Religiosity and household income in Sekhukhune

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Abstract

Literature analysing the interrelation of religion and economic performance suggests religion to explain differences in household income. Religious communities foster economically conducive attitudes and are important sources of social capital, particularly under weak economic structures. This paper targets at investigating effects of religiosity on rural household income using survey data from Greater Sekhukhune in the Limpopo Province of South Africa. Using insights from religious studies within a conceptual framework of rural household decision-making, the authors estimate an income equation that includes measures for religious affiliation. While church membership per se does not reveal a significant effect on household income, the results show a positive and robust relationship for membership in the Zion Christian Church and the practice of African traditional religion.

Keywords: rural households; religion; household income; Zion Christian Church; African traditional religion

JEL codes: O12; O15; Q12; Z12

Word count: 6887

1. Introduction

Recent literature concludes that research on differences in economic performance must account for political, social and cultural factors (Barro & McCleary, 2003; Selinger, 2004). Related to this broad view on determinants of economic success in general, various studies have emphasized the role of religion (cf. de Jong, 2011). The research thus far does not yield unanimous conclusions and likely, no general answer exists. This may be because effects of religion on economic success vary across religious communities and different contexts.

Religiosity – the degree to which religion[1] is relevant in daily life – can be argued to affect economic performance through its intrinsic dimension (beliefs, norms, ethics) and social dimension (social capital). Most economic research on religion and economic performance relies on Weber's (1920) notion of the Protestant Ethic to undergird empirical work: Weber suggests that by penetrating all spheres of every-day life, intrinsic religiosity changes believers' behaviour in economically favourable ways. While Weber's hypothesis has been debated for many years, the recent boom of African Initiated Churches (AICs)[2], also known as 'African Reformation' (Anderson, 2001), imposes new contemporary relevance on this topic: These churches foster a similarly intensive religiosity as Weber saw it in early modern Protestantism (Meyer, B, 2004). Against this backdrop, the question arises whether AICs produce effects comparable to those initially noted by Weber.

Religious studies' research has put forward strong arguments in favour of an economically conducive role of AICs in South Africa, especially Pentecostal-Charismatic churches. However, many of these studies predominantly base their analyses on qualitative research

[1] Extending Iannaccone's (1998) definition, we define religion as any shared set of beliefs, activities, organisations and institutions premised on faith in supernatural forces that affect the adherents' lives and are worshipped.

[2] AICs are characterised by the contextual relevance of the spiritual in believers' lives. Following Anderson (2000) the term is understood here as including both Zionist/Apostolic churches as well as Pentecostal-Charismatic churches.

while quantitative-econometric substantiation is lacking (e.g., Meyer, LER, 2004, Schlemmer 2008, Mafuta 2010). With this paper, we aim at contributing to closing this gap. Our objective is to investigate potential effects of religiosity on economic success. We carry out a case study to quantify whether the religiosity fostered by AICs in South Africa is conducive to economic success by econometric techniques. We hypothesize that in rural South Africa religiosity positively influences the household's economic situation and therefore reflects in higher household income. We expand the existing literature by providing a micro-level case study on a specific and limited context, the former Fetakgomo Municipality[3] in the Greater Sekhukhune District of the Limpopo Province. The results contribute to the understanding of the determinants of household income in South Africa's rural north by highlighting the role of religion.

Due to their highly diverse religious landscape, the rural areas of northern South Africa provide an excellent setting for this case study. In Fetakgomo Municipality, questions on the determinants of economic success seem particularly pertinent: As a South African poverty node and part of the former Lebowa homeland[4], the municipality has a weak economic base (Drimie et al., 2009; StatsSA, 2016). We hence expect social capital effects of religion to be particularly relevant. Moreover, the municipality offers a diverse religious landscape: Members of various AICs and mainline churches[5] live in this region, along with people practicing African traditional religion (ATR) and nonreligious persons. At the same time, the area is relatively homogeneous in terms of economic development, sociodemographic composition and culture: It is entirely rural, incoming migration is low and 94% of the population belong to the Bapedi cultural group (StatsSA, 2016). Limiting the scope to this

[3] Fetakgomo Municipality was merged with Greater Tubatse Municipality in 2016. It had a population of 93 795 in 22 851 households (StatsSA, 2016).
[4] One of 10 'self-governing' areas based on the ethnic segregation of the black South African population during Apartheid.
[5] That is, churches emanating from a European or North American mission background.

area allows us to focus on the contextually relevant categories of religion and to narrow down the possibility of unobserved factors that may confound empirical identification. We draw on insights from theology and religious studies about the mechanisms through which religiosity transmits to economic performance. Our empirical analysis is based on a conceptual framework sketching the role of religion in household decision-making – a desideratum highlighted, inter alia, by de Jong (2011). With respect to its intrinsic dimension, religiosity changes economic attitudes and constitutes emotional support. In its social dimension, religion constitutes a social capital-type resource and therefore directly relates to income.

Using data from a household survey[6] conducted in 2011, we estimate a household income equation within a log-linear regression model, where we relate income to contextual categories of religious affiliation and practice. To hedge against misspecification, we carry out several robustness checks. We employ a Heckman-type approach (cf. Heckman, 1979) to test for potential selectivity biases arising from unobserved variables confounding measured impacts of religiosity and self-selection into religiosity.

The remainder of this paper is organised as follows. Section 2 provides an overview of the state of the art, followed by a description of the dataset (section 3). Section 4 outlines the analytical and empirical approaches, followed by the presentation and discussion of the results (section 5). The final section concludes.

2. Background and literature review

2.1 Economic research on religion and economic success

Economic research has investigated economic effects of religion both at the macro and micro levels. At the macroeconomic level, studies have examined the effect on economic growth

[6] We present a description of sampling and data collection in supplementary appendix A/2.

and development caused by religious fragmentation (Montalvo & Reynal-Querol, 2003), the shares of different religions (Noland, 2005) or aggregated indicators of belief and practice from large-scale surveys (Barro & McCleary, 2003; Mangeloja, 2005). Analysing the impact of religion at the microeconomic level, the effects of religious affiliation and behaviour on income (Bettendorf & Dijkgraaf, 2010, 2011; Lipford & Tollison, 2003) and economic attitudes (Guiso et al., 2003; Brañas-Garza et al., 2009) have been investigated.[7]

These results, however, are highly ambiguous and no general conclusions can be drawn based on this research (cf. de Jong, 2011). While Barro & McCleary (2003) show a positive effect of belief and a negative effect of religious practice, Bettendorf & Dijkgraaf (2010) conclude that religious affiliation has a positive effect in high-income countries, while a negative one is found for low-income countries. Where Bettendorf & Dijkgraaf (2011) find a negative effect of Islam, Noland (2005) shows Islam's effect to be nonnegative. Most economic studies on the relationship of religion and economic performance use cross-country or cross-regional datasets. This entails the inevitable implicit assumption that the religious categories used as explanatory variables are homogeneous. Thus, context-specific characteristics of religions are not taken into account. Moreover, empirical findings might suffer from unobserved heterogeneity such as geographical, institutional and cultural differences across countries (Guiso et al., 2003).

2.2 Insights on religion and economic success from theology and religious studies

In religious studies, it has been criticised (e.g. de Jong, 2011) that most of the economic research fails to lay open the transmission mechanisms and impact pathways through which religion affects economic performance. Literature from theology and religious studies may offer detailed explanations for identified effects in economic research. Most prominently,

[7] In supplementary appendix A/1 we provide an overview table presenting recent micro-level studies.

Weber (1920) argues along the lines of an effect of religion's intrinsic dimension: religion facilitated a change in the attitudes and behaviour of the adherents of early modern Protestant denominations. Thus, their religious ethics promoted the development of capitalism. However, these Protestant ethics only developed because of an increase in the 'ecclesiastic-religious domination of life' brought about by the reformation (Weber, 1920; authors' translation). According to Weber, the increase of the relevance of religion in every-day life, that is, an increase in religiosity, was the prerequisite for an impact of religion on economic behaviour.

Another aspect of intrinsic religiosity is emotional support through religion (cf. Mangeloja, 2005). As Cilliers & Wepener (2007) argue, religious beliefs constitute a system of values, norms, identity and transcendence that provide 'spiritual endurance'. It increases believers' resilience against adverse circumstances and external shocks, such as the death of a family member, natural catastrophes, criminal acts and poverty (cf. Masondo, 2014). This is highly relevant in contexts of high adversity, such as the poverty-stricken rural areas of South Africa.

Religiosity also affects economic success through its social dimension, which constitutes social capital – a resource that has economic returns (Knack & Keefer, 1997; Woolcock & Narayan, 2000). The literature suggests, first, that religious networks provide a form of risk mitigation (Dehejia et al., 2007). Second, networks reduce transaction costs (Coleman, 1988; Woolcock & Narayan, 2000). Third, they provide club goods (Coleman, 1988). Mafuta (2010) shows this for the example of the South African Zion Christian Church (ZCC), which organizes savings groups, provides insurance schemes and conducts entrepreneurship trainings for its members. In principal, these functions are not limited to religious social capital. However, the role of religious social capital could be argued to be unique because of

the high degree of trust and cohesion these networks command, which is constantly created and (re-)affirmed through religious ritual (Cilliers & Wepener, 2007). Moreover, religious communities constitute the largest social networks in many developing countries.

Recent research on AICs in South Africa has highlighted that today more than half of the country's population are members of an AIC (cf. Öhlmann et al., 2016). Many of these churches foster high religiosity in both the intrinsic and the social dimension. They actively engage in the economic upliftment of their members and many of the more Pentecostal AICs preach a gospel of wealth, portraying the economic success of their members as divine promise (Cross et al., 1993; Schlemmer, 2008; Heuser, 2015). Regarding the economic effects of AICs, Garner (2000) and Dickow (2012) show a high upward social mobility of their members. Mafuta (2010) and Meyer (LER, 2004) find positive economic effects for specific denominations.

3. Case study Fetakgomo Municipality: dataset and descriptives

The dataset stems from a household survey conducted in Fetakgomo Municipality. Supplementary appendix A/2 provides a description of the data collection process. The survey questionnaire can be found in supplementary appendix B. We take the household head's religiosity as proxy of the entire household's religiosity, measured by affiliation with a certain type of church (Apostolic, mainline, Pentecostal-Charismatic, ZCC, St. Engenas ZCC and other churches)[8], and the practice of ATR. Church membership and traditional religion are not mutually exclusive. All these religious communities foster different intensities and forms of religiosity. Moreover, we have information on two religious core dimensions according to

[8] Of the specific church categories, all but mainline churches can be classified as either Pentecostal-type or Pentecostal AICs (Anderson, 2000).

Huber & Huber (2012): public practice (worship attendance) and private practice (prayer frequency).

In order to measure household income, both formal and informal sector income as well as the implicit monetary value of agricultural subsistence production must be considered. We rely on a livelihood strategy based approach. That is, households were asked for any income-generating activities of their members and their respective monetary returns. In the case of agricultural subsistence production, monetary values were imputed. Field crop production was valued by the average quantity harvested per year, livestock and livestock products by the number/quantity produced per year and firewood by the quantity gathered. Horticultural production was valued by the area under cultivation.

Table 1

As reported in Table 1, monthly income ranges from ZAR 305 (US$ 44) to ZAR 32 735 (US$ 4676) with the mean at ZAR 4356 (US$ 622).[9] Agriculture is the most important income source, followed by social grants and informal (self-)employment. Roughly half of the households receive remittances and only a fifth of all households have formal income at all. In terms of the mean returns, formal income is the most important income source with R 8085 (US$ 1155). Social grants and informal income are almost equally important with mean returns of R 1417 (US$ 170) and R 1190 (US$ 202), respectively (cf. Table 1).

Table 2

[9] US$ equivalent calculated based on an exchange rate at the time of data collection of US$ 1 = ZAR 7. Figures rounded to nearest US$ 1.

In terms of household characteristics, we consider a dummy variable for a female household head (*gender*), the age of the household head (*age*), the number of household members (*size*) and the share of household members below and above working age (*s_child* and *s_pens*, respectively). The majority of the households (64%) are headed by women. Mean age of heads is 55 years (cf. Table 2) and more than half of the household members are either children (45%) or pensioners (14%).

The distance to the nearest tar road (*road*) and the distance to the nearest larger shop (*shop*) in kilometres capture the degree of remoteness and reflect the weak economic structures of the area. On average, households are located 3.5 kilometres away from the next tar road and nearly 20 kilometres away from the next supermarket. Human capital, as measured by the school and tertiary education of the household head (*school* and *tertiary*), offers insights in educational disadvantages. The majority of the household heads in the dataset have not completed primary education. Schooling of other household members at working age (*school_o*), the number of additional household members who completed a learnership (*learn*) or academic education (*acad*) show the educational levels of the other household members, predominantly children who have not yet moved out of the household. We also consider a dummy variable for the existence of a clinic in the village (*clinic*) to proxy the household's health status. Finally, to retrieve information on social capital we consider the number of groups the household is a member of (*groups*), such as burial societies or village committees, and by the proximity to the local chief (*chief*).

Mean income and mean religiosity indicators show substantial differences between religious groups (cf. Table 3). Household income of mainline church adherents is twice as high as the average in the dataset and correlated with the highest educational levels. Indicators of

religiosity are higher in all AICs than in mainline churches. However, religiosity seems to be highest among members of Zionist churches. Members of the ZCC reported the highest prayer frequency, more than twice a day on average, and attend more congregational activities than members of all other churches. Although church membership and ATR are not mutually exclusive, the two variables are negatively correlated with a correlation coefficient of –0.64.

Table 3

4. Analytical framework

4.1 Religion and household decision-making

In order to investigate the impact of religion on economic success[10] at household level, we draw on Becker's (1965) model of household production and Low's (1986) model of deficit-producing households in Southern Africa. This approach assumes one common household utility function and takes into account the allocation of time – a key factor influenced by religion. The household allocates time in accordance with its preferences for so-called z-goods. Such z-good is 'the seeing of a play, which depends on the input of actors, script, theatre and the playgoer's time; another is sleeping, which depends on the input of a bed, house (pills?) and time' (Becker, 1965). These goods are produced by the household according to a household production function with market goods and time as inputs. If the household prefers z-goods that require a larger share of market good inputs (such as a satellite dish) the household will allocate more time on wage labour. If the household prefers time-intensive z-goods (such as social activities), less household time will be allocated to wage labour.

Religion enters the framework in three ways. First, it is a human and social capital-type asset (Narayan & Pritchett, 1999) increasing the market-earning potential of the household members. Second, religion is a z-good – that is, it yields utility and potentially decreases the time allocated to wage labour. Third, religion changes the household's preferences and the structure of the household's utility function, as it alters the relative valuation of z-goods. This is an economic description of the Weberian argument presented above. Such shift in preferences affects the household's economic decision-making through the allocation of the

[10] In the context considered here, economic success is not to imply vast wealth. In many cases the issue is survival, not prosperity (Garner 2004).

household members' time. One household might diversify the income portfolio through agricultural activities, while another one might not.

In principal, an alteration of the utility function because of religiosity can increase or decrease the time allocated to wage labour and subsistence good production and hence has an ambiguous effect on the household's overall income. Based on the religious studies research cited in section 2, we expect religiosity to shape preferences in such a way that labour supply in subsistence production and the formal and informal labour markets is increased. Furthermore, we assume that the sum of the effects described is positive and therefore religiosity increases household income.

4.2 Empirical strategy

To identify and quantify potential effects of religiosity on household income we resort to the following income equation (cf. Glewwe, 1991) as a basis for our empirical model. We include religiosity as additional variables on the right-hand side measured by church membership and ATR practice.

$$income_i = F\left(\boldsymbol{a}_i, \boldsymbol{g}_i, \boldsymbol{hc}_i, \boldsymbol{sc}_i, \boldsymbol{r}_i, \boldsymbol{e}_i\right), \quad (1)$$

where $\boldsymbol{a}_i$ is a vector of household characteristics, $\boldsymbol{g}_i$ a vector of geographical characteristics, $\boldsymbol{hc}_i$ a vector of human capital characteristics, $\boldsymbol{sc}_i$ a vector of social capital characteristics, $\boldsymbol{r}_i$ a vector of religiosity characteristics of household *i*. Symbol $\boldsymbol{e}_i$ denotes an error term. Since we assume land for subsistence production to be non-scarce (Low 1986), it is not included in (1).

To estimate the income equation we use a natural logarithmic transformation of the dependent variable *income*. Aside from moving the distribution of the outcome variable closer to normal distribution, it is likely that the independent variables have exponential effects. For example,

education would not increase income by a certain amount, but rather by a certain percentage, as there are various other factors influencing the outcome at the same time. Dummy variables account for the membership in one of the six church categories and the practice of traditional religion. The finally estimated empirical model is given by:

$$\begin{aligned}\ln(income_i) = {} & \beta_0 + \beta_1 gender_i + \beta_2 age_i + \beta_3 size_i + \beta_4 s\_child_i + \beta_5 s\_pens_i + \beta_6 road_i + \beta_7 shop_i \\ & + \beta_8 school_i + \beta_9 tertiary_i + \beta_{10} school\_o_i + \beta_{11} learn_i + \beta_{12} acad_i + \beta_{13} clinic_i \\ & + \beta_{14} group_i + \beta_{15} chief_i + \beta_{16} mainline_i + \beta_{17} zcc_i + \beta_{18} engenas_i + \beta_{19} apostolic_i \\ & + \beta_{20} charismatic_i + \beta_{21} other_i + \beta_{22} atr_i + e_i\end{aligned} \quad (2)$$

Symbol β_0 denotes the intercept, where $\beta_1 \ldots \beta_{22}$ denote the coefficients to be estimated. For a description of the variables, we refer to section 3.1 and table 2. We use an ordinary least squares estimator. In order to check for robustness, we also employ non-linear version of (2), showing similar results. Given the relatively small sample at hand, we opt for the linear model.

The question arises, however, whether correlations identified using (2) can be interpreted as causal effects. As the data is non-experimental (that is, assignment of households to religious categories is not random, but by the choice of the household head), our empirical estimates may potentially suffer from selectivity issues. Unobserved heterogeneity may affect both, household income, and the decision to join a certain religious group. This could lead to biased estimates of the coefficients in (2) (cf. Cameron & Trivedi, 2005:868). To address this issue, we test for selection bias using a Heckman (1979) two-step procedure (cf. Cameron & Trivedi, 2005 and supplementary appendix A/3 for further details).[11]

[11] We cannot entirely rule out the possibility of a reverse relation in the sense that higher income directly affects religiosity, particularly in the ZCC. Given the case study's aim to present first insights with a rather small sample at hand, we cannot address this issue here. Larger samples with at least a repeated cross section structure would be desirable in this context.

5. Results

In Table 4/I we present the estimation results of the log-linear income equation (2). The adjusted R^2 of 0.48 indicates that the model explains nearly half the variation in household income. Eight of the coefficients are significant at least at the 5% level, four of those at the 1% level (see table 4). The sociodemographic characteristics reveal signs of the coefficients in line with the expectations and common results from household surveys. The negative coefficient of *gender* indicates that female-headed households have lower income. Positive coefficients of *age* and *size* show that household income increases with the age of the household head and the number of household members, respectively. Geographical factors seem to play a subordinate role, which we conjecture to be due to the relatively small geographic area covered. The positive coefficients of three of the human capital variables resonate well with human capital theory. The number of school years (*school*) and tertiary qualifications (*tertiary*) completed by the household head is positively related to income, so are the tertiary qualifications of the other household members (*acad*). Neither of the two social capital variables has a significant coefficient.

Two of the religion dummy variables, ZCC and ATR, have significant positive coefficients. Household income is higher when the household head is a member of ZCC or practices ATR.[12] Not only are their coefficients statistically significant, their size indicates substantial economic significance as well. In order to quantify the magnitude of these coefficients, one can re-transform the model as given in (2). Membership in the ZCC increases income by the factor $e^{0.469} = 1.598$, practice of ATR by the factor $e^{0.314} = 1.369$. On average, members of ZCC and those practicing ATR have 59.8% and 36.9% higher household income, respectively. This constitutes amounts of roughly R 2600 and R 1600 when looking at the

[12] The fact that none of the other religion dummies has a significant coefficient does not necessarily mean that these groups do not have an effect. This could also be due to the low number of observations in these categories.

mean household income of R 4356 in the dataset. In the Greater Sekhukhune District, as a poor economic context, these amounts constitute substantial differences to rural households.

Table 4

As a robustness check, we run the same model with only one dummy variable for membership in any church (cf. table 4/II). The non-significant coefficient of *church* indicates that church membership per se is not significantly correlated with household income when correcting for the other factors in the regression. The identified correlation from model (2) (cf. table 4/I) points to specific church categories affecting household income. As these church categories both indicate specific sets of theological tenets and specific levels of intrinsic and social religiosity (cf. table 3), we conjecture the relationship contingent on these tenets and levels of religiosity. The fact that ZCC and ATR, which constitute two very distinct belief systems, are positively related to income might indicate that levels of religiosity are more decisive than theological tenets. While we cannot fully discern this based on the data at hand, it would be consistent with the theoretical framework outlined above. The more intense religiosity is in the social dimension, the more likely it is to constitute social capital. The more intense it is in the intrinsic dimension, the more likely that it actually does alter preferences.

In order to substantiate our hypothesis of a potentially causal relationship of ZCC and ATR on household income, we use the Heckman two-step procedure to test for potential selection effects (cf. supplementary appendix A/3 where we detail the procedure). The first stage probit estimations for *zcc*, we identify *chief* and *school_o* from the probit estimation as two variables fulfilling the exclusion restriction of being uncorrelated with the outcome variable except through their correlation with *zcc* (cf. table 5, both coefficients significantly different from

zero at the 5% level). The probability of being a member of ZCC is higher for those household heads related to the chief and decreases with the number of school years completed by the additional adult household members. At the same time, both variables are uncorrelated with household income when correcting for membership in the ZCC (table 4/I).

Table 5

We conjecture that in the case of *chief* this has to do with the status of ZCC as a majority church and the fact that their theology includes elements of traditional belief systems. This includes healing, prophecy, a positive relationship with one's ancestors and protection powers against evil spirits (Anderson 2000; Mokgobi, 2014). Tradition is particularly relevant in the context of traditional royal courts. It can be assumed that people in this context (relatives, members of the court etc., as captured in the variable *chief*) are likely to join a church that makes reference to these beliefs. ZCC would be a preferred choice compared to other AICs because of its reputation of granting spiritual protection and because of its immense size indicating its power. At the same time, it is credible that the relationship to the chief itself does not affect household income. While the traditional authorities have important functions in the given context regarding local tradition and their offices have some administrative functions, they cannot be seen as bearers of large economic power to the extent that their royal court and extended family would substantially benefit from this (as confirmed by the nonsignificant coefficient, cf. table 4/I). The negative effect of the other household members' schooling could be explained by the fact that ZCC is a church with strong membership in rural areas and among less educated people. Hence, people from less educated households might be more likely to join the church (cf. Müller, 2011).

In the case of practice of ATR it is more difficult to find a variable that fulfils the requirement of not being correlated with *atr*, but uncorrelated with household income. The only candidate from table (5) is *clinic*, the negative coefficient indicating a lower probability if a clinic exists in the village. Our interpretation is that the more difficult the access to health facilities, the more likely a person is to rely on traditional religion for healing purposes.

Table 6

Table 6 presents the results of the second stage estimation of the Heckman procedure where we added the inverse Mill's ratio as an additional regressor to capture possible selectivity bias (cf. supplementary appendix A/3). We cannot reject the hypothesis that these results do not suffer from selection bias, since in both cases (ZCC membership and practice of ATR) the respective coefficients are not significantly different from zero at any usual level. The results, however, must be interpreted in the context of the case study with relatively low number of observations and, in the case of *atr*, relatively weak explanatory power in the first-stage probit model.

6. Concluding remarks

Based on a household survey in the Greater Sekhukhune District, we investigate the relation between religiosity and rural household income. Using a regression-based approach, we explain household income by measures of socio-demographic characteristics, geography, human and social capital as well as indicators of church membership and the practice of African traditional religion. We find two indicators of religiosity to be strongly correlated with household income: membership in the Zion Christian Church and the practice of African

Traditional Religion. This correlation is specific to the ZCC; no other church category reveals a relevant relation to household income.

A crucial question is whether these correlations can be interpreted as causal effects. Relying on evidence from recent research in theology and religious studies, we find that membership in ZCC and practice of ATR have a potentially causal impact on household income. This is substantiated by a Heckman two-step procedure, though acknowledging the relatively small sample.

It is important to note three caveats regarding our empirical procedure. First, the results must be interpreted in the context of the relatively small sample. While we conclude that membership in the ZCC has an effect on household income, we cannot conclude that this is the only church in which membership goes along with increased economic success. Second, the Heckman test depends on the strength of the identifying variables. While based on our estimations we can be relatively confident about those factors determining ZCC membership, the identifying variable for practice of ATR is relatively weak. Hence, the causal interpretation of ATR needs to be treated with caution. Third, our data is statistically representative only for the geographical area of the former Fetakgomo Municipality. However, we reckon that the results possess external validity for similar rural former homeland areas in Sekhukhune and neighbouring districts in the Limpopo Province, because of their similar economic, demographic, cultural and religious structures.

Notwithstanding these limitations, our results provide quantitative empirical evidence that religiosity does influence economic success in the region studied. This effect, however, does not appear to be an influence of religious affiliation and church membership per se, but rather

to be contingent on specific patterns of social or intrinsic religiosity fostered in a religious community or, potentially, its dominant theological tenets. In particular, such patterns seem to exist in the ZCC. Our results are in line with the religious studies research arguing that many AICs promote economic upliftment (Cross et al., 1993; Schlemmer, 2008; Öhlmann et al., 2016). Possibly, such patterns also exist in ATR.

An impact of traditional religious practice on economic success has to the best of our knowledge thus far not been documented. How this specific religiosity might transmit to household income remains for future studies to discern. The ZCC, on the other hand, has been documented as a church fostering high degrees of religiosity among its members (in the Weberian sense as ecclesiastic-religious domination of life) and as promoting economically conducive attitudes (Mafuta 2010). Hence, the results resonate well with Weber's hypothesis that increased religiosity leads to improved economic outcomes. Moreover, this church constitutes a network with millions of members and provides its members with various social capital-type resources, which directly relates to social capital theory. From our data, both seem plausible. ZCC members have the highest indicators of religiosity in the dataset both in the individual and in the social dimension.

We see our analysis as a starting point in the quantitative analysis of the effects of religiosity on economic success in the rural areas of South Africa. Particularly three points merit further attention. First, comparative studies in other areas would provide insights as to whether the results are context-specific or possess cross-contextual validity. This might also yield an indication as to whether effects can be identified for other religious communities. Second, analyses based on larger samples (and potentially using panel data) would enable the use of more sophisticated econometric techniques required to further substantiate causal impacts of

religion on economic success. Third, in order to elucidate the actual transmission mechanisms of religiosity to economic success, in-depth analysis of these mechanisms is needed, particularly with respect to the religious communities highlighted above.

References

Anderson, A, 2000. Zion and Pentecost. The spirituality and experience of Pentecostal and Zionist/ Apostolic churches in South Africa. University of South Africa Press, Pretoria.

Anderson, A, 2001. African Reformation. African Initiated Christianity in the 20th Century. Africa World Press, Trenton.

Barro, RJ, & McCleary, RM, 2003. Religion and economic growth across countries. American Sociological Review 68, 760–81.

Bettendorf, L, & Dijkgraaf, E, 2010. Religion and income: Heterogeneity between countries. Journal of Behaviour and Organization 74, 12–29.

Bettendorf, L, & Dijkgraaf, E, 2011. The Bicausal Relation between Religion and Income. Applied Economics 43, 1351–63.

Brañas-Garza, P, Rossi, M, & Zaclicever, D, 2009. Individual's religiosity enhances trust: Latin American evidence for the puzzle. Journal of Money, Credit and Banking 41, 555–66.

Cameron, CA, & Trivedi PK, 2005. Microeconometrics. Methods and applications. Cambridge University Press, Cambridge.

Cilliers, J, & Wepener, C, 2007. Ritual and the generation of social capital in contexts of poverty: A South African exploration.” International Journal of Practical Theology 11, 39–55.

Coleman, JS, 1988. Social capital in the creation of human capital. The American Journal of Sociology 94, Supplement: Organizations and Institutions: Social and Economic Approaches to the Analysis of Social Structure, 95–120.

Cross, C, Oosthuizen, GC, & Clark, C, 1993. Out of the wind: The African Independent Churches and youth urbanization in Metropolitan Natal. A report prepared for the Co-operative Programme on the Youth, Durban.

De Jong, E, 2011. Religious values and economic growth: A review and assessment of recent rtudies." In Ter Haar, G (Ed.), Religion and development. Ways of transforming the world. Columbia University Press, New York, 111–40.

Drimie, S, Germishuyse, T, Rademeyer, L & Schwabe, C., 2009. Agricultural production in Greater Sekhukhune: the future for food security in a poverty node of South Africa? Agrekon 48, 245–75.

Dehejia, R, DeLeire, T & Luttmer EFP, 2007. Insuring consumption and happiness through religious organizations. Journal of Public Economics 91, 259–79.

Dickow, H, 2012. Religion and attitudes towards life in South Africa. Pentecostals, charismatics and reborns. Nomos, Baden-Baden.

Garner, RC, 2000. Religion as a source of social change in the New South Africa. Journal of Religion in Africa 30, 310–43.

Garner, RC, 2004. African Independent Churches and economic development in Edendale. In Venter, D (Ed.), Engaging modernity. Methods and cases for studying African Independent Churches in South Africa. Prager, Westport, 81–103.

Glewwe, P, 1991. Investigating the determinants of household welfare in Côte d'Ivoire. Journal of Development Economics 35, 307–37.

Guiso, L, Sapienza, P & Zingales, L, 2003. People's opium? Religion and economic attitudes. Journal of Monetary Economics 50, 225–82.

Heckman, JJ, 1979. Sample selection bias as a specification error. Econometrica 47, 153–61.

Heuser, A (Ed.), 2015. Pastures of Plenty: Tracing Religio-scapes of Prosperity Gospel in Africa and Beyond. Peter Lang, Frankfurt.

Huber, S, & Huber, O, 2012. The centrality of religiosity scale (CRS). Religions 3, 710–24.

Iannaccone, LR, 1998. Introduction to the economics of religion. Journal of Economic Literature 36, 1465–96.

Knack, S, & Keefer, P, 1997. Does social capital have an economic payoff? A cross-country investigation. Quarterly Journal of Economics 112, 1251–88.

Lipford, JW, & Tollison, RD, 2003. Religious participation and income. Journal of Economic Behaviour & Organization 51, 249–60.

Low, A, 1986. Agricultural development in Southern Africa. Farm-household conomics and the food crisis. James Currey. London.

Mafuta, L, 2010. Religion and development in South Africa: an investigation of the relationship between soteriology and capital development in an African Initiated Church (AIC), PhD thesis, University of South Africa.

Mangeloja, E, 2005. Economic growth and religious production efficiency. Applied Economics 37, 2349–59.

Masondo, ST, 2014. The African indigenous churches' spiritual resources for democracy and social cohesion, Verbum et Ecclesia 35. http://dx.doi.org/10.4102/ve.v35i3.1341. Accessed 1 August 2017.

Meyer, B, 2004. Christianity in Africa: From African independent to Pentecostal-charismatic churches. Annual Review of Anthropology 33, 447–74.

Meyer, LER, 2004. The Pentecostal movement as represented in Breakthrough International. An expression of missio dei? A contribution to an experiental pneumatology of mission. PhD thesis, University of KwaZulu-Natal.

Mokgobi, MG, 2014. Understanding traditional African healing. African Journal for Physical Health Education, Recreation, and Dance 20, 24–34.

Montalvo, JG, & Reynal-Querol, M, 2003. Religious polarization and economic development. Economics Letters 80, 201–10.

Müller, R, 2011. African Pilgrimage: Ritual Travel in South Africa's Christianity of Zion. Ashgate, Surrey.

Narayan, D, & Pritchett, L, 1999. Cents and sociability: Household income and social capital in rural Tanzania. Economic Development and Cultural Change 47, 871–97.

Noland, M, 2005. Religion and economic performance. World Development 33, 1215–32.

Öhlmann, P, Frost, M-L, & Gräb, W, 2016. African Initiated Churches' potential as development actors, HTS Theological Studies 72, http://dx.doi.org/10.4102/hts.v72i4.3825. Accessed 1 August 2017.

Schlemmer, L, 2008. Dormant Capital: The Pentecostal Movement in South Africa and its Potential Social and Economic Role. Centre for Development and Enterprise, Johannesburg.

Selinger, L, 2004. The forgotten factor: The uneasy relationship between religion and development. Social Compass 51, 523–43.

StatsSA (Statistics South Africa), 2016. Statistics by place: Fetakgomo. http://www.statssa.gov.za/?page_id=993&id=fetakgomo-municipality. Accessed 11 April 2016.

Weber, M, (1920) 2002. Die protestantische Ethik und der 'Geist' des Kapitalismus. In Kaesler, D (Ed.), Max Weber. Schriften 1894–1922. Kröner, Stuttgart, 150–226.

Woolcock, M, & Narayan, D, 2000. Social capital: Implications for development theory, research, and policy. The World Bank Research Observer 15, 225–49.

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Table 1: Income sources in Fetakgomo

Income source	% of households receiving income from the source	Mean monetary return per month in ZAR	
Agriculture			
Field crops	41	146	(206)
Vegetables	29	98	(259)
Livestock	53	391	(764)
Fruit	56	24	(32)
Gathering wood	69	137	(113)
Agriculture total	94	429	(673)
Other income sources			
Formal income (excluding social grants)	23	8 085	(7 835)
Informal income	53	1 190	(1 395)
Remittances	39	818	(680)
Social grants	78	1 417	(868)

Note: Standard deviation in brackets; amounts rounded to nearest ZAR 1; N=180.

Table 2: Descriptive statistics

Variable	Min.	Max.	Mean	Std. dev.
Income (ZAR)	305	32 735	4 356	4 933
Household demographics				
gender [1=female]	dummy		.64	
age [years]	21	101	54.67	14.97
size [number of household members]	1	15	4.80	2.44
s_child [share of household members below age 18]	0	1	.45	.28
s_pens [share of household members above age 65]	0	1	.14	.21
Geography:				
road [distance to nearest tar road in km]	0	18	3.58	3.95
shop[distance to closest supermarket in km]	0	75	18.53	18.13
Human capital				
school [school years completed by household head]	0	12	5.76	4.84
tertiary [tertiary education completed by household head, 1=learnership, 2=college/university]	0	2	.19	.53
school_o [mean school years completed by adult household members, except household head]	0	12	8.28	2.89
learn [number of adult household members with completed learnership, except household head]	0	2	.12	.34
acad [number of adult household members with completed college/university, except household head]	0	2	.09	.30
clinic [1=clinic in village]	dummy		.69	
Social capital				
group [number of groups household head is a member of]	0	4	1.40	.74
chief [household head's relation to chief, 1=distant family or council member, 2=2nd degree relation or distant relation and council member, 3=1st degree relation or relation and senior councillor]	0	3	.56	.81

Note: N=180.

Table 3: Religious groups' profiles

	Household income in ZAR	School years completed	Weekly church service attendance	Weekly other church activities attendance	Weekly prayer frequency
All observations	4 356 (4 933)	5.76 (4.84)		n/a	
Apostolic churches (12.8%) *apostolic*	3 006 (2 158)	5.78 (4.55)	1.52 (1.37)	.57 (.51)	13.09 (5.30)
Pentecostal-Charismatic churches (8.3%) *charismatic*	5 078 (8 034)	7.60 (5.58)	1.65 (1.34)	1.06 (.70)	12.83 (8.12)
Mainline churches (5.0%) *mainline*	10 718 (10 556)	9.33 (3.87)	1.08 (.77)	.47 (.71)	12.37 (4.64)
Zion Christian Church (20.0%) *zcc*	4 216 (3 875)	6.08 (5.01)	1.78 (.87)	1.28 (.70)	14.44 (6.57)
St. Engenas Zion Christian Church (12.8%) *engenas*	3 264 (1 988)	5.61 (4.75)	2.38 (1.20)	1.00 (.91)	12.75 (5.83)
Other churches (2.8%) *other*	4 285 (1 053)	7.40 (4.98)	1.20 (.45)	.80 (.84)	8.80 (5.17)
All churches (61.7%)	4 415 (5 184)	6.45 (5.90)	1.75 (1.15)	.96 (.77)	13.17 (6.21)
African traditional religion (43.9%) *atr*	4 958 (5 974)	4.77 (4.79)		n/a	

Notes: Standard deviation in brackets; household income rounded to nearest ZAR 1; N=180.

Table 4: Estimation results log-linear income equation

	I		II	
	Coefficient	**Standard error**	**Coefficient**	**Standard error**
Constant	6.184***	.440	6.460***	.432
Household demographics				
gender	–.344***	.106	–.286***	.107
age	.016**	.006	.012**	.006
size	.096***	.026	.101***	.026
s_child	–.179	.236	–.185	.239
s_pens	.166	.327	.266	.332
Geography				
road	–.024*	.014	–.023*	.014
shop	.004	.003	.004	.003
Human capital				
school	.034**	.015	.029**	.015
tertiary	.648***	.103	.683***	.101
school_o	.008	.017	.003	.018
learn	.231	.155	.213	.158
acad	.363**	.169	.385**	.171
clinic	.028	.105	.061	.107
Social capital				
group	.064	.069	.034	.069
chief	–.086	.061	–.088	.061
Religious groups				
mainline	.286	.241		
zcc	.469***	.160		
engenas	.166	.173		
apostolic	-.156	.166		
charismatic	.268	.204		
other	.372	.313		
church			.181	.129
atr	.314**	.124	.314**	.124

Notes: Dependent variable: ln(*income*); N=180; Adjusted R^2= .48(I)/.45(II). *p < .1, **p < .05, ***p < .01.

Table 5: Probit estimates of membership in the ZCC and practice of ATR

	Membership in ZCC			Practice of ATR		
	Coefficient	**Standard error (asymptotic)**	**Wald statistic**	**Coefficient**	**Standard error (asymptotic)**	**Wald statistic**
constant	–.828	1.154	.515	–1.079	1.081	.996
gender	.832***	.350	5.658	–.404	.265	2.323
school_o	–.110**	.050	4.910	–.010	.046	.051
clinic	.180	.298	.367	–.516*	.265	3.806
chief	.334**	.163	4.181	.087	.149	0.344
church				–2.027***	.269	56.990
atr	–1.120***	.307	13.310			

Notes: Dependent variables: prob(*zcc*=1*)*, prob(*atr*=1); N=180; McFadden Pseudo R^2 = 0.24 (ZCC model), 0.377 (ATR model). *p < .1, **p < .05, ***p < .01. Non-significant coefficients omitted.

Table 6: Estimation results log-linear model with Heckman's λ

	Estimation with ZCC		Estimation with ATR	
	Coefficient	**Standard Error**	**Coefficient**	**Standard Error**
constant	6.505***	.465	6.627***	.478
gender	–.281**	.112	–.318**	.103
age	.012*	.007	.012**	.006
size	.092***	.026	.092***	.022
s_child	–.084	.244		
s_pens	.216	.347	.281	.322
road	–.027*	.015	–.025*	.014
shop	.004	.003	.004	.003
school	.031**	.016	.029**	.015
tertiary	.671***	.100	.698***	.103
school_o			.004	.018
learn	.218	.153	.226	.155
acad	.391**	.167	.414**	.171
clinic	.054	.107		
groups	.056	.069		
chief			–.079	.059
church			.058	.286
zcc	.481	.501		
atr	.185	.123	.056	.550
λ_1	–.092	.185	.045	.172
λ_0	1.531	1.957	.939	1.379

Notes: Dependent variable: ln(*income*); N=180; Adjusted R^2= .46. *p < .1, **p < .05, ***p < .01. Standard errors corrected according to Heckman (1979).

Supplementary Appendix A

1. Overview of recent micro-level research on the effect of religion on economic variables

2. Data collection and sampling

3. Description of the Heckman (1979) two-step procedure to check for possible selectivity biases arising from unobserved variables and self-selection into religiosity

1. Overview of recent micro-level research on the effect of religion on economic variables

Study	Synopsis of results with respect to effects on religion on economic variables
Guiso et al. (2003)	Using data from 66 countries, the authors find that religious upbringing, religiosity and religious practice promote economically conducive attitudes.
Cuesta (2004)	Religious affiliation does not have an effect on basis needs satisfaction in Nicaragua.
Steen (2004)	Focusing on men in the USA, 'the paper finds evidence that both men raised as Catholics and men raised as Jews have higher earnings.'
Sakwa (2006)	Among Catholic university students in Nairobi, Kenia, religious attitudes towards poverty correlate with specific poverty alleviation objectives.
Arano and Blair (2008)	There is a 'bicausal relationship between religion and income' in Mississippi, USA.
Chiswick and Huang (2008)	Among Jewish men in the USA, 'religious involvement is associated with more favorable labor market outcomes,' but 'beyond some point religious practice has a negative effect.'
Bettendorf and Dijkgraaf (2010)	Using data from 25 countries, 'church membership is found to have a positive effect on income for high-income countries,' while 'this effect is negative for low-income countries.'
Bettendorf and Dijkgraaf (2011)	Religious attendance does not have an effect on household income in the Netherlands.
Permani (2011)	There is a positive effect of religious social capital on earnings in Indonesia.
Cornelissen and Jirjahn (2012)	In Germany, 'being raised by two religious parents, but having no current religious affiliation is associated with higher earnings.'
Audretsch et al. (2013)	'Religions like Islam and Jainism are more favorable for self-employment,' while 'Hindus are less likely to be self-employed.'

2. Data collection and sampling

The data collection process followed a two-phase design, a qualitative preparatory study followed by a quantitative household survey. We chose the two-phase approach in order to be able to contextualise the key analytical concepts and to pre-test the survey instrument. In the first phase, semi-structured interviews and focus group workshops were conducted in various villages. We gathered information on religious communities and developed contextually relevant categorizations with representatives of the local population. Moreover, we collected data on income sources such as informal income-generating activities and agricultural production patterns such as livestock-breeding, small-scale horticultural activities and the cultivation of field crops (cf. survey questionnaire in supplementary appendix B). The data was used to develop the survey instrument and later to perform consistency checks on the quantitative data.

In the second phase, 221 households were sampled from the universe (all households in Fetakgomo Municipality) in a two-stage cluster sampling process. We used a geographical approach. As the area is entirely rural, in nearly all instances one household inhabits one dwelling. The primary sampling units (clusters) were formed on the basis of the subplace delimitations by StatsSA. Thirty of 61 clusters were randomly selected with equal probability of selection. The size of the clusters varied between 25 and 2066 households.

The secondary sampling units are the households.[1] The sampling frame was recent Google Maps (2011) satellite imagery, in which all dwellings were clearly visible. Cluster delimitations were plotted on the aerial map, facilitating an allocation of households/ dwellings to clusters. In each cluster, the households to be interviewed were selected through

[1] In order to ensure compatibility with data from official statistics, we used StatsSA's (2010) definitions of a household as 'a group of persons who live together and provide themselves jointly with food and/or other essentials for living, or a single person who lives alone' and of a household member as 'a person that resides with the household for at least four nights a week.' The household head was operationalised as the household member who bears the responsibility in the household.

fixed rate sampling (1 in 55), ensuring that each household in the universe had the same probability of selection given the differing size of the clusters. The satellite image proved to be an accurate frame. In the rare case of inaccuracies encountered, the frame was adjusted accordingly by adding those household or removing them, respectively. If the household head was absent, at least four re-visits were done at different hours and at least two different days. Of the 221 sampled households, 14 either refused to participate or were repeatedly unavailable. Interviews were conducted in 207 cases, yielding a response rate of 93.7%. Of these, due to missing values and the removal of outliers, 180 are used in the empirical part. All interviews were conducted with the household head in Northern Sotho, using the questionnaire presented in supplementary appendix B.

3. Description of the Heckman (1979) two-step procedure to check for possible selectivity biases arising from unobserved variables and self-selection into religiosity

In the first step, we run two probit-models, on the household head's probability of being member of the ZCC and on the probability of practicing ATR (as those are the religion categories with significant coefficients in the estimation of (2), see section 5 of the main article). The selection of the household into religion category *r* (*zcc* or *atr,* respectively) is modelled as follows.

$$r_i^* = \boldsymbol{z}_i\boldsymbol{\gamma} + u_i \tag{A.1}$$

where r_i^* is a latent variable and religion category $r_i = 1$ if $r_i^* > 0$ and $r_i = 0$ otherwise. $\boldsymbol{z}_i$ is the respective vector of the variables explaining the decision to actively practice *zcc* or *atr*. Symbol $\boldsymbol{\gamma}$ is a vector of the respective coefficients in the probit model and u_i is the error term, assumed to be normally distributed. This probit model needs to contain "at least one nontrivial determinant" of r_i, that is, a variable uncorrelated with household income except through its correlation with the religion category (Cameron & Trivedi, 2005:870). In section 5 of the main article, we identify such variables from the probit model (A.1) in combination with the results of equation (2) and provide a justification why we consider this exclusion restriction to hold.

We compute the inverse Mill's ratio (Heckman's λ) from the generalised residual of the probit estimates. The inverse Mill's ratio is given as

$$\lambda_1 = \frac{\varphi(z_i\boldsymbol{\gamma})}{\Phi(z_i\boldsymbol{\gamma})} \quad \text{and} \quad \lambda_0 = \frac{\varphi(z_i\boldsymbol{\gamma})}{1-\Phi(z_i\boldsymbol{\gamma})} \tag{A.2}$$

for the *r*=1 and the *r*=0 cases, respectively. $\varphi(z_i\boldsymbol{\gamma})$ is the probability density function of the standard normal distribution and $\Phi(z_i\boldsymbol{\gamma})$ the cumulative distribution function.

In the second step, Heckman's λ is included as an additional regressor in the income equation. It is interacted with the dummy of the religion category *r*:

$$\ln(income_i) = \boldsymbol{x}_i\boldsymbol{\beta} + \beta_r r_i + \beta_a \lambda_{1i} r_i + \beta_b \lambda_{0i} (1 - r_i), \quad \text{(A.3)}$$

where $\mathbf{x}_i$ summarises the regressors, $\boldsymbol{\beta}$ is the corresponding vector of coefficients, r_i denotes the religiosity dummy variable with β_r its coefficient. The terms $\beta_a \lambda_{1i} r_i$ and $\beta_b \lambda_{0i}(1-r_i)$ switch on and off depending on whether a household is in the $r_i = 1$ category or not. The coefficient β_r is the 'true' effect of the dummy variable. The coefficients of Heckman's λ, β_a and β_b are the estimated covariances between the unobserved variables in the error term of the probit estimate and the unobserved variables in the error term of the income equation (1). If there is no significant correlation between the error terms, we can rule out selection bias from unobserved variables (Cameron & Trivedi, 2005). To statistically test for selection bias we perform a t-test on the coefficients of λ_1 and λ_0 (cf. Vella & Verbeek, 1999).

References

Arano, KG, & Blair, BF, 2008. Modeling Religious Behavior and Economic Outcome. Is the Relationship Bicausal? Evidence From a Survey of Mississippi Households. Journal of Socio-Economics 37, 2043–53.

Audretsch, DB, Bönte, W, & Tamvada, JP, 2013. Religion, social class, and entrepreneurial choice. Journal of Business Venturing 28, 774–89.

Bettendorf, L, & Dijkgraaf, E, 2010. Religion and Income: Heterogeneity Between Countries. Journal of Economic Behavior and Organization 74, 12–29.

Bettendorf, L, & Dijkgraaf, E, 2011. The Bicausal Relation between Religion and Income. Applied Economics 43, 1351–63.

Cameron, CA, & Trivedi PK, 2005. Microeconometrics. Methods and applications. Cambridge University Press, Cambridge.

Chiswick, BR, & Huang, J, 2008. The Earnings of American Jewish Men. Human Capital, Denomination, and Religiosity. Journal for the Scientific Study of Religion 47, 694–709.

Cornelissen, T, & Jirjahn, U, 2012. Religion and earnings. Is it good to be an atheist with religious parental background? Economics Letters 117, 905–8.

Cuesta, J, 2004. From Economicist to Culturalist Development Theories. How Strong is the Relation between Cultural Aspects and Economic Development? The European Journal of Development Research 16, 868–91.

Google Maps, 2011. maps.google.com. Accessed 6 June 2011.

Guiso, L, Sapienza, P, & Zingales, L, 2003. People's Opium? Religion and Economic Attitudes. Journal of Monetary Economics 50, 225–82.

Heckman, JJ, 1979. Sample selection bias as a specification error. Econometrica 47, 153–61.

Lipford, JW, & Tollison, RD, 2003. Religious participation and income. Journal of Economic Behavior & Organization 51, 249–60.

Permani, R, 2011. The presence of religious organisations, religious attendance and earnings. Evidence from Indonesia. The Journal of Socio-Economics, 40 (3), 247–258.

Sakwa, MM, 2006. Bible and Poverty in Kenia. An Empirical Exploration. Dissertation: Radboud Universiteit.

StatsSA (Statistics South Africa), 2010. Concepts and definitions for Statistics South Africa v3. Pretoria: Statistics South Africa.

Steen, TP, 2004. The relationship between religion and earnings. Recent evidence from the NLS Youth Cohort. International Journal of Social Economics 31, 572–81.

Vella, F, & Verbeek, M, 1999. Estimating and interpreting models with endogenous treatment effects. Journal of Business & Economic Statistics 17, 473–78.

Questionnaire Number		
Distance to tar road		[km]
Reliabilty / Remarks		

1. Socio-demographic Characteristics

1.a Mohlokomedi wa lapa / Motho yo a rwalago maikarabelo

Gender		☐Monna	☐Mosadi
Age	**Le belegwe neng?**		

School		☐O sa se tsena
Le feditše sekolo ka mphato ofe?		
Tertiary Education		[Code 1-6]
Le ile la tsena college goba yunibesithi?		
Le na le tikrii ya college goba yunibesithi?		
Le ile la tsena sekolo sa mošomo?		

Tertiary education codes
1 = unfinished learnership
2 = learnership
3 = unfinished college
4 = college
5 = unfinished university
6 = university

Schooling codes
0 = No schooling
1 = G1/Sub A
2 = G2/Sub B
3 = G3/S1
4 = G4/S2
5 = G5/S3
6 = G6/S4
7 = G7/S5
8 = G8/S6/F1
9 = G9/S7/F2
10 = G10/S8/F3
11 = G11/S9/F4
12 = G12/S10/F5

1.b Members of the household

Mo lapeng le go dula batho ba bakae? (Batho ba ba robalago mo lapeng matšatši a a fihlago a mane mo bekeng)					
	Motho wa mathomo ke lena. Motho wa bobedi, o...				
	O belegwe neng?	O feditše sekolo ka mphato ofe?		Tertiary Education	
2			☐O sa se tsena		[Code 1-6]
3			☐O sa se tsena		[Code 1-6]
4			☐O sa se tsena		[Code 1-6]
5			☐O sa se tsena		[Code 1-6]
6			☐O sa se tsena		[Code 1-6]
7			☐O sa se tsena		[Code 1-6]
8			☐O sa se tsena		[Code 1-6]
9			☐O sa se tsena		[Code 1-6]
10			☐O sa se tsena		[Code 1-6]
11			☐O sa se tsena		[Code 1-6]
12			☐O sa se tsena		[Code 1-6]

1.c Social Status

Maemo a lapa le ke afe setšhabeng? / Mošomo wa lena setšhabeng ke eng?		
Tona		[0/1]
Moetapele wa koma		[0/1]
Le leloko sehlopa sa poloko?		[0/1]
Le leloko la serapa sa community garden project?		[0/1]
Le na le karata ya boleloko bja mokahlo wa dipolitiki?		[0/1]
Le moleloko wa dihlopa tše dingwe?		[0/1;efe]
Le tswalana bjang le ba mošate?		[Code 0-4]

Chief's family codes
0=no
1=distant familyor council member and no relation
2=2nd degree relation (e.g. cousin) or distant relation and council member
3=1st degree relation (e.g. brother) or relation and senior councillor
4=chief him/herself

2. Distances

2.a Central locations

Le ya kae go reka dijo (mabenkele a magolo)?			[km]
Go na le kliniki mo motseng?			[km]

3. Religion / Tumelo

Dipotšišo tše di lebane le mohlokomedi wa lapa le / Questions apply to household head

3.a Church attendance

Naa le tsena kereke efe?	**Le thomile neng go tsena kereke ye?**	**Le tsenela ditirelo tše kae mo kerekeng?**		**Le tsenela mediro ye mengwe ya phutego gakae (go swana le khwaere goba mekgatlo ya banna goba ya basadi goba dihlopa tša baswa etc.)? / Le tšea karolo efe mo kerekeng?**	
			☐g/☐k/☐hg		☐beke / ☐kgwedi / ☐ngwaga
Le tsena kereke ye ngwe gape?			per year		times per year
			☐g/☐k/☐hg		☐beke / ☐kgwedi / ☐ngwaga
			per year		times per year

3.b Traditional Religion

Le a phasa?		[0/1]

3.c Praying

Naa le rapela ka nnoši? Gakae?		ka beke

4. Agriculture / Temo

4.a Field crops

Le a lema mašemong naa?

Area

Le na le mašemo a makae?		☐Morgen / ☐ha

Water

Ka ntle ga pula, o na le meetse a go humanago go tšweletša temo ya gago pele?		[0/1]

Crops

Ke dibjalwa dife tšeo o di bjalago tšemong ya gago?		
Dibjalwa dife?	**Ka tlwaelo le buna … … (mafela a ma) kaakang ka ngwaga o tee?**	**Le rekiša … ka bokae?**
Mafela / Mahea		
Mabele		
Leotša / lebelebele		
Magapu		
Dinawa		
Dipongisi		
Marotse		
		Income from field crops

Le lema ka eng?	☐Tonki	☐Terekere			
Le ba lefa bokae / Terekere ke bokae?		Ka tšhelete			
Le tšhela manyoro?	[0/1]		[ke eng?]	Ke bokae?	
				Input costs – field crops	

4.b Vegetables (harvest year round)
Le bjala dibjalo ka tšhingwaneng / serapeng?

Area

Serapa ke se se kaakang?		m²

Vegetables

Le bjala dibjalo dife?			
Dibjalo	**Area (m²)**	**Ka tlwaelo le buna … kaakang ka beke?**	**Le rekiša … ? / Le rekiša … ka bokae? (refer to quantity given)**
Beetroot			
Carrot			
Dintso			
Ditamati			
Eie			
Khabetšhe			
Morogo			
Pepper			
Potato			
Spinatšhe			

Income from gardening	

Le tšhela manyoro?	[0/1]	[ke eng?]	Ke bokae?	

Input costs – garden vegetables	

4.e Livestock and poultry
Naa le na le diruiwa?

Diruiwa	**Le na le … tše kae?**	**Ka tlwaelo le rekiša … tše kae ka kgwedi?**	**Ka tlwaelo le rekiša ka bokae … e tee?**	**Le hlaba … tše kae ka ngwaga?**
Dikgomo				
Dipudi				
Dinku				
Dikolobe				
Dikgogo				
Ditonki				

Income from l+p	

Livestock and poultry products

Le a gama? Le tlatša dibuckete tše kae ka letšatši? Buckete ke dilitere tše kae?	
Maswi a kgomo	litres
Maswi a pudi	litres
Maswi a nku	litres
Le humana mae a makae ka letšatši?	

Income from l+p products	

Naa le hira batho go hlokomela diruiwa tša gago?					
☐Aowa	☐Ee →	**Le ba le fa bokae?**		ka	☐beke

Labour costs l+p	

4.f Fruits

Naa le na le mehlare ya dikenywa? E mekae?	

4.g Firewood

Le rwallela dikgong tša mollo? (for home use only)				
☐Aowa	☐Ee →	**Le rwallela gakae?**		ka beke

Total income from agriculture	

5. Household Income / Letseno

5.a Formal sector income

Le a šoma naa? Batho ba bangwe ba ba dulago mo lapeng ba a šoma? (formal employment)			**Batho ba ba dulago ka mo lapeng le ba humana letseno la digwebong tša bona na? (formal business)**		
	Le / o šomang?	Tefo ke bokae?		Kgwebo ya lena / gagwe ke eng?	Ka tlwaelo le / o dira bokae ka beke goba ka kgwedi?
Mohlokomedi			Mohlokomedi		
yo mongwe			yo mongwe		
yo mongwe			yo mongwe		
Total			Total		

Le humana phenšene ya mošomo? Ke bokae?		ka kgwedi

5.b Informal sector income

Mokgwa o mongwe wa go iphediša ke ofe? / Le na le mošomo wa lebakanyana?		
Mokgwa wa go iphediša (rekiša / kgwebo potlana / aga / go hiriša etc.)	Ka tlwaelo le dira bokae ka beke goba ka kgwedi?	Mohlokomedi goba yo mongwe?
		☐mohlokomedi ☐motho yo mongwe
		☐mohlokomedi ☐motho yo mongwe
		☐mohlokomedi ☐motho yo mongwe
		☐mohlokomedi ☐motho yo mongwe
		☐mohlokomedi ☐motho yo mongwe
Total		

5.c Government grants / other government support

Batho ba ba dulang ka mo lapeng le ba humana mphiwafela na?				
Mphiwafela wa old age		(how many)	* R 1140 =	
Mphiwafela wa bana		(how many)	* R 260 =	
Total				

Batho ba lapa le ba humana mphiwafela o mongwe wa mmušo? (other government support)	
Ke mphiwafela wa eng?	Ke bokae ka kgwedi?

Lelapa le humana mohlagase wa mahala? (free basic electricity)		[0/1]

5.d Remittances

Le humana thušo ya batho ba ba sa dulego ka mo lapeng le?			
	Ke eng le lena?	**O le thuša ka eng?**	**Tšelete goba tšelete ya bokae?**
1			
2			
3			
4			
Lena le thuša batho ka tšelete goba dilo tše dingwe? (negative remittances)			
Total			

Total income excluding agriculture	
Total overall income	