,178	6,178	6,178	6,178	6,178	6,178	6,178	6,178	6,178	6,178	6,178	6,178	6,178
R-squared	0.054	0.110	0.009	0.168	0.103	0.119	0.090	0.032	0.053	0.012	0.024	0.039	0.005	0.017	0.009	0.011	0.024

Table A7: First-stage probit regression results for d

Coefficient on:	**Full Sample**	**Urban**	**Rural**	**Top 50%**	**Bottom 50%**
Proportion of Adult Females	0.895***	1.030***	0.747***	0.786***	1.050***
	(0.101)	(0.145)	(0.143)	(0.153)	(0.159)
Proportion of Adults	0.408**	0.084	0.788***	0.354	0.700**
	(0.172)	(0.245)	(0.246)	(0.248)	(0.289)
Household Size	0.279***	0.148	0.422***	0.131	0.484***
	(0.072)	(0.105)	(0.100)	(0.107)	(0.118)
Head School	-0.058	-0.040	0.062	-0.290***	0.075
	(0.061)	(0.106)	(0.076)	(0.103)	(0.088)
Head Wage Employment	0.083	0.066	0.118	0.060	0.162
	(0.052)	(0.062)	(0.098)	(0.065)	(0.128)
Household Employment	0.056**	0.074**	0.037	0.057	0.042
	(0.025)	(0.036)	(0.034)	(0.036)	(0.040)
Adult Age	0.931***	0.854***	0.996***	0.842***	1.08***
	(0.166)	(0.254)	(0.222)	(0.257)	(0.254)
Child Age	-0.092***	-0.076*	-0.102**	-0.096**	-0.080*
	(0.031)	(0.046)	(0.043)	(0.049)	(0.047)
Household Head Age	-0.407***	-0.308	-0.504**	-0.351	-0.525**
	(0.149)	(0.220)	(0.203)	(0.222)	(0.231)
Most Educated	-0.151*	-0.213	-0.138	-0.133	-0.221**
	(0.079)	(0.144)	(0.095)	(0.149)	(0.108)
Household Type 2	-0.209**	N/A	-0.231**	-0.499***	-0.140
	(0.090)		(0.092)	(0.190)	(0.127)
Household Type 3	-0.288	N/A	-0.351	-0.872*	Omitted
	(0.375)		(0.379)	(0.515)	
Household Type 4	-0.107	N/A	-0.106	0.001	-0.101
	(0.090)		(0.091)	(0.218)	(0.111)
Household Type 5	-0.507	N/A	N/A	0.212	0.413
	(0.757)			(1.290)	(0.770)
Household Type 6	-0.039	-0.558	N/A	-1.620	0.518
	(0.681)	(0.456)		(1.020)	(0.795)
Household Type 7	0.075	-.040	N/A	-0.274	1.370
	(0.560)	(0.468)		(0.765)	(1.070)
Region	Omitted	N/A	N/A	Omitted	Omitted
Tobacco Grow	0.253	0.428	0.220	0.319	0.301
	(0.242)	(0.645)	(0.262)	(0.467)	(0.308)
Observations	**8619**	**4567**	**4052**	**4099**	**3251**

Notes: The table shows results of estimating a probit model for the tobacco smoking status of a household. The dependent variable in the probit is d (the tobacco smoking status of a household). The independent variables include the instrument for d, the adult sex ratio, alongside other control variables as discussed in Section 4. We do not report the coefficient results for the cluster fixed effects because of space considerations. Standard errors are in parenthesis. *, **, *** signify statistical significance at the 10%, 5% and 1% levels respectively. In all data specifications, the adult sex ratio is a strong predictor of whether the household spends on tobacco or not. The F statistic associated with the instrumental variable are equal to 78, 50, 27, 26 and 44 in the full, urban, rural, top 50% and bottom 50% samples respectively

Table A8: First-stage ordinary least squares (OLS) regression results for lnM

Coefficient on:	Full Sample	Urban	Rural	Top 50%	Bottom 50%
Log of Assets	0.232***	0.222***	0.235***	0.190***	0.142***
	(.004)	(0.005)	(.007)	(.005)	(0.006)
Proportion of Adults	0.072	0.054	0.118	0.061	0.060
	(0.046)	(0.054)	(0.080)	(0.049)	(0.072)
Household Size	0.222***	0.196***	0.262***	0.163***	0.239***
	(0.020)	(0.023)	(0.033)	(0.021)	(0.030)
Head School	0.134***	0.201***	0.087***	0.157***	0.056**
	(0.019)	(0.027)	(0.026)	(0.024)	(0.024)
Head Wage Employment	0.220***	0.149***	0.424***	0.103***	0.102***
	(0.014)	(0.014)	(0.032)	(0.013)	(0.031)
Household Employment	0.020***	0.055***	-0.020*	0.041***	-0.013
	(0.007)	(0.009)	(0.012)	(0.008)	(0.011)
Adult Age	-0.179***	-0.021	-0.382***	-0.003	-0.213***
	(0.047)	(0.058)	(0.075)	(0.052)	(0.069)
Child Age	0.040***	0.027***	0.054***	0.015	0.012
	(0.009)	(0.010)	(0.014)	(0.010)	(0.012)
Household Head Age	0.009	-0.079	0.143**	-0.084*	0.024
	(0.042)	(0.051)	(0.069)	(0.045)	(0.063)
Most Educated	0.249***	0.271***	0.224***	0.214***	0.161***
	(0.024)	(0.037)	(0.033)	(0.034)	(0.030)
Household Type 2	0.249***	N/A	0.242**	0.038	0.154***
	(0.026)		(0.030)	(0.038)	(0.033)
Household Type 3	0.833***	N/A	0.828***	0.593***	0.164
	(0.109)		(0.122)	(0.110)	(0.240)
Household Type 4	0.118***	N/A	0.099***	0.105**	0.021
	(0.026)		(0.029)	(0.045)	(0.029)
Household Type 5	Omitted	N/A	N/A	Omitted	Omitted
Household Type 6	Omitted	Omitted	N/A	Omitted	Omitted
Household Type 7	1.160***	Omitted	N/A	1.160***	-0.003
	(0.215)			(0.232)	(0.440)
Region	Omitted	N/A	N/A	Omitted	Omitted
Fixed Effect	F = 11.420***	F= 11.080***	F = 5.700***	F = 4.200***	F = 5.000***
Tobacco Grow	0.119	0.302	0.109	0.158	0.084
	(0.074)	(0.200)	(0.088)	(0.109)	(0.091)
Observations	**13661**	**7276**	**6385**	**7510**	**6151**

Notes: The table shows results of an OLS regression of lnM on its instrumental variable the logarithm of assets and other control variables as discussed in Section 4. Standard errors are in parenthesis. *, **, *** signify statistical significance at the 10%, 5% and 1% levels respectively. We also report the F test for the joint significance of the cluster fixed effects. In all data specifications, the logarithm of the value of household assets explains a substantial proportion of the variation in lnM. The F statistics associated with the instrumental variable are equal to 3364, 1971, 1127, 1444 and 560 in the full, urban, rural, top 50% and bottom 50% samples respectively

Table A9: First-stage ordinary least squares (OLS) regression results for $(\boldsymbol{lnM})^2$

Coefficient on:	Full Sample	Urban	Rural	Top 50%	Bottom 50%
Log of Assets Squared	0.224***	0.216***	0.228***	0.186***	0.132***
	(0.004)	(0.005)	(0.006)	(0.004)	(0.005)
Proportion of Adults	1.760	1.360	2.600	1.440	1.380
	(1.130)	(1.430)	(1.830)	(1.330)	(1.560)
Household Size	5.240***	4.980***	5.730***	4.260***	5.190***
	(0.477)	(0.618)	(0.746)	(0.570)	(0.649)
Head School	3.280***	5.100***	2.030***	4.170***	1.280**
	(0.460)	(0.722)	(0.605)	(0.662)	(0.523)
Head Wage Employment	5.670***	3.930***	10.500***	2.820***	2.370***
	(0.336)	(0.371)	(0.735)	(0.350)	(0.692)
Household Employment	0.608***	1.490***	-0.392	1.150***	-0.264
	(0.175)	(0.232)	(0.266)	(0.207)	(0.242)
Adult Age	-4.020***	-0.281	-8.900***	0.024	-4.680***
	(1.140)	(1.520)	(1.720)	(1.410)	(1.490)
Child Age	0.978***	0.676**	1.290***	0.368	0.288
	(0.211)	(0.276)	(0.324)	(0.265)	(0.267)
Household Head Age	-0.069	-2.410*	3.370*	-2.440**	0.531
	(1.020)	(1.350)	(1.570)	(1.240)	(1.360)
Most Educated	5.720***	6.720***	4.960***	5.490***	3.470***
	(0.024)	(0.974)	(0.762)	(0.924)	(0.654)
Household Type 2	5.390***	N/A	5.360***	0.838	3.280***
	(0.633)		(0.676)	(1.050)	(0.718)
Household Type 3	19.640***	N/A	19.700***	15.100***	2.940
	(2.660)		(2.780)	(3.010)	(5.190)
Household Type 4	2.910***	N/A	2.390***	2.810**	0.480
	(0.628)		(0.661)	(1.220)	(0.633)
Household Type 5	Omitted	N/A	N/A	Omitted	Omitted
Household Type 6	Omitted	Omitted	N/A	Omitted	Omitted
Household Type 7	32.270***	Omitted	N/A	32.300***	0.226
	(5.250)			(6.350)	(9.530)
Region	Omitted	N/A	N/A	Omitted	Omitted
Fixed Effect	F = 10.970***	F= 10.570***	F = 5.600***	F = 4.200***	F = 5.000***
Tobacco Grow	2.870	8.810*	2.480	4.540	1.730
	(1.830)	(5.300)	(0.088)	(2.970)	(1.980)
Constant	92.700***	97.800***	89.400***	110.000***	105.000***
	(2.470)	(3.590)	(3.390)	(3.520)	(2.880)
Observations	**13661**	**7276**	**6385**	**7510**	**6151**

Notes: The table shows results of an OLS regression of $(lnM)^2$ on its instrumental variable, the square of the logarithm of assets and other control variables as discussed in Section 4. Standard errors are in parenthesis. *, **, *** signify statistical significance at the 10%, 5% and 1% levels respectively. We also report the F test for the joint significance of the cluster fixed effects. In all data specifications, the square of the logarithm of the value of household assets explains a substantial proportion of the variation in $(lnM)^2$. The F statistics associated with the instrumental variable are equal to 3136, 1866, 1444, 2162 and 697 in the full, urban, rural, top 50% and bottom 50% samples respectively.

Table A10: Three stage least squares (3LS) results, Full sample

Variable	Food	Alc	Health	Sch	Clothing	Housing	Water	Electricity	Alt. Energ	Daily Tprt	Other Tprt	Equpt	Ent	Tele	Remit	Hse Care	Pers. Cre
d	-5.061***	9.696***	0.0118	-1.975**	-2.665***	-0.366	-0.795***	-0.479	1.788***	0.177	-0.661	0.405	0.398	0.687	0.627**	0.213	-1.566*
	(1.634)	(0.668)	(0.337)	(0.863)	(0.890)	(0.675)	(0.273)	(0.341)	(0.554)	(0.586)	(0.652)	(0.294)	(0.260)	(0.487)	(0.261)	(0.222)	(0.872)
LnM	26.55***	-5.832**	-1.624	-3.557	10.50***	5.881**	-0.754	-4.396***	9.116***	-28.57***	8.146***	-2.838**	-6.110***	0.361	-0.219	-5.036***	-10.06***
	(6.477)	(2.647)	(1.334)	(3.420)	(3.528)	(2.676)	(1.081)	(1.350)	(2.195)	(2.324)	(2.583)	(1.165)	(1.032)	(1.929)	(1.034)	(0.882)	(3.455)
LnM2	-1.360***	0.214**	0.0619	0.195	-0.429***	-0.232**	0.0424	0.233***	-0.435***	1.241***	-0.279***	0.157***	0.266***	0.0806	0.0380	0.230***	0.330**
	(0.250)	(0.102)	(0.0515)	(0.132)	(0.136)	(0.103)	(0.0417)	(0.0521)	(0.0847)	(0.0897)	(0.0997)	(0.0450)	(0.0398)	(0.0745)	(0.0399)	(0.0340)	(0.133)
Adult prop	-3.056*	0.960	0.259	1.307	1.422*	0.726	0.425	-0.241	0.00894	0.911	-0.431	-0.147	-0.168	-0.140	-1.018***	-0.349	-1.620*
	(1.587)	(0.648)	(0.327)	(0.838)	(0.864)	(0.656)	(0.265)	(0.331)	(0.538)	(0.569)	(0.633)	(0.285)	(0.253)	(0.473)	(0.253)	(0.216)	(0.846)
loghhsize	-0.436	-0.0387	0.242*	3.334***	0.746**	-1.192***	-0.0609	-0.349**	-0.0305	-0.0468	-0.566**	0.166	-0.241**	-0.557***	-0.504***	-0.414***	-0.308
	(0.673)	(0.275)	(0.139)	(0.355)	(0.366)	(0.278)	(0.112)	(0.140)	(0.228)	(0.241)	(0.268)	(0.121)	(0.107)	(0.200)	(0.107)	(0.0916)	(0.359)
Head Sch	-0.0615	-0.144	-0.205	1.007***	-0.233	0.521**	0.0512	0.145	-0.281	-0.139	-0.183	0.0811	-0.0557	0.0505	0.0796	-0.170**	-0.415
	(0.616)	(0.252)	(0.127)	(0.325)	(0.336)	(0.255)	(0.103)	(0.128)	(0.209)	(0.221)	(0.246)	(0.111)	(0.0982)	(0.184)	(0.0984)	(0.0839)	(0.329)
Head w age	0.172	0.563***	-0.161	0.160	-0.684***	2.075***	-0.214***	-0.419***	-0.0296	-1.125***	-0.506***	-0.911***	-0.0266	0.168	-0.0235	-0.0524	1.369***
	(0.482)	(0.197)	(0.0992)	(0.254)	(0.262)	(0.199)	(0.0804)	(0.100)	(0.163)	(0.173)	(0.192)	(0.0867)	(0.0767)	(0.143)	(0.0769)	(0.0656)	(0.257)
Hhold Emp	0.195	0.0849	0.0227	-0.815***	0.347***	-0.130	-0.0879**	-0.189***	0.0261	0.0205	0.0264	0.0201	0.0511	0.0152	0.127***	0.0264	0.231**
	(0.215)	(0.0880)	(0.0444)	(0.114)	(0.117)	(0.0890)	(0.0359)	(0.0449)	(0.0730)	(0.0773)	(0.0859)	(0.0387)	(0.0343)	(0.0642)	(0.0344)	(0.0293)	(0.115)
Adult Age	3.111*	-0.0858	0.728**	-8.060***	0.582	1.098*	-0.158	-0.632*	0.592	1.080*	0.228	0.501*	0.399	0.442	-0.205	0.306	-0.620
	(1.598)	(0.653)	(0.329)	(0.844)	(0.870)	(0.660)	(0.267)	(0.333)	(0.541)	(0.573)	(0.637)	(0.287)	(0.255)	(0.476)	(0.255)	(0.218)	(0.852)
Child age	-0.514*	-0.136	0.0591	2.314***	-0.682***	-0.420***	0.00827	0.0746	-0.141	-0.0248	-0.0418	-0.0993*	-0.0211	-0.0132	-0.0881*	-0.0117	-0.290*
	(0.290)	(0.119)	(0.0597)	(0.153)	(0.158)	(0.120)	(0.0484)	(0.0604)	(0.0983)	(0.104)	(0.116)	(0.0522)	(0.0462)	(0.0864)	(0.0463)	(0.0395)	(0.155)
Head Age	-2.565*	-1.031*	-0.338	10.30***	-2.379***	-2.286***	0.650***	0.973***	0.00349	-1.138**	0.588	-0.458*	-0.404*	-0.683	0.0955	-0.149	-0.392
	(1.417)	(0.579)	(0.292)	(0.748)	(0.772)	(0.585)	(0.236)	(0.295)	(0.480)	(0.508)	(0.565)	(0.255)	(0.226)	(0.422)	(0.226)	(0.193)	(0.756)
Most Edu	0.577	0.797**	-0.0221	-0.383	-0.855*	0.333	-0.0856	-0.348*	-0.0197	-0.376	-0.131	-0.711***	0.112	-0.210	-0.0589	0.188	1.239***
	(0.859)	(0.351)	(0.177)	(0.453)	(0.468)	(0.355)	(0.143)	(0.179)	(0.291)	(0.308)	(0.342)	(0.154)	(0.137)	(0.256)	(0.137)	(0.117)	(0.458)
2.stratum	-1.009	-0.364	0.118	0.919**	0.278	0.223	-0.378**	-0.845***	0.102	1.315***	-0.0134	0.190	-0.126	-0.396	-0.00863	0.167	-0.143
	(0.882)	(0.360)	(0.182)	(0.466)	(0.480)	(0.364)	(0.147)	(0.184)	(0.299)	(0.316)	(0.352)	(0.159)	(0.140)	(0.263)	(0.141)	(0.120)	(0.470)
3.stratum	0.767	-1.696	-0.300	-1.769	-3.910*	0.996	-0.967	-2.668***	2.099	6.046***	-3.165**	1.927***	-1.346**	2.346**	2.757***	-0.0135	-1.751
	(3.819)	(1.561)	(0.787)	(2.017)	(2.080)	(1.578)	(0.637)	(0.796)	(1.294)	(1.370)	(1.523)	(0.687)	(0.608)	(1.138)	(0.610)	(0.520)	(2.037)
4.stratum	7.446***	-1.224***	0.275	-0.732*	-2.829***	-0.591*	0.0315	-0.148	0.411	0.0621	0.441	-0.608***	-0.0599	-0.183	-0.171	0.00814	-1.892***
	(0.837)	(0.342)	(0.172)	(0.442)	(0.456)	(0.346)	(0.140)	(0.175)	(0.284)	(0.300)	(0.334)	(0.151)	(0.133)	(0.249)	(0.134)	(0.114)	(0.447)
5.stratum	6.829***	0.723**	-0.203	-2.089***	-0.994**	3.436***	0.788***	0.469**	-0.225	2.423***	0.0315	0.533***	-0.188*	-0.521**	0.286**	0.0197	-1.167***
	(0.683)	(0.364)	(0.141)	(0.360)	(0.485)	(0.282)	(0.114)	(0.186)	(0.302)	(0.320)	(0.355)	(0.128)	(0.109)	(0.203)	(0.142)	(0.0929)	(0.364)
6.stratum	7.302***	0.491	-0.303	-1.621***	-0.599	4.419***	1.894***	1.026***	-0.665**	0.460	-0.0577	Omitted	-0.486***	-0.952***	-0.197	-0.0341	-0.0473
	(0.939)	(0.384)	(0.194)	(0.496)	(0.512)	(0.388)	(0.157)	(0.196)	(0.318)	(0.337)	(0.375)		(0.150)	(0.280)	(0.150)	(0.128)	(0.501)
7.stratum	7.473***	Omitted	-0.373*	-2.226***	Omitted	3.440***	1.226***	Omitted	Omitted	Omitted	Omitted	0.186	0.584***	-0.513	Omitted	0.944***	-0.648
	(1.051)		(0.217)	(0.555)		(0.434)	(0.175)					(0.169)	(0.167)	(0.313)		(0.143)	(0.561)
Cluster	4.06e-05	-0.000462*	-2.43e-05	0.00151***	0.00106***	-0.000324	3.16e-05	-0.000465***	-0.000915***	8.13e-05	-0.000322	-0.000212*	0.000205*	0.000948***	8.82e-05	-0.000210**	-0.00148***
	(0.000660)	(0.000270)	(0.000136)	(0.000348)	(0.000359)	(0.000273)	(0.000110)	(0.000138)	(0.000224)	(0.000237)	(0.000263)	(0.000119)	(0.000105)	(0.000197)	(0.000105)	(8.99e-05)	(0.000352)
Tobacco	-1.426	-0.302	0.146	0.198	2.374*	0.416	-0.152	-0.657	-1.174	0.349	-0.316	0.659	0.562	-0.603	-0.107	-0.359	0.470
	(2.310)	(0.944)	(0.476)	(1.220)	(1.258)	(0.954)	(0.385)	(0.482)	(0.783)	(0.829)	(0.921)	(0.416)	(0.368)	(0.688)	(0.369)	(0.315)	(1.232)
Cons	-70.59*	42.64**	10.27	-0.0729	-43.03*	-31.07*	1.586	19.84**	-43.19***	164.8***	-55.74***	14.00*	35.22***	-12.98	-0.713	27.78***	89.40***
	(41.34)	(16.90)	(8.517)	(21.83)	(22.52)	(17.08)	(6.897)	(8.617)	(14.01)	(14.83)	(16.48)	(7.436)	(6.585)	(12.31)	(6.599)	(5.628)	(22.05)
Obs.	8,555	8,555	8,555	8,555	8,555	8,555	8,555	8,555	8,555	8,555	8,555	8,555	8,555	8,555	8,555	8,555	8,555
R-squared	0.172	0.039	0.015	0.207	0.117	0.153	0.089	0.092	0.078	0.173	0.029	0.002	0.081	0.148	0.030	0.139	0.049

Table A11: Three stage least squares (3LS) results, Urban sample

Variable	Food	Alc	Health	Sch	Clothing	Housing	Water	Electricity	Alt. Energ	Daily Tprt	Other Tprt	Equpt	Ent	Tele	Remit	Hse Care	Pers. Cre
d	-0.728	8.656***	0.267	-2.925*	-2.751**	-1.829	-2.228***	-2.164***	1.251	0.256	-0.249	1.038**	0.817	2.099*	1.490***	-0.417	-1.788
	(2.543)	(1.019)	(0.434)	(1.523)	(1.194)	(1.666)	(0.679)	(0.813)	(0.943)	(1.264)	(1.032)	(0.449)	(0.620)	(1.111)	(0.497)	(0.492)	(1.310)
LnM	32.17**	-7.443	-0.222	-1.429	10.06	16.23*	3.475	13.02***	-12.97***	-53.64***	6.456	-16.27***	-13.08***	27.71***	1.528	-6.976***	4.414
	(13.38)	(5.362)	(2.283)	(8.011)	(6.279)	(8.763)	(3.569)	(4.274)	(4.960)	(6.651)	(5.429)	(2.363)	(3.259)	(5.841)	(2.616)	(2.587)	(6.891)
LnM2	-1.558***	0.270	0.00811	0.123	-0.387*	-0.615*	-0.115	-0.406**	0.368**	2.156***	-0.228	0.652***	0.530***	-0.926***	-0.0273	0.300***	-0.212
	(0.497)	(0.199)	(0.0849)	(0.298)	(0.233)	(0.326)	(0.133)	(0.159)	(0.184)	(0.247)	(0.202)	(0.0878)	(0.121)	(0.217)	(0.0972)	(0.0962)	(0.256)
Adult prop	-2.786	1.330*	0.698**	0.291	0.134	1.452	0.755	-0.0159	-0.400	0.824	-0.326	-0.481	-0.433	0.246	-0.910**	-0.718**	-0.327
	(1.811)	(0.726)	(0.309)	(1.085)	(0.850)	(1.187)	(0.483)	(0.579)	(0.672)	(0.901)	(0.735)	(0.320)	(0.441)	(0.791)	(0.354)	(0.350)	(0.933)
loghhsize	0.986	0.100	0.181	3.019***	0.194	-1.775***	-0.193	-0.499**	0.555*	-0.416	-0.171	-0.0819	-0.432**	-0.862**	-0.701***	-0.517***	0.316
	(0.772)	(0.310)	(0.132)	(0.463)	(0.363)	(0.506)	(0.206)	(0.247)	(0.286)	(0.384)	(0.313)	(0.136)	(0.188)	(0.337)	(0.151)	(0.149)	(0.398)
Head Sch	-1.508*	-0.0825	-0.471***	0.958*	0.332	1.443**	0.0185	0.148	-0.801**	-0.340	0.629*	0.175	-0.121	0.195	-0.0876	-0.581***	0.334
	(0.861)	(0.345)	(0.147)	(0.515)	(0.404)	(0.564)	(0.230)	(0.275)	(0.319)	(0.428)	(0.349)	(0.152)	(0.210)	(0.376)	(0.168)	(0.166)	(0.443)
Head w age	-0.768	0.492***	-0.130	0.280	-0.219	2.004***	-0.245*	-0.521***	0.345*	-0.647***	-0.592***	-0.452***	0.0257	-0.197	-0.0925	-0.0259	1.009***
	(0.476)	(0.191)	(0.0812)	(0.285)	(0.223)	(0.312)	(0.127)	(0.152)	(0.176)	(0.236)	(0.193)	(0.0840)	(0.116)	(0.208)	(0.0930)	(0.0920)	(0.245)
Hhold Emp	0.184	0.174	0.0414	-0.779***	0.489***	-0.265	-0.0769	-0.277***	-0.147	-0.0529	0.0510	-0.0193	0.0458	0.212*	0.167***	0.0323	0.134
	(0.269)	(0.108)	(0.0458)	(0.161)	(0.126)	(0.176)	(0.0717)	(0.0858)	(0.0996)	(0.134)	(0.109)	(0.0475)	(0.0654)	(0.117)	(0.0525)	(0.0520)	(0.138)
Adult Age	2.425	0.291	1.220***	-7.071***	-0.0215	1.228	-0.00510	-0.805	0.793	0.0707	1.009	-0.335	0.276	0.748	-0.0703	0.438	-0.811
	(1.944)	(0.779)	(0.332)	(1.164)	(0.912)	(1.273)	(0.519)	(0.621)	(0.721)	(0.966)	(0.789)	(0.343)	(0.473)	(0.849)	(0.380)	(0.376)	(1.001)
Child age	-0.669**	-0.0655	0.0734	2.247***	-0.251	-0.852***	0.00567	0.0854	-0.179	0.0955	-0.0574	8.93e-05	0.00127	-0.0397	-0.0607	-0.0442	-0.335*
	(0.339)	(0.136)	(0.0578)	(0.203)	(0.159)	(0.222)	(0.0903)	(0.108)	(0.126)	(0.168)	(0.137)	(0.0598)	(0.0825)	(0.148)	(0.0662)	(0.0655)	(0.174)
Head Age	-1.943	-1.515**	-0.494*	9.218***	-1.012	-4.080***	1.285***	1.685***	0.614	-0.959	0.108	0.185	-0.471	-0.978	0.0495	-0.295	-0.466
	(1.663)	(0.666)	(0.284)	(0.996)	(0.780)	(1.089)	(0.444)	(0.531)	(0.616)	(0.827)	(0.675)	(0.294)	(0.405)	(0.726)	(0.325)	(0.322)	(0.857)
Most Edu	0.642	0.935*	0.632***	-0.614	-1.957***	0.501	-0.0719	-1.022**	0.572	0.399	-0.506	-0.577**	0.376	-0.945	0.0981	0.923***	0.208
	(1.320)	(0.529)	(0.225)	(0.791)	(0.620)	(0.865)	(0.352)	(0.422)	(0.490)	(0.656)	(0.536)	(0.233)	(0.322)	(0.577)	(0.258)	(0.255)	(0.680)
6.stratum	0.605	-0.194	-0.145	0.418	-0.177	0.867**	1.017***	0.314	-0.00861	-1.496***	0.0535	-0.456***	-0.338**	-0.736***	-0.459***	-0.0121	0.998***
	(0.609)	(0.244)	(0.104)	(0.364)	(0.286)	(0.399)	(0.162)	(0.194)	(0.226)	(0.303)	(0.247)	(0.108)	(0.148)	(0.266)	(0.119)	(0.118)	(0.314)
7.stratum	0.969	-0.667**	-0.194	-0.208	0.188	-0.0293	0.474**	-0.335	0.349	-2.444***	0.157	-0.584***	0.510***	0.217	-0.238	0.946***	0.794**
	(0.780)	(0.313)	(0.133)	(0.467)	(0.366)	(0.511)	(0.208)	(0.249)	(0.289)	(0.388)	(0.317)	(0.138)	(0.190)	(0.341)	(0.153)	(0.151)	(0.402)
Cluster	-6.31e-05	-0.000805**	-6.62e-05	0.00223***	0.00132***	-0.000579	-9.52e-05	-0.000744***	-0.00141***	-0.000657	-0.000180	-0.000111	0.000306	0.00202***	0.000340**	-0.000424***	-0.000835**
	(0.000814)	(0.000326)	(0.000139)	(0.000488)	(0.000382)	(0.000534)	(0.000217)	(0.000260)	(0.000302)	(0.000405)	(0.000331)	(0.000144)	(0.000198)	(0.000356)	(0.000159)	(0.000158)	(0.000420)
Tobacco	-5.535	-2.021	-0.0399	0.139	0.204	5.689	-0.282	-2.401	-0.0952	8.740***	-0.0992	0.924	-1.625	-0.789	-0.570	-1.648	-0.596
	(5.483)	(2.198)	(0.936)	(3.283)	(2.573)	(3.592)	(1.463)	(1.752)	(2.033)	(2.726)	(2.225)	(0.968)	(1.335)	(2.394)	(1.072)	(1.060)	(2.824)
Cons	-102.5	53.77	-1.252	-15.47	-51.80	-91.47	-28.46	-98.24***	106.6***	337.3***	-46.53	103.2***	81.30***	-197.1***	-13.23	40.99**	-7.869
	(89.15)	(35.73)	(15.21)	(53.38)	(41.84)	(58.40)	(23.79)	(28.48)	(33.05)	(44.32)	(36.18)	(15.75)	(21.71)	(38.92)	(17.43)	(17.24)	(45.92)
Obs.	4,545	4,545	4,545	4,545	4,545	4,545	4,545	4,545	4,545	4,545	4,545	4,545	4,545	4,545	4,545	4,545	4,545
R-squared	0.308	0.016	0.012	0.199	-0.024	0.074	-0.000	-0.016	0.139	0.149	0.011	-0.052	0.079	0.017	-0.004	0.107	0.018

Table A12: Three stage least squares (3LS) results, Rural sample

Variable	Food	Alc	Health	Sch	Clothing	Housing	Water	Electricity	Alt. Energ	Daily Tprt	Other Tprt	Equpt	Ent	Tele	Remit	Hse Care	Pers. Cre
d	-7.086***	10.06***	-0.0644	-1.662	-2.836**	0.134	-0.119	0.132	2.205***	0.305	-0.761	0.195	0.220	0.0606	0.279	0.390**	-1.116
	(2.250)	(0.928)	(0.507)	(1.084)	(1.328)	(0.177)	(0.111)	(0.221)	(0.733)	(0.563)	(0.884)	(0.423)	(0.157)	(0.410)	(0.303)	(0.192)	(1.227)
LnM	29.76**	-5.094	-1.309	-7.040	29.17***	-0.363	-0.680	-7.627***	10.64**	-27.50***	3.892	1.252	-0.300	-9.989***	-2.699	-5.397***	-17.28**
	(13.60)	(5.612)	(3.062)	(6.555)	(8.029)	(1.072)	(0.670)	(1.337)	(4.434)	(3.405)	(5.346)	(2.557)	(0.948)	(2.477)	(1.833)	(1.158)	(7.420)
LnM2	-1.509***	0.186	0.0479	0.334	-1.253***	0.0169	0.0316	0.342***	-0.455**	1.243***	-0.0827	0.00403	0.0184	0.483***	0.142*	0.248***	0.627**
	(0.562)	(0.232)	(0.127)	(0.271)	(0.332)	(0.0443)	(0.0277)	(0.0553)	(0.183)	(0.141)	(0.221)	(0.106)	(0.0392)	(0.102)	(0.0758)	(0.0479)	(0.307)
Adult prop	-3.440	0.352	-0.307	3.064**	3.230*	0.0386	0.137	0.108	-0.145	0.0463	-0.456	-0.251	-0.100	0.404	-1.044***	0.0162	-2.989*
	(2.801)	(1.156)	(0.631)	(1.350)	(1.654)	(0.221)	(0.138)	(0.275)	(0.913)	(0.701)	(1.101)	(0.527)	(0.195)	(0.510)	(0.378)	(0.238)	(1.528)
loghhsize	-2.397**	-0.211	0.252	4.012***	1.381**	-0.111	0.0335	-0.0745	-0.904**	0.163	-0.928**	0.314	-0.0553	-0.0476	-0.304*	-0.272***	-1.012
	(1.160)	(0.479)	(0.261)	(0.559)	(0.685)	(0.0914)	(0.0571)	(0.114)	(0.378)	(0.290)	(0.456)	(0.218)	(0.0809)	(0.211)	(0.156)	(0.0987)	(0.633)
Head Sch	0.714	-0.178	-0.0753	1.131***	-0.499	-0.0411	0.0187	0.0716	0.0457	0.000993	-0.630*	0.0611	0.00795	-0.0596	0.172	0.0699	-0.900*
	(0.889)	(0.367)	(0.200)	(0.429)	(0.525)	(0.0701)	(0.0438)	(0.0874)	(0.290)	(0.223)	(0.350)	(0.167)	(0.0620)	(0.162)	(0.120)	(0.0757)	(0.485)
Head w age	3.689***	0.752	-0.307	-0.453	-0.961	0.694***	-0.0221	-0.429***	-0.179	-2.103***	-0.542	-1.816***	0.161*	0.155	0.0611	-0.145	1.802***
	(1.239)	(0.511)	(0.279)	(0.597)	(0.732)	(0.0977)	(0.0610)	(0.122)	(0.404)	(0.310)	(0.487)	(0.233)	(0.0864)	(0.226)	(0.167)	(0.105)	(0.676)
Hhold Emp	0.308	0.0113	0.0145	-0.919***	0.201	-0.0324	-0.0424**	-0.0141	0.142	-0.0194	-0.00448	-0.00382	0.0204	-0.104*	0.0853*	0.0111	0.415**
	(0.345)	(0.142)	(0.0777)	(0.166)	(0.204)	(0.0272)	(0.0170)	(0.0339)	(0.112)	(0.0864)	(0.136)	(0.0649)	(0.0241)	(0.0628)	(0.0465)	(0.0294)	(0.188)
Adult Age	4.534*	-0.505	0.268	-9.295***	1.276	-0.189	0.0615	0.140	0.781	1.447**	-0.389	1.049**	0.168	0.366	-0.349	0.127	-0.0461
	(2.594)	(1.070)	(0.584)	(1.250)	(1.532)	(0.204)	(0.128)	(0.255)	(0.846)	(0.649)	(1.020)	(0.488)	(0.181)	(0.473)	(0.350)	(0.221)	(1.415)
Child age	-0.454	-0.229	0.0464	2.425***	-1.036***	0.0906**	0.00217	0.0621	-0.124	-0.162	-0.0376	-0.180**	-0.0172	-1.71e-05	-0.125*	0.0258	-0.288
	(0.482)	(0.199)	(0.109)	(0.232)	(0.285)	(0.0380)	(0.0238)	(0.0474)	(0.157)	(0.121)	(0.190)	(0.0907)	(0.0336)	(0.0879)	(0.0650)	(0.0411)	(0.263)
Head Age	-3.800	-0.467	-0.0967	11.46***	-3.467**	-0.184	-0.0692	-0.112	-0.778	-0.958	0.968	-0.856*	-0.0900	-0.540	0.188	-0.00158	-0.650
	(2.360)	(0.974)	(0.531)	(1.138)	(1.393)	(0.186)	(0.116)	(0.232)	(0.769)	(0.591)	(0.928)	(0.444)	(0.165)	(0.430)	(0.318)	(0.201)	(1.288)
Most Edu	0.383	0.734	-0.349	-0.351	-0.210	0.199**	-0.0624	-0.0818	-0.232	-0.645**	0.0767	-0.660***	0.0235	0.0154	-0.157	-0.192*	1.772***
	(1.189)	(0.491)	(0.268)	(0.573)	(0.702)	(0.0937)	(0.0586)	(0.117)	(0.388)	(0.298)	(0.467)	(0.224)	(0.0829)	(0.217)	(0.160)	(0.101)	(0.649)
2.stratum	-0.329	-0.360	0.183	0.678	1.218**	-0.0920	-0.140***	-0.363***	-0.405	0.441*	-0.266	-0.118	-0.106	-0.0838	-0.101	0.0790	0.0723
	(1.022)	(0.422)	(0.230)	(0.493)	(0.604)	(0.0806)	(0.0504)	(0.101)	(0.333)	(0.256)	(0.402)	(0.192)	(0.0713)	(0.186)	(0.138)	(0.0870)	(0.558)
3.stratum	3.143	-1.660	-0.161	-2.600	0.947	-0.163	-0.380	-1.697***	0.561	3.621***	-4.558**	1.460	-0.396	2.008**	2.252***	-0.265	-2.215
	(4.897)	(2.021)	(1.103)	(2.360)	(2.891)	(0.386)	(0.241)	(0.481)	(1.596)	(1.226)	(1.925)	(0.921)	(0.341)	(0.892)	(0.660)	(0.417)	(2.672)
4.stratum	6.490***	-1.250***	0.306	-0.497	-2.670***	0.232***	0.0320	-0.0190	0.0312	0.119	0.282	-0.543***	0.00700	-0.0707	-0.185	0.0480	-1.990***
	(0.978)	(0.403)	(0.220)	(0.471)	(0.577)	(0.0771)	(0.0482)	(0.0961)	(0.319)	(0.245)	(0.384)	(0.184)	(0.0682)	(0.178)	(0.132)	(0.0832)	(0.534)
Cluster	0.000155	-0.000148	0.000110	0.000732	0.00120*	8.32e-05	0.000257***	0.000160	-0.000872**	0.000311	-0.000583	-0.000476**	6.53e-05	0.000269	-0.000166	-2.49e-05	-0.00203***
	(0.00110)	(0.000454)	(0.000248)	(0.000530)	(0.000649)	(8.67e-05)	(5.42e-05)	(0.000108)	(0.000359)	(0.000275)	(0.000432)	(0.000207)	(7.67e-05)	(0.000200)	(0.000148)	(9.36e-05)	(0.000600)
Tobacco	-0.476	0.00740	0.196	0.0420	2.289	-0.0673	-0.0486	-0.0584	-1.489	-1.058	-0.428	0.319	0.730***	-0.445	-0.0619	-0.133	0.782
	(2.852)	(1.177)	(0.642)	(1.375)	(1.684)	(0.225)	(0.140)	(0.280)	(0.930)	(0.714)	(1.121)	(0.536)	(0.199)	(0.520)	(0.384)	(0.243)	(1.556)
Cons	-86.05	37.97	9.890	19.81	-148.1***	2.999	3.715	42.16***	-55.06**	150.7***	-30.94	-13.04	0.836	51.66***	14.14	29.34***	133.4***
	(81.69)	(33.71)	(18.39)	(39.37)	(48.23)	(6.439)	(4.024)	(8.031)	(26.63)	(20.45)	(32.11)	(15.36)	(5.695)	(14.88)	(11.01)	(6.954)	(44.57)
Obs.	4,010	4,010	4,010	4,010	4,010	4,010	4,010	4,010	4,010	4,010	4,010	4,010	4,010	4,010	4,010	4,010	4,010
R-squared	0.040	0.055	0.010	0.211	-0.013	0.046	0.013	-0.004	-0.022	0.095	0.053	-0.053	0.012	0.111	0.052	0.023	0.035

Table A13: Three stage least squares (3LS) results, Top 50%

Variable	Food	Alc	Health	Sch	Clothing	Housing	Water	Electricity	Alt. Energ	Daily Tprt	Other Tprt	Equpt	Ent	Tele	Remit	Hse Care	Pers. Cre
d	-4.275*	8.672***	0.769*	-0.735	0.661	-2.760*	-2.187***	-1.684*	-3.045***	0.388	0.191	1.949***	0.451	3.861***	2.050***	-1.114**	-3.148**
	(2.504)	(1.068)	(0.447)	(1.609)	(1.143)	(1.611)	(0.600)	(0.874)	(0.843)	(1.363)	(1.269)	(0.520)	(0.636)	(1.199)	(0.573)	(0.522)	(1.246)
LnM	-55.32	-32.12*	-4.884	34.84	45.86***	24.40	9.749	71.36***	-83.32***	-100.2***	27.83	-22.37***	-15.31	117.1***	22.85***	-12.56	7.759
	(38.68)	(16.50)	(6.907)	(24.84)	(17.65)	(24.88)	(9.270)	(13.49)	(13.01)	(21.04)	(19.60)	(8.026)	(9.826)	(18.52)	(8.853)	(8.067)	(19.24)
LnM2	1.572	1.152*	0.176	-1.199	-1.663***	-0.931	-0.335	-2.488***	2.887***	3.849***	-1.003	0.882***	0.607*	-4.127***	-0.788**	0.501*	-0.331
	(1.392)	(0.594)	(0.249)	(0.894)	(0.636)	(0.896)	(0.334)	(0.486)	(0.468)	(0.758)	(0.706)	(0.289)	(0.354)	(0.667)	(0.319)	(0.290)	(0.693)
Adult prop	-4.022**	-0.0406	0.664*	0.619	0.00958	2.163*	0.857*	0.422	-0.295	1.320	-0.615	-0.174	-0.494	0.479	-1.273***	-0.655	0.477
	(1.950)	(0.832)	(0.348)	(1.253)	(0.890)	(1.255)	(0.468)	(0.680)	(0.656)	(1.061)	(0.988)	(0.405)	(0.496)	(0.934)	(0.446)	(0.407)	(0.970)
loghhsize	0.992	-0.314	0.0912	3.792***	-0.341	-1.582***	-0.133	-0.498*	0.926***	-0.145	-0.889**	0.0886	-0.520**	-0.653*	-0.784***	-0.576***	0.407
	(0.822)	(0.351)	(0.147)	(0.528)	(0.375)	(0.529)	(0.197)	(0.287)	(0.276)	(0.447)	(0.416)	(0.171)	(0.209)	(0.393)	(0.188)	(0.171)	(0.409)
Head Sch	-0.587	-0.275	-0.558***	2.103***	-0.121	1.342**	-0.300	0.0292	-0.671**	-0.204	0.704	0.167	-0.175	0.129	0.0747	-0.610***	-0.610
	(0.918)	(0.392)	(0.164)	(0.589)	(0.419)	(0.590)	(0.220)	(0.320)	(0.309)	(0.499)	(0.465)	(0.190)	(0.233)	(0.439)	(0.210)	(0.191)	(0.456)
Head w age	-0.00822	0.626***	-0.0699	0.174	-0.0315	1.677***	-0.159	-0.765***	0.259	-0.813***	-0.968***	-0.591***	0.0901	-0.210	-0.149	-0.0320	1.102***
	(0.519)	(0.221)	(0.0927)	(0.333)	(0.237)	(0.334)	(0.124)	(0.181)	(0.175)	(0.282)	(0.263)	(0.108)	(0.132)	(0.248)	(0.119)	(0.108)	(0.258)
Hhold Emp	0.268	0.0887	-0.00529	-0.765***	0.224*	-0.0554	-0.102	-0.218**	-0.0628	-0.130	0.125	-0.0894	0.0669	0.134	0.199***	0.00181	0.226*
	(0.273)	(0.117)	(0.0488)	(0.176)	(0.125)	(0.176)	(0.0655)	(0.0953)	(0.0920)	(0.149)	(0.139)	(0.0567)	(0.0694)	(0.131)	(0.0626)	(0.0570)	(0.136)
Adult Age	1.627	-0.370	0.907**	-8.260***	0.233	2.254*	0.331	-0.0613	0.324	0.464	0.813	-0.252	0.406	1.034	-0.199	0.680	0.00803
	(2.094)	(0.893)	(0.374)	(1.345)	(0.956)	(1.347)	(0.502)	(0.730)	(0.705)	(1.139)	(1.061)	(0.435)	(0.532)	(1.003)	(0.479)	(0.437)	(1.042)
Child age	-0.693*	-0.372**	0.0878	2.461***	-0.323*	-0.931***	-0.00535	0.0739	-0.0605	0.0618	-0.136	0.0636	0.0117	-0.0355	-0.106	-0.0392	-0.125
	(0.378)	(0.161)	(0.0676)	(0.243)	(0.173)	(0.244)	(0.0907)	(0.132)	(0.127)	(0.206)	(0.192)	(0.0785)	(0.0962)	(0.181)	(0.0866)	(0.0789)	(0.188)
Head Age	-1.466	-0.467	-0.0989	10.37***	-0.688	-4.865***	0.988**	1.405**	0.283	-1.416	1.052	-0.0371	-0.524	-1.685**	0.0981	-0.444	-2.007**
	(1.780)	(0.760)	(0.318)	(1.144)	(0.813)	(1.146)	(0.427)	(0.621)	(0.599)	(0.969)	(0.902)	(0.369)	(0.452)	(0.852)	(0.408)	(0.371)	(0.885)
Most Edu	-0.422	0.886	0.699***	-0.745	-0.968	0.559	0.132	-0.935*	0.690	-1.075	-0.765	-0.783***	0.325	-0.522	0.0270	1.097***	0.857
	(1.410)	(0.602)	(0.252)	(0.906)	(0.644)	(0.907)	(0.338)	(0.492)	(0.475)	(0.767)	(0.715)	(0.293)	(0.358)	(0.675)	(0.323)	(0.294)	(0.701)
2.stratum	-0.781	-0.0353	0.130	-0.144	-0.440	0.868	-0.755**	-1.377***	-0.469	3.188***	-1.472**	1.092***	-0.144	0.0147	0.0622	0.392	-0.531
	(1.395)	(0.595)	(0.249)	(0.896)	(0.637)	(0.898)	(0.334)	(0.487)	(0.469)	(0.759)	(0.707)	(0.290)	(0.354)	(0.668)	(0.319)	(0.291)	(0.694)
3.stratum	-3.452	-1.526	-0.500	-2.182	-2.171	2.234	-1.498	-3.409**	2.490*	10.42***	-4.609**	1.446*	-1.546	0.192	4.135***	0.836	-1.447
	(4.233)	(1.806)	(0.756)	(2.719)	(1.932)	(2.724)	(1.015)	(1.477)	(1.424)	(2.303)	(2.145)	(0.879)	(1.076)	(2.027)	(0.969)	(0.883)	(2.105)
4.stratum	6.751***	-0.818	-0.395	-2.698**	-0.973	-1.061	-0.205	-0.913	0.412	0.930	1.230	0.0256	-0.136	-0.685	-0.547	-0.0292	-1.283
	(1.793)	(0.765)	(0.320)	(1.151)	(0.818)	(1.153)	(0.430)	(0.625)	(0.603)	(0.975)	(0.909)	(0.372)	(0.455)	(0.858)	(0.410)	(0.374)	(0.892)
5.stratum	4.150***	0.751**	0.240	-2.938***	-0.425	3.980***	-0.630***	0.0342	0.474	3.340***	-3.294***	0.762***	-0.672***	-0.914**	0.517***	-0.937***	-0.379
	(0.896)	(0.381)	(0.159)	(0.576)	(0.407)	(0.577)	(0.214)	(0.311)	(0.300)	(0.485)	(0.454)	(0.185)	(0.227)	(0.427)	(0.150)	(0.186)	(0.444)
6.stratum	6.136***	0.537	0.0967	-2.781***	-0.315	4.697***	0.347	0.00885	0.319	1.699***	-3.257***	0.275	-0.964***	-1.954***	Omitted	-0.964***	0.394
	(1.105)	(0.418)	(0.175)	(0.710)	(0.447)	(0.711)	(0.235)	(0.342)	(0.330)	(0.533)	(0.560)	(0.203)	(0.249)	(0.469)		(0.204)	(0.487)
7.stratum	4.991***	Omitted	Omitted	-2.641***	Omitted	4.305***	Omitted	Omitted	Omitted	Omitted	-2.732***	Omitted	Omitted	Omitted	0.402*	Omitted	Omitted
	(1.171)			(0.752)		(0.753)					(0.593)				(0.224)		
Cluster	-0.000351	-0.000321	8.99e-06	0.00189***	0.000239	-8.75e-05	-0.000402**	-0.00103***	0.000177	0.000430	-0.000318	-0.000149	0.000463**	0.00129***	0.000305	-0.000239	-0.00178***
	(0.000810)	(0.000345)	(0.000145)	(0.000520)	(0.000370)	(0.000521)	(0.000194)	(0.000282)	(0.000272)	(0.000441)	(0.000410)	(0.000168)	(0.000206)	(0.000388)	(0.000185)	(0.000169)	(0.000403)
Tobacco	-5.837	-2.723*	0.139	4.676*	5.820***	0.402	-0.493	-0.488	-0.834	1.160	0.288	-0.750	-0.445	0.599	-0.428	-1.257	0.548
	(3.739)	(1.595)	(0.668)	(2.401)	(1.706)	(2.405)	(0.896)	(1.304)	(1.258)	(2.034)	(1.895)	(0.776)	(0.950)	(1.790)	(0.856)	(0.780)	(1.859)
Cons	504.6*	226.5**	30.70	-265.3	-300.4**	-148.9	-73.30	-506.5***	595.5***	659.1***	-190.8	144.5***	97.51	-818.9***	-161.3***	79.15	-27.35
	(266.7)	(113.8)	(47.62)	(171.3)	(121.7)	(171.6)	(63.92)	(93.00)	(89.72)	(145.1)	(135.1)	(55.34)	(67.74)	(127.7)	(61.04)	(55.62)	(132.6)
Obs.	4,092	4,092	4,092	4,092	4,092	4,092	4,092	4,092	4,092	4,092	4,092	4,092	4,092	4,092	4,092	4,092	4,092
R-squared	0.248	0.005	-0.002	0.193	-0.004	0.080	0.015	-0.089	-0.040	0.147	0.013	-0.066	0.081	-0.144	-0.040	0.064	0.017

Table A14: Three stage least squares (3LS) results, Bottom 50%

Variable	Food	Alc	Health	Sch	Clothing	Housing	Water	Electricity	Alt. Energ	Daily Tprt	Other Tprt	Equpt	Ent	Tele	Remit	Hse Care	Pers. Cre
d	-6.315***	8.989***	-0.113	-2.096**	-3.174**	0.571**	-0.0950	0.114	2.204***	-0.325	1.504**	-1.136***	0.174	-0.218	0.196	0.464***	-0.517
	(2.235)	(0.956)	(0.505)	(0.935)	(1.411)	(0.269)	(0.209)	(0.0825)	(0.774)	(0.227)	(0.635)	(0.373)	(0.134)	(0.338)	(0.226)	(0.155)	(1.318)
LnM	121.9	12.01	-24.29	-36.87	76.27	-5.299	-5.798	-0.699	12.44	-10.64	6.245	8.403	2.540	-48.22***	-5.151	-7.765	-105.8**
	(90.30)	(38.62)	(20.42)	(37.79)	(57.03)	(10.88)	(8.427)	(3.334)	(31.26)	(9.173)	(25.64)	(15.07)	(5.413)	(13.64)	(9.125)	(6.282)	(53.26)
LnM2	-5.659	-0.615	1.104	1.704	-3.383	0.219	0.270	0.0346	-0.525	0.500	-0.260	-0.293	-0.113	2.216***	0.253	0.364	4.607*
	(4.067)	(1.739)	(0.920)	(1.702)	(2.568)	(0.490)	(0.380)	(0.150)	(1.408)	(0.413)	(1.155)	(0.679)	(0.244)	(0.614)	(0.411)	(0.283)	(2.399)
Adult prop	-5.380*	2.127	-0.473	3.263**	4.006**	0.105	0.469	-0.0831	0.331	0.107	-1.505*	-0.0485	0.134	0.518	-0.501	-0.00480	-3.479*
	(3.175)	(1.358)	(0.718)	(1.329)	(2.005)	(0.383)	(0.296)	(0.117)	(1.099)	(0.323)	(0.902)	(0.530)	(0.190)	(0.480)	(0.321)	(0.221)	(1.873)
loghhsize	-2.866**	0.305	0.0263	2.983***	2.192**	-0.102	0.0399	-0.0597	-0.948**	-0.0833	-0.565	0.127	0.0436	-0.0192	-0.162	-0.194**	-0.830
	(1.350)	(0.577)	(0.305)	(0.565)	(0.852)	(0.163)	(0.126)	(0.0498)	(0.467)	(0.137)	(0.383)	(0.225)	(0.0809)	(0.204)	(0.136)	(0.0939)	(0.796)
Head Sch	0.247	-0.0462	0.00404	0.364	0.113	-0.0997	0.0454	0.0307	0.0938	0.0582	-0.670**	0.221	0.0487	0.0203	0.164	0.00402	-0.719
	(1.003)	(0.429)	(0.227)	(0.420)	(0.633)	(0.121)	(0.0936)	(0.0370)	(0.347)	(0.102)	(0.285)	(0.167)	(0.0601)	(0.151)	(0.101)	(0.0698)	(0.591)
Head w age	3.269*	1.034	-0.851**	-1.584**	-1.685	1.057***	-0.288	-0.0749	1.011	-0.238	-0.146	-0.795**	-0.0448	-0.645**	-0.0133	-0.0809	0.279
	(1.913)	(0.818)	(0.433)	(0.801)	(1.208)	(0.230)	(0.179)	(0.0706)	(0.662)	(0.194)	(0.543)	(0.319)	(0.115)	(0.289)	(0.193)	(0.133)	(1.128)
Hhold Emp	0.377	0.0333	0.0412	-0.876***	0.363	-0.0524	-0.0441	-0.0206	0.00809	-0.0191	-0.00695	0.0704	0.0227	-0.0511	0.0332	0.0563**	0.182
	(0.404)	(0.173)	(0.0914)	(0.169)	(0.255)	(0.0487)	(0.0377)	(0.0149)	(0.140)	(0.0411)	(0.115)	(0.0675)	(0.0242)	(0.0611)	(0.0409)	(0.0281)	(0.239)
Adult Age	3.846	-0.0246	0.690	-6.085***	0.853	-0.0956	0.119	-0.101	1.123	-0.0955	-1.011	1.042**	0.230	0.515	-0.253	-0.0507	-0.876
	(2.958)	(1.265)	(0.669)	(1.238)	(1.868)	(0.356)	(0.276)	(0.109)	(1.024)	(0.300)	(0.840)	(0.494)	(0.177)	(0.447)	(0.299)	(0.206)	(1.744)
Child age	-0.419	-0.0726	0.0859	2.093***	-0.785**	-0.0717	0.0465	0.00953	-0.229	0.0238	-0.173	-0.117	-0.0118	0.0177	-0.0603	0.0331	-0.300
	(0.510)	(0.218)	(0.115)	(0.214)	(0.322)	(0.0615)	(0.0476)	(0.0188)	(0.177)	(0.0518)	(0.145)	(0.0852)	(0.0306)	(0.0771)	(0.0516)	(0.0355)	(0.301)
Head Age	-2.080	-1.172	-0.493	8.790***	-3.334**	-0.553*	-0.119	0.147	-0.656	0.189	1.024	-0.720	-0.176	-0.613	0.156	0.143	-0.230
	(2.684)	(1.148)	(0.607)	(1.123)	(1.695)	(0.323)	(0.251)	(0.0991)	(0.929)	(0.273)	(0.762)	(0.448)	(0.161)	(0.405)	(0.271)	(0.187)	(1.583)
Most Edu	0.348	0.632	-0.462	0.295	-0.988	0.365**	-0.167	-0.0529	-0.638	-0.111	0.257	-0.776***	-0.0204	-0.0598	-0.171	-0.181*	2.207***
	(1.349)	(0.577)	(0.305)	(0.564)	(0.852)	(0.162)	(0.126)	(0.0498)	(0.467)	(0.137)	(0.383)	(0.225)	(0.0808)	(0.204)	(0.136)	(0.0938)	(0.795)
2.stratum	-0.172	-0.314	-0.267	0.0449	1.367	0.185	-0.158	-0.0268	-0.445	-0.179	-0.0521	-0.190	-0.00530	-0.167	0.0917	0.123	0.311
	(1.468)	(0.628)	(0.332)	(0.614)	(0.927)	(0.177)	(0.137)	(0.0542)	(0.508)	(0.149)	(0.417)	(0.245)	(0.0880)	(0.222)	(0.148)	(0.102)	(0.866)
4.stratum	7.913***	-1.282**	0.277	-0.260	-3.089***	-0.113	0.0504	0.0195	-0.337	0.0775	0.329	-0.786***	-0.00306	-0.0934	-0.164	0.106	-2.297***
	(1.191)	(0.509)	(0.269)	(0.498)	(0.752)	(0.143)	(0.111)	(0.0440)	(0.412)	(0.121)	(0.338)	(0.199)	(0.0714)	(0.180)	(0.120)	(0.0828)	(0.702)
5.stratum	2.650	1.951	-2.033	-2.579	2.457	-0.899	-0.831	0.261	-2.195	0.372	0.376	0.571	0.102	-1.012	0.131	0.209	-12.39***
	(5.697)	(2.436)	(1.725)	(3.193)	(4.819)	(0.686)	(0.532)	(0.210)	(1.972)	(0.579)	(2.167)	(1.273)	(0.457)	(1.152)	(0.576)	(0.396)	(4.500)
6.stratum	-12.53	0.929	Omitted	Omitted	Omitted	-2.992***	1.499*	0.0562	-0.570	-0.118	Omitted	Omitted	Omitted	Omitted	-0.261	-0.180	Omitted
	(9.305)	(3.979)				(1.121)	(0.868)	(0.344)	(3.221)	(0.945)					(0.940)	(0.647)	
7.stratum	Omitted	Omitted	-2.522	-3.648	3.612	Omitted	Omitted	Omitted	Omitted	Omitted	-0.448	0.379	0.00357	-1.893	Omitted	Omitted	-8.530
			(2.104)	(3.894)	(5.876)						(2.642)	(1.553)	(0.558)	(1.405)			(5.488)
Cluster	0.00163	-0.000594	-0.000171	0.000616	0.00255***	-0.000334**	0.000404***	3.14e-06	-0.00171***	-0.000140	-0.00103***	-0.000422*	7.02e-05	5.21e-05	-0.000238*	-0.000126	-0.00183**
	(0.00130)	(0.000558)	(0.000295)	(0.000546)	(0.000824)	(0.000157)	(0.000122)	(4.82e-05)	(0.000451)	(0.000132)	(0.000370)	(0.000218)	(7.82e-05)	(0.000197)	(0.000132)	(9.07e-05)	(0.000769)
Tobacco	-1.553	0.687	0.368	-1.488	2.875	-0.106	0.108	-0.0180	-1.849	-0.230	-0.258	1.164**	0.678***	-0.221	0.141	-0.0640	0.0618
	(3.483)	(1.490)	(0.788)	(1.458)	(2.200)	(0.420)	(0.325)	(0.129)	(1.206)	(0.354)	(0.989)	(0.581)	(0.209)	(0.526)	(0.352)	(0.242)	(2.054)
Cons	-598.1	-53.45	134.7	182.1	-408.3	34.03	30.76	3.469	-66.59	56.23	-33.44	-55.80	-14.54	261.2***	27.06	41.34	623.7**
	(500.9)	(214.2)	(113.2)	(209.6)	(316.3)	(60.34)	(46.74)	(18.49)	(173.4)	(50.88)	(142.2)	(83.58)	(30.02)	(75.65)	(50.62)	(34.85)	(295.4)
Obs.	3,212	3,212	3,212	3,212	3,212	3,212	3,212	3,212	3,212	3,212	3,212	3,212	3,212	3,212	3,212	3,212	3,212
R-squared	-0.001	0.058	-0.017	0.154	-0.070	0.094	0.038	0.000	-0.003	-0.027	0.003	-0.209	-0.004	-0.581	-0.003	-0.078	-0.085