

WIDER Working Paper 2020/126

Ethnic diversity and informal work in Ghana

Sefa Awaworyi Churchill¹ and Michael Danquah²

October 2020

Abstract: We present the first study that examines the effects of ethnic diversity on informal work. Using two waves of data from the Ghana Socioeconomic Panel Survey, we find that ethnic diversity is associated with a higher probability of engaging in informal work. Specifically, our instrumental variable estimates suggest that a unit increase in ethnic diversity is associated with up to a 26.3 percentage point increase in the probability of engaging in informal work. This result is robust to alternative estimation approaches and alternative ways of measuring ethnic diversity. Our results also show that trust, which is lower in ethnically diverse neighbourhoods, is an important channel through which ethnic diversity operates to increase the probability of engaging in informal work. Our results point to the need for policies that promote trust between diverse ethnic groups in heterogeneous societies.

Key words: ethnic diversity, informal work, informality, trust, Ghana

JEL classification: J15, J46, O17

¹ School of Economics, Finance and Marketing, RMIT University, Melbourne, Australia, corresponding author: sefa.churchill@rmit.edu.au; ² UNU-WIDER, Helsinki, Finland.

This study has been prepared within the UNU-WIDER project [Transforming informal work and livelihoods](#).

Copyright © UNU-WIDER 2020

Information and requests: publications@wider.unu.edu

ISSN 1798-7237 ISBN 978-92-9256-883-2

<https://doi.org/10.35188/UNU-WIDER/2020/883-2>

Typescript prepared by Luke Finley.

United Nations University World Institute for Development Economics Research provides economic analysis and policy advice with the aim of promoting sustainable and equitable development. The Institute began operations in 1985 in Helsinki, Finland, as the first research and training centre of the United Nations University. Today it is a unique blend of think tank, research institute, and UN agency—providing a range of services from policy advice to governments as well as freely available original research.

The Institute is funded through income from an endowment fund with additional contributions to its work programme from Finland, Sweden, and the United Kingdom as well as earmarked contributions for specific projects from a variety of donors.

Katajanokanlaituri 6 B, 00160 Helsinki, Finland

The views expressed in this paper are those of the author(s), and do not necessarily reflect the views of the Institute or the United Nations University, nor the programme/project donors.

1 Introduction

In the classical study of informality, de Soto (1989) describes informality as the collection of economic agents (including firms and workers) and activities that operate outside the regulatory and legal framework of a country. Such economic agents, operating in the informal sector, fail to comply with labour market statutes, as well as avoiding regulation and the burden of taxation. However, they do not fully enjoy the benefits of the formal sector, including potential state benefits derived from regulation (Loayza et al. 2009). Evidence suggests that formal workers tend to enjoy higher wages, pension, and employment security and longer vacation, while informal workers are often engaged in labour-intensive activities in either small firms or self-employment without protected benefits or job security (de Almeida et al. 1995; Maloney 1999).

A significant part of economic activity in both developed and developing countries occurs in the informal sector (Galiani and Weinschelbaum 2012; Meghir et al. 2015), thus providing livelihoods for billions of people globally (La Porta and Shleifer 2014). Since the 1970s, the informal economy and its role in the development process have been widely debated (see, e.g., de Soto 1989; Gërkhani 2004; Harris and Todaro 1970; Schneider and Enste 2000). On the one hand, the informal economy is seen as a pool of entrepreneurial talent that provides livelihoods for the poor. In this view, relaxing entry requirements and enhancing institutions to fuel informality is expected to promote economic development (de Soto 1989; Hart 1973). On the other hand, the informal economy has been viewed as problematic, with arguments suggesting that many economic agents within the informal sector deliberately avoid formal registration to evade taxes, thus hindering development (Chen et al. 2006; Levy 2010). A related strand of literature entrenched in the classical views of economic development considers informality as an outcome. Here, informality is seen as a by-product of poor economic performance and poverty, and thus an increase in economic growth is expected to reduce the size of the informal economy (Harris and Todaro 1970; Rauch 1991).

Despite sustained growth in many developing countries, the prevalence of unproductive informal sectors is on the rise (Kanbur 2017), and informal workers tend to be disproportionately poor (Maloney 2004). Policy-makers are therefore concerned about the growth of the informal sector. A first step to addressing the issue of unproductive informal sectors is improved understanding of the root causes of this lack of productivity. Consequently, some studies have examined the determinants of informality and informal work with a focus on economic and institutional factors (see, e.g., Cebula 1997; Dabla-Norris et al. 2008; Friedman et al. 2000; Johnson et al. 1998).

At the same time as informality is growing globally (especially in developing countries), local communities across the globe are becoming more ethnically diverse. Thus, sitting alongside the literature on the determinants of informality, there is a growing body of literature that seeks to understand the role of an important sociocultural factor such as ethnic diversity in shaping social, institutional, and economic outcomes including poverty, inequality, economic growth (see, e.g., Awaworyi Churchill and Smyth 2017; Easterly and Levine 1997; Leigh 2006), innovation (see, e.g., Fafchamps 2000), entrepreneurship, wages, and productivity (see, e.g., Awaworyi Churchill 2017a; Ottaviano and Peri 2006), among others. However, to date, no study has examined the effect of ethnic diversity on informal work. We fill an important gap in the literature by providing the first study that examines how ethnic diversity influences informal work using panel data for Ghana.

Using data from two waves of the Ghana Socioeconomic Panel Survey, we measure ethnic diversity at the district level and examine the impact of ethnic diversity on various measures of informal work. Specifically, we focus on the distinction between wage employment and self-employment in the informal sector, and we examine informal work along both dimensions separately and also together. Our results suggest that ethnic diversity is associated with a higher probability of engaging in informal work. This finding is robust to various estimation methods and alternative ways of measuring ethnic diversity. We also find that trust is a channel through which ethnic diversity influences informal work.

Ghana makes an interesting case study in examining the effects of ethnic diversity on informal work for at least two reasons. First, Ghana has a large informal sector, with about 80 per cent of the labour force engaged in informal work. The informal sector in Ghana is often traced back to the onset of colonial capitalism in what was then called the Gold Coast, where a defining feature of the labour market was an informal economy characterized by peasant farming and trade (Osei-Boateng and Ampratwum 2011). Over time, the informal economy has expanded into rural and urban areas, significantly contributing to the labour force. Second, as an African country, Ghana makes for an important case study in examining the dynamics of ethnic diversity. Evidence suggests that the most ethnically diverse continent in the world is Africa, and that it hosts some of the most diverse countries in the world (see Fearon 2003). Fearon (2003) reports an ethnic fractionalization score of 0.846 for Ghana, making it one of the most ethnically diverse countries in the world, ahead of all countries in Europe, Asia, the Middle East, and Latin America and the Caribbean.

The remainder of the study is structured as follows. The next section provides an overview of how ethnic diversity might affect informal work. Section 3 discusses the data and variables, while Section 4 presents the empirical methods. Section 5 presents the results, while Section 6 concludes.

2 Why should ethnic diversity affect informal work?

Conceptually, the impact of ethnic diversity on informality could be positive (increase the probability of informality) or negative (decrease the probability of informality), depending on the channels through which diversity operates to influence informality. In this section, we discuss how ethnic diversity is linked to various factors, and how this consequently influences informal work.

2.1 Entrepreneurship, trade, and business density

Existing literature has shown that the performance of businesses in various areas is influenced by cultural values (Hofstede 1984), and thus that differences across ethnic groups can explain differential economic outcomes, including labour market outcomes (Sowell 1981). Along these lines, ethnic groups are known to be endowed with different cultural and social institutions that can influence entrepreneurial talent at different levels (Awaworyi Churchill 2017b; Ibrahim and Galt 2011; Wilson and Portes 1980). This explains why different ethnic groups dominate different labour market segments and trades, and also sheds light on why differences in cultural values, and consequently the level of concentration of such values (i.e., diversity or homogeneity), influence business performance and the labour market opportunities available in an area (Awaworyi Churchill 2017b). Related to this, the existing literature argues that ethnic diversity promotes innovation (Fafchamps 2000). It is argued that that a more ethnically diverse community or workforce is likely to benefit from different skills and expertise that complement each other and

consequently promote productivity and wages (Longhi 2014; Ottaviano and Peri 2006; Trax et al. 2015). Such productivity is likely to translate into more labour market opportunities that could lead to a more structured or formal labour market setting.

Early theoretical work on innovation and firm survival suggests that firm productivity depends on innovation, and that firms that are able to innovate tend to survive and grow, while those that do not innovate tend to fail (Jovanovic 1982). This finding is supported by recent empirical evidence which shows that the survival of informal firms is linked to their ability to be innovative (Fu et al. 2015). In addition, research has shown that, for new entrants, innovation impacts on entrepreneurial decisions to operate informally or formally (Schipper 2020). Further, for firms in both the informal and formal sectors, innovation is important for cost efficiency, competitiveness, and growth (McEvily et al. 2004; Senge et al. 2001). However, the impact of innovation on productivity is greater for informal firms (Fu et al. 2015), and informal firms that are innovative are able to transition into the formal economy (Fu et al. 2015; ILO 2002). The effect of innovation on the performance of a firm, be it formal or informal, is further moderated by the institutional environment such that the effects of innovation are stronger in stronger institutional environments characterized by good legal and regulatory frameworks (LiPuma et al. 2013). Thus, ethnic diversity, via its effects on innovation, is able to shape the dynamics of informal work by influencing: (1) entrepreneurial decisions to operate informally or formally, (2) the survival of firms in the informal sector, and (3) the transition of firms from the informal to the formal sector.

Theories such as the ethnic enclave theory (Wilson and Portes 1980) and the middleman theory (Aldrich and Waldinger 1990; Bonacich 1973) also offer some useful insights. ‘Ethnic enclave’ refers to an area with a high concentration of an ethnic group characterized by a dominant cultural identity and cultural-goods-related peculiar economic activity. The ethnic enclave theory suggests that ethnic networks, emerging from ethnic enclaves, often stimulate social connections that are able to help promote entrepreneurship and create various business opportunities. The theory of middleman minorities suggests that cultural capital and its associated networks and resources tend to propel some ethnic groups to engage in specific businesses or trade related to ‘market intermediation’.¹ The related literature on the ethnic enclave and middleman theories has demonstrated that ethnic diversity is a major factor that influences entrepreneurship and accordingly influences the prevalence of, and types of, labour market opportunities in an area. The pace of development of labour market outcomes in an area, is, however, expected to influence informality.

Evidence from Depetris-Chauvin and Özak (2016) show that by promoting division of labour, ethnic diversity tends to promote economic specialization and trade. Montalvo and Reynal-Querol (2017) argue that increased trade across ethnic boundaries due to specialization helps to promote economic growth. With trade being an important component of livelihoods in most economies, ethnic diversity may shape labour market outcomes that are reliant on trade.

2.2 Discrimination

Ethnic diversity has been associated with discrimination, including discrimination in labour markets, with groups that suffer or perpetuate discrimination losing financially in the labour market

¹ For instance, in Ghana the Fantes and Ewes are often associated with fishing in the Central and Volta regions, respectively, while in Kenya the Luos are known to dominate the fishing industry and Kenyan-Asians the textile industry.

(Awaworyi Churchill 2017b). For instance, the existence of several (or multiple) ethnic groups in a society tends to engender an inherent hierarchical structure conserved within the norms of society over time, which projects one ethnic group as superior over others. This hierarchical structure induces categorizations (e.g., ethnic minority vs ethnic majority) that are typical in ethnically diverse communities and causes economic and labour market disadvantages. This leaves ethnic minorities often discriminated against, lacking opportunities, and relatively disadvantaged (Epprecht et al. 2011; Gustafsson and Sai 2009). Awaworyi Churchill (2017b) also argues that ethnic diversity tends to promote labour force discrimination, which influences wages and productivity. This could influence informality indirectly, or even more directly, when, as a result of labour force discrimination, certain groups or individuals are cut off from the formal labour market and forced into informal employment. In a model of discrimination, Becker (1957) shows that discrimination tends to lower profits, and thus firms that are more unprejudiced and open-minded force firms that discriminate out of the labour market. This influences the concentration of labour market opportunities and, thus, the employment choices available to economic agents.

2.3 Trust, institutions, and macroeconomic policies

A large body of literature has linked trust to ethnic diversity, and to several socioeconomic outcomes. Perhaps the most salient channel through which ethnic diversity could influence informal work is trust, which has been linked to outcomes such as institutional quality, income poverty, entrepreneurship, social capital, innovation, the provision of public goods, productivity, and wages, all of which play important roles in determining the levels of informality.

Ethnic diversity has been shown to erode trust and social networks in society, consequently promoting several undesirable effects on society (see, e.g., Alesina and La Ferrara 2000, 2002; Awaworyi Churchill et al. 2019; Leigh 2006). Previous discussions shed light on the role of social capital and networks as resource that promotes entrepreneurship. Weaker networks, on the other hand, result in weaker collective action (Miguel 2006), including collective action on formalizing existing business ventures. Here, it is argued that trust is relevant for maintaining strong social networks that promote cohesion, an important component of collective action. With lower levels of trust, individuals find it difficult to reach an agreement on a common good, given that they are less able to resolve their differences and collective-action problems. Further, when rent-seeking activities promoted by different ethnic groups make agreeing on public goods difficult (Alesina et al. 1999), this could induce the exit of talented individuals from local labour markets and pooling arrangements that are likely to benefit society (Platteau and Seki 2007).

From a related perspective, informal social institutions such as trust have been shown to be important in shaping formal institutions, influencing economic transaction, and enforcing contracts (Alesina and Zhuravskaya 2011; Awaworyi Churchill 2017a). Arrow (1972) provides a very useful summary that emphasizes the role and importance of trust in every economic transaction. Specifically, Arrow (1972: 357) notes that ‘virtually every commercial transaction has within itself an element of trust, certainly any transaction conducted over a period of time. It can be plausibly argued that much of the economic backwardness in the world can be explained by the lack of mutual confidence.’ Poor economic and institutional outcomes have therefore been attributed to lack of mutual confidence and trust in economic agents. Awaworyi Churchill (2017a) finds evidence to suggest that higher diversity (via its effect on trust) lowers new business density and increases the costs of contract enforcement and the bureaucratic burden associated with new business registration and formalization, thus promoting informality. By creating an environment that promotes social capital and reduces information asymmetry, trust provides an enabling environment that allows business to thrive and provides various labour market opportunities

(Fafchamps 1998; Kranton 1996). Here, it is argued that with imperfect information and information asymmetry, trust promotes a self-sustaining system and maintains strong social networks that provide advantages to economic agents that are better connected.

Ethnic diversity could also influence informality via its effect on economic policy-making. Ethnic diversity has been shown to influence standard indicators of economic policy-making, which tend to influence policy in the area of informal work and are thus likely to shape the dynamics of informal work. In particular, ethnic diversity has been shown to influence public policies relating to government expenditures, tax compliance, education, institutions, and financial development, among others, all of which determine the size of the informal economy (see, e.g., Alesina and Zhuravskaya 2011; Easterly and Levine 1997; Posner 2004). For instance, financial development can promote informality by lowering the barriers to credit access. At the same time, financial development is likely to increase the opportunity cost of operating in the informal economy, thus providing incentives for firms to transition to the formal sector (Blackburn et al. 2012; Capasso and Jappelli 2013). As another example, ethnic diversity decreases tax compliance, and thus, in order to avoid taxes, entrepreneurs are more likely to operate in the informal market, thereby contributing to larger informal sectors (Lassen 2007; Xin Li 2010).

The preceding discussions suggest that ethnic diversity is likely to influence the dynamics of informal work via its effect on trust in two distinct and contrasting ways. First, when privileged information about economic and income-earning opportunities exists, such information is likely to circulate more effectively among social networks, and thus in the absence of trust formal economic opportunities can be lost, which contributes to the prevalence of informality. Second, the lack, or failure, of informal institutions such as trust, which has been associated with poorer economic outcomes, can induce greater demand for formal institutions. Such formal institutions are often characterized by strict laws and regulations that do not create room for a thriving informal sector, thus leading to less informality. In addition, ethnic diversity is linked with several policies that are likely to promote or hinder the informal sector depending on the specific policy channel.

2.4 Conflict and crime

Ethnic diversity has also been linked with social disorganization that promotes conflict and crime (see, e.g., Awaworyi Churchill and Laryea 2019; Kanbur et al. 2011). The argument here suggests that inequality in ethnically diverse communities tends to engender frustration, anger, and antisocial behaviour that culminates in crime and conflict. The prevalence of conflict and crime creates an environment that serves as a disincentive for new business growth and/or registration. In contrast, some studies argue that ethnic diversity (i.e., fractionalization) could reduce the risk of crime and conflict, and rather that ethnic polarization is a greater issue (see, e.g., Collier 2001; de Soysa and Noel 2020). Ethnic polarization is higher when large ethnic groups dominate. Collier (2001: 129) notes that 'both theoretically and empirically fractionalization actually makes societies safer, while dominance increases the risk of conflict'. Fractionalization has also been found to be unproblematic in an environment characterized by good institutions. For instance, Collier (2001) shows that ethnic diversity could have negative implications in dictatorships but not in democracies. Thus, diversity is likely to influence the dynamics of informality either positively or negatively.

3 Data and variables

We use two waves of data from the Ghana Socioeconomic Panel Survey (GSPS). The GSPS is a collaboration between the Institute of Statistical, Social and Economic Research (ISSER) of the University of Ghana and the Economic Growth Center (EGC), Yale University, which is designed to monitor economic conditions and living standards in Ghana over time (Aryeetey et al. 2011). The survey is both nationally representative and regionally representative for the ten regions of Ghana. It uses a two-staged stratified sample design; as part of the sampling process, enumeration areas across the regions in Ghana were randomly selected proportional to the 2009 regional population estimates, and then households were randomly selected from each enumeration area. The first wave of the GSPS, conducted in 2009 and 2010, sampled just over 5,000 households with close to 19,000 individuals, while the second wave, conducted in 2013 and 2014, sampled 4,774 households with over 16,000 individuals. The survey provides data on the demographic characteristics, health, education, and other relevant socioeconomic details of households and their constituent members. The GSPS is widely used in the literature (see, e.g., Canavan et al. 2013; Ghebru and Lambrecht 2017; Khalid and Serieux 2018; Sipsma et al. 2013). Our study restricts the sample to respondents within the prime working age range of 15 to 65 years.

To generate indices of ethnic diversity, we use data from the 2010 Population and Housing Census (Ghana Statistical Service 2014), which is the closest to the dates the GSPS surveys were conducted.

3.1 Ethnic diversity

Ethnic diversity is measured at the district level based on data from the 2010 Ghana Population and Housing Census using the Herfindahl fractionalization index (Greenberg 1956). Where n_{ij} is the share of ethnic group i in district j , indices of diversity are calculated using the Herfindahl formula as follows:

$$ETHNIC\ DIVERSITY_j = 1 - \sum_{i=1}^i n_{ij}^2$$

This index of ethnic diversity (in this case ethnic fractionalization) measures the probability that two randomly selected individuals in a given district belong to different ethnic groups. The Herfindahl fractionalization index is the most widely used measure of diversity in the literature (Alesina and La Ferrara 2002; Alesina et al. 2003; Awaworyi Churchill et al. 2019; Benier and Wickes 2016; Wickes et al. 2014). We calculate ethnic diversity based on the ethnicity reported in the 2010 Ghana Population and Housing Census.² The census also provides information on the district within which each respondent lives. This district (location) information on each respondent provides a precise geographical identifier, which we use to calculate district-level ethnic diversity measures across Ghana. We merge this with the GSPS data.

² The census provides detailed information on respondents' ethnic groups, including over 60 ethnic groups. In robustness checks, we follow the literature that uses religious classifications and examine the sensitivity of our results to religious diversity.

In robustness checks, as an alternative to the ethnic fractionalization index, we also use the index of ethnic polarization. Where n_{ij} is as defined previously, we calculate indices of ethnic polarization using the approach in Montalvo and Reynal-Querol (2005), which is as follows:

$$ETHNIC\ POLARIZATION = 1 - \sum_{i=1}^i \left(\frac{0.5 - n_{ij}}{0.5} \right)^2 \cdot n_{ij}$$

The index of ethnic polarization captures the conflict dimension of ethnic diversity and thus measures the distance between any distribution of ethnic group that leads to maximum conflict. Montalvo and Reynal-Querol (2005) argue that an increase in diversity, beyond a threshold, tends to decrease the likelihood of conflict, and thus conflicts are less likely in highly homogeneous and highly heterogeneous states. The extent of polarization depends only on the size of ethnic groups, given that distances are assumed to be equal among groups. Thus, in the context of our analysis, the closer the distribution of ethnic groups in a district, the higher the index of ethnic polarization.

3.2 Informal work

Our measures of informal work are consistent with Danquah et al. (2019), who construct measures of informal work following the definition proposed by the International Labour Organization (ILO). Informal work is defined as ‘all remunerative work (i.e. both self-employment and wage employment), that is not registered, regulated or protected by existing legal or regulatory frameworks, as well as non-remunerative work undertaken in an income-producing enterprise’ (ILO 2019). Danquah et al. (2019) identify eight employment types, distinguishing between formal and informal employment as well as wage and self-employment.³ They first distinguish between wage employment and self-employment and then further categorize these employment types into formal and informal work. Among wage workers, formality status is determined using information on social security contributions, and thus wage workers are considered formal workers if social security contributions are withheld from their salaries and informal workers if not. The formality status of self-employed workers is determined by the nature of the enterprise. Here, self-employed workers operating a business that is officially registered with the relevant authorities are classified as in formal employment. Danquah et al. (2019) further divide informal employment into upper-tier and lower-tier, with the aim of capturing important structural components of the labour market that are peculiar to Sub-Saharan Africa. However, given data constraints, we are not able to use these subdivisions.

Our study thus focuses on three measures of informal work. The first is a binary variable which is equal to 1 if a respondent is engaged in informal work (either wage employment or self-employed), and 0 otherwise. The second and third measures focus on the nature of employment (i.e., wage or self-employment). Thus, the second measure is a binary variable set equal to 1 if a respondent is engaged in informal wage employment as per the definition above, while the third is a binary variable set equal to 1 if a respondent is engaged in informal self-employment.

³ These include formal wage employment, informal wage employment, informal upper-tier wage employment, and informal lower-tier wage employment for the wage employment category. The types for the self-employment category include formal self-employed, informal self-employed, informal upper-tier self-employed, and informal lower-tier self-employed.

3.3 Covariates

We include a standard set of covariates consistent with the literature on labour market outcomes (see, e.g., Bridges and Lawson 2009; Charette and Meng 1998; Heintz and Pickbourn 2012). Specifically, we control for age and its quadratic term, gender, geographic location (i.e., urban vs rural), education, and marital status. Table A1 in the appendix provides a summary of variables included in our analysis.

4 Empirical specification

We employ a panel probit model in which the binary outcome variable denoting informal work is regressed on ethnic diversity and a vector of covariates:

$$INF_{ijt} = \beta_1 ED_j + \beta_2 ED_j^2 + \sum_n \beta_n X_{n,it} + \alpha_s + \mu_t + \varepsilon_{ijt}$$

where INF is the measure of informal work for individual i in district j at time t . ED is the measure of ethnic diversity for district j , while X is a set of individual characteristics correlated with informal work. α_s captures regional fixed effects, μ_t represents time fixed effects, and ε is the error term. Given that labour market outcomes tend to be persistent, especially over short periods of time, and that our measure of ethnic diversity is time-invariant, we do not estimate an individual fixed-effect model. Thus, our baseline results are estimated using a panel probit model that controls for time and region fixed effects. We also conduct a wave-by-wave analysis in which we conduct a probit analysis for Wave 1 and Wave 2 separately.

To ensure our results are robust to endogeneity which may arise due to measurement error or omitted-variable bias, we also adopt an instrumental variable (IV) probit model. Consistent with the literature, we instrument ethnic diversity at the district level using a regional-level measure of ethnic diversity based on older population census information (Akay et al. 2017; Awaworyi Churchill et al. 2019; Longhi 2014). The existing literature has demonstrated that measures of ethnic diversity drawn from older censuses operate like lags and serve as good instruments, especially if the instrument is derived from a much older census (Dustmann et al. 2005; Hatton and Tani 2005). Put differently, the older the census year from which the instrument is derived, the stronger the instrument will be. This ensures that potential selection into locations that predates the census is adequately controlled for (Awaworyi Churchill and Smyth 2020; Glennerster et al. 2013).

The exclusion restriction is that historical or older measures of ethnic diversity (which operate like lags) should affect current diversity but should not be correlated with unobserved factors that influence current labour market outcomes. Specifically, in our case, we use information from the 2000 Ghanaian population census (Ghana Statistical Service 2002), which is the oldest census information available to us, to generate indices of ethnic diversity at the regional level. Geographic patterns in a region will reflect the patterns of districts or other smaller geographic areas within that region, and thus historic regional-level diversity should be correlated with district-level diversity. However, regional diversity from a decade preceding the earliest GSPS (i.e. 2009/10) should not influence current labour market status. Moreover, the use of the historic regional-level diversity measure as an instrument has the dual advantage of addressing potential selection bias as

well as reducing the severity of endogeneity. Although location decisions are endogenous when small and concentrated geographic areas are considered (e.g., the district level in our case), Dustmann and Preston (2001) demonstrate that the severity of endogeneity decreases with the geographic size of the area. Thus, by instrumenting ethnic diversity at a lower geographic area (i.e., district level) with a measure of ethnic diversity from a higher (and broader) geographic area (i.e., regional level), we ensure that the strongest possible instrument is used.

A possible limitation of our instrument is that it is drawn from a census that does not go back far enough. As Dustmann et al. (2005) demonstrate, the instrument is stronger if it is drawn from a much older census. However, in our case the census information that is available to us only dates back to 2000, and thus persistence may be an issue. Thus, for robustness, we also use the Lewbel (2012) two-stage least squares (2SLS) approach and propensity score matching (PSM). Lewbel (2012) proposes an approach that relies on heteroscedasticity in the data to achieve identification and establish causality. This method provides the advantage of not relying on an exclusion restriction (Lewbel 2012) and is widely used in the literature in the absence of external instruments or as a robustness check on findings with external instruments (see, e.g., Awaworyi Churchill et al. 2019; Belfield and Kelly 2012; Mishra and Smyth 2015).

PSM is often used in the literature with non-experimental data to draw causal inferences (see, e.g., Awaworyi Churchill and Smyth 2020; Campello et al. 2010; Dehejia and Wahba 2002; Maertens and Swinnen 2009). We adopt PSM to determine the average effect of the treatment (in our case individuals who live in ethnically homogeneous districts) on our outcome variable (informal work). To help draw causal inferences about the effect of ethnic diversity on informal work using PSM, we ask the question: what is the outcome (in terms of informal work status) for respondent i who is treated (i.e., lives in an ethnically homogeneous district) relative to the hypothetical outcome that would have prevailed if the same respondent lived in a heterogeneous district? We apply the Rosenbaum and Rubin (1983) technique, and adopt the nearest neighbour, radius, and kernel matching methods, consistent with the standard approach in the literature that encourages the use of multiple matching algorithms (see Caliendo and Kopeinig 2008).

5 Results

Table 1 reports baseline results for the effects of ethnic diversity on informal work. Panels A, B, and C report results using data from Wave 1, Wave 2, and Waves 1 and 2 of the GSPS, respectively. In Columns 1 and 2, we report results for effects on informal work without distinction between the type of employment. In Columns 3 and 4 we report results for informal wage employment, while Columns 5 and 6 report results for informal self-employment. Estimates reported in Columns 1, 3, and 5 are drawn from regressions without control variables, while those reported in Columns 2, 4, and 6 include the standard set of covariates.

Across all columns and panels of the table, the general conclusion suggested by the results is that ethnic diversity is associated with a higher probability of being involved in informal work. Comparing estimates from Columns 1, 3, and 5 with those reported in Columns 2, 4, and 6, we find that with the inclusion of the relevant covariates, the coefficient on ethnic diversity reduces

in magnitude.⁴ Depending on the specification and sample, we find that a unit increase in ethnic diversity is associated with a 4.0 to 43.9 percentage point increase in the probability of engaging in informal work. The results also show evidence of a non-linear relationship between ethnic diversity and informal work, albeit a weak one that is not consistent or robust across estimation types.

Table 1: Ethnic diversity and informal work (baseline results)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Informal work		Informal work (wage employment)		Informal work (self-employment)	
<i>Panel A—Wave 1</i>						
Ethnic diversity	0.194*** (0.023)	0.062** (0.029)	0.071*** (0.015)	0.014 (0.018)	0.128*** (0.020)	0.040* (0.022)
Diversity squared	-0.214* (0.115)	-0.027 (0.154)	0.007 (0.081)	0.035 (0.099)	-0.192** (0.096)	-0.047 (0.109)
Controls	No	Yes	No	Yes	No	Yes
Observations	8,576	5,618	8,576	5,618	8,576	5,618
<i>Panel B—Wave 2</i>						
Ethnic diversity	0.439*** (0.107)	0.387*** (0.069)	0.342*** (0.075)	0.285*** (0.108)	0.314*** (0.089)	0.245* (0.140)
Diversity squared	-0.329*** (0.121)	-0.551*** (0.195)	-0.066 (0.086)	-0.311** (0.125)	-0.273*** (0.101)	-0.296* (0.161)
Controls	No	Yes	No	Yes	No	Yes
Observations	6,850	3,824	6,850	3,824	6,850	3,824
<i>Panel C—Waves 1 and 2</i>						
Ethnic diversity	0.400*** (0.073)	0.245** (0.105)	0.096* (0.051)	0.094 (0.068)	0.301*** (0.062)	0.154* (0.082)
Diversity squared	-0.266*** (0.083)	-0.238** (0.121)	-0.026 (0.059)	-0.092 (0.079)	-0.231*** (0.070)	-0.154 (0.095)
Controls	No	Yes	No	Yes	No	Yes
Observations	15,426	9,442	15,426	9,442	15,426	9,442

Note: all regressions control for regional fixed effects, while regressions in Panel C also include time fixed effects; standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Source: authors' construction based on own analysis.

Table 2 reports IV probit results using lag of ethnic diversity based on 2000 census information as an instrument. Across all specifications, findings from the first stage confirm the validity of our instruments. Specifically, the F-statistics show that our instruments are not weakly correlated with district-level ethnic diversity, while the positive effect of the instrument is consistent with expectations and the previous literature (see, e.g., Awaworyi Churchill et al. 2019; Longhi 2014). Consistent with the baseline results, we find that the coefficients on ethnic diversity are positive. Thus, the IV probit results confirm the positive relationship between ethnic diversity and informal work. However, the IV estimates are relatively lower in magnitude compared with the baseline estimates, suggesting that endogeneity generates an upward bias in our baseline estimates. Depending on the specification and sample, we find that a unit increase in ethnic diversity is associated with up to a 26.3 percentage point increase in the probability of engaging in informal

⁴ Note that the decline in the number of observations for regressions that include all covariates is due to data unavailability for some control variables.

work. The non-linear effect of ethnic diversity is also much weaker, here given that the coefficients on the quadratic term of ethnic diversity are mostly insignificant.

Table 2: Ethnic diversity and informal work (IV results)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Informal work		Informal work (wage employment)		Informal work (self-employment)	
<i>Panel A—IV with external instrument (Wave 1)</i>						
Ethnic diversity	0.263*** (0.050)	0.077** (0.031)	0.106*** (0.032)	0.018* (0.011)	0.167*** (0.043)	0.016 (0.057)
Diversity squared	-1.685 (1.395)	-0.127 (2.374)	-1.037 (0.886)	-0.918 (1.724)	-0.846 (1.194)	0.737 (2.067)
Controls	No	Yes	No	Yes	No	Yes
Observations	8,576	5,618	8,576	5,618	8,576	5,618
Instrument	0.518*** (0.020)	0.450*** (0.023)	0.518*** (0.020)	0.450*** (0.023)	0.518*** (0.020)	0.450*** (0.023)
F-statistics	173.01	129.22	173.01	129.22	173.01	129.22
R-squared	0.1031	0.1397	0.1031	0.1397	0.1031	0.1397
<i>Panel B—IV with external instrument (Wave 2)</i>						
Ethnic diversity	0.099*** (0.019)	0.006* (0.004)	0.085** (0.033)	0.055 (0.051)	0.045*** (0.017)	0.034 (0.062)
Diversity squared	-0.796 (1.094)	-0.893 (1.590)	0.330 (0.744)	-0.803 (1.143)	-1.565* (0.943)	-0.653 (1.395)
Controls	No	Yes	No	Yes	No	Yes
Observations	6,850	3,824	6,850	3,824	6,850	3,824
Instrument	0.956*** (0.027)	0.902*** (0.032)	0.956*** (0.027)	0.902*** (0.032)	0.956*** (0.027)	0.902*** (0.032)
F-statistics	121.36	94.20	121.36	94.20	121.36	94.20
R-squared	0.0816	0.1249	0.0816	0.1249	0.0816	0.1249
<i>Panel C—IV with external instrument (Waves 1 and 2)</i>						
Ethnic diversity	0.106*** (0.012)	0.048*** (0.008)	0.075*** (0.022)	0.035*** (0.002)	0.056* (0.033)	0.054* (0.031)
Diversity squared	0.497 (0.926)	-0.596 (1.482)	0.761 (0.611)	-0.037 (1.053)	-0.396 (0.796)	-0.778 (1.299)
Controls	No	Yes	No	Yes	No	Yes
Observations	15,426	9,442	15,426	9,442	15,426	9,442
Instrument	0.961*** (0.018)	0.998*** (0.020)	0.961*** (0.018)	0.998*** (0.020)	0.961*** (0.018)	0.998*** (0.020)
F-statistics	272.11	187.23	272.11	187.23	272.11	187.23
R-squared	0.1058	0.1080	0.1058	0.1080	0.1058	0.1080

Note: all regressions control for regional fixed effects, while regressions in Panel C also include time fixed effects; standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Source: authors' construction based on own analysis.

In Table 3, we present Lewbel 2SLS results. Here, estimates from Columns 1, 3, and 5 are drawn from regressions using only internally generated instruments, while those reported in Columns 2, 4, and 6 are drawn from regressions that combine our external instrument (lag of ethnic diversity) with internally generated instruments. Overall, these results also reinforce the existing conclusion of a positive relationship between ethnic diversity and informal work. We find that a unit increase

in ethnic diversity is associated with up to a 67.6 percentage point increase in the probability of engaging in informal work, depending on the specification.

Table 3: Ethnic diversity and informal work (Lewbel 2SLS results)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Informal work		Informal work (wage employment)		Informal work (self-employment)	
<i>Panel A—Wave 1</i>						
Ethnic diversity	0.351**	0.356**	0.206*	0.194*	0.169	0.185
	(0.163)	(0.162)	(0.117)	(0.117)	(0.141)	(0.141)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,618	5,618	5,618	5,618	5,618	5,618
F-statistics	50.11	138.13	50.11	138.13	50.11	138.13
Sargan P value	0.0511	0.0894	0.0615	0.1070	0.4128	0.3156
<i>Panel B—Wave 2</i>						
Ethnic diversity	0.676***	0.663***	0.382**	0.366**	0.398**	0.404**
	(0.209)	(0.208)	(0.150)	(0.150)	(0.184)	(0.183)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,824	3,824	3,824	3,824	3,824	3,824
F-statistics	29.03	94.40	29.03	94.40	29.03	94.40
Sargan P value	0.6558	0.7091	0.3539	0.1395	0.0578	0.0601
<i>Panel C—Waves 1 and 2</i>						
Ethnic diversity	0.488***	0.487***	0.280***	0.267***	0.261**	0.274**
	(0.131)	(0.130)	(0.093)	(0.093)	(0.114)	(0.114)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	9,442	9,442	9,442	9,442	9,442	9,442
F-statistics	76.82	230.84	76.82	230.84	76.82	230.84
Sargan P value	0.2488	0.2349	0.4901	0.0263	0.2211	0.1379

Note: all regressions include relevant control variables and control for regional fixed effects; odd columns present estimates from Lewbel 2SLS regressions with internal instruments only; even columns present estimates from Lewbel 2SLS regressions with both external and internal instruments; standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Source: authors' construction based on own analysis.

Next, we examine the sensitivity to PSM of our results as an alternative approach to addressing endogeneity. PSM results using different matching algorithms are reported in Table 4. Given that our baseline results show that ethnic diversity is associated with a higher probability of engaging in informal work, we consider the treatment here as respondents who live in ethnically homogeneous districts.⁵ Using the combined samples from Waves 1 and 2, we find that living in ethnically homogeneous districts is associated with a lower probability of engaging in informal work. This finding is consistent with the baseline and IV results.

⁵ We consider districts with a fractionalization index of at least 0.5 as ethnically heterogeneous and those below 0.5 as homogeneous. Thus, we code a dummy variable (homogeneous: 1, heterogeneous: 0) which we use in PSM.

Table 4: PSM results with different matching methods

Matching method	ATT (average treatment effect on the treated)		
	(1)	(2)	(3)
1—Nearest neighbour (one to one)	-0.099*** (0.018)	-0.040*** (0.014)	-0.071** (0.031)
4—Nearest neighbour	-0.096*** (0.019)	-0.041*** (0.012)	-0.070** (0.031)
Radius	-0.098*** (0.020)	-0.040*** (0.012)	-0.073** (0.031)
Kernel	-0.098*** (0.020)	-0.040*** (0.011)	-0.071** (0.031)

Note: Column 1 reports results for overall informal work, Column 2 results for informal wage employment, Column 3 results for informal self-employment; standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Source: authors' construction based on own analysis.

In Table 5, we examine the robustness of our results to alternative measures of diversity. Columns 1, 3, and 5 report results in which we use the index of ethnic polarization rather than the Herfindahl index, while in Columns 2, 4, and 6 we report results for the effects of religious fractionalization. We find that the effect of ethnic diversity on the prevalence of informal work is not sensitive to how diversity is measured. Overall, the results from Table 5 reinforce the finding of a positive association between ethnic diversity and informal work.

Table 5: Ethnic diversity and informal work (alternative measures of diversity)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Informal work		Informal work (wage employment)		Informal work (self-employment)	
<i>Panel A—Wave 1</i>						
Diversity	0.071*** (0.003)	0.191*** (0.065)	0.021** (0.010)	0.194*** (0.045)	0.043*** (0.002)	-0.004 (0.046)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,618	5,618	5,618	5,618	5,618	5,618
<i>Panel B—Wave 2</i>						
Diversity	0.168*** (0.061)	0.253*** (0.086)	0.135*** (0.038)	0.300*** (0.078)	-0.060 (0.051)	0.021 (0.070)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,824	3,824	3,824	3,824	3,824	3,824
<i>Panel C—Waves 1 and 2</i>						
Diversity	0.071* (0.038)	0.225*** (0.053)	0.035 (0.024)	0.249*** (0.042)	0.042 (0.030)	0.012 (0.042)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	9,442	9,442	9,442	9,442	9,442	9,442

Note: all regressions include relevant control variables; odd columns present estimates for the effects of ethnic polarization, even columns estimates for the effects of religious fractionalization; standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Source: authors' construction based on own analysis.

5.1 Potential channel analysis

Section 2 discussed trust as an important channel through which ethnic diversity might influence informal work. In this section, we take advance of the ‘village trust’ question in the GSPS to examine the role of trust as a channel of influence. Although we are unable to isolate the role of all potential channels as we do not have the data to do so, we are, however, able to examine the role of trust, which is an important variable that underlies other channels discussed in Section 2.

Our measure of trust is based on the GSPS survey question in which respondents are asked the extent to which they agree with the statement ‘Most people in this village can be trusted (it is safe to deal with most people in this village)’. Responses are coded on a five-point scale where 1 represents ‘strongly disagree’ and 5 represents ‘strongly agree’. Our approach to examining trust as a potential channel is consistent with the existing literature (Alesina and Zhuravskaya 2011; Awaworyi Churchill et al. 2019). For trust to qualify as a channel of influence, in addition to being correlated with ethnic diversity it should also be correlated with informal work, and the inclusion of trust as an additional covariate in the regression linking informal work to ethnic diversity should decrease the magnitude of the coefficient on ethnic diversity.

Table 6 reports result from regressions linking trust to ethnic diversity. We find that an increase in ethnic diversity is associated with lower levels of trust. This finding is consistent with the broader literature that has examined the relationship between trust and ethnic diversity (see, e.g., Leigh 2006). Table 7 reports results for regressions that include trust as an additional covariate in the fully specified informal work regressions. We find that trust is negatively associated with informal work, and thus an increase in trust is associated with a lower probability of engaging in informal work. Further, the inclusion of trust as an additional control variable either reduces the magnitude of the coefficient on ethnic diversity or renders it statistically insignificant. This is evident when we compare the coefficients on ethnic diversity to the baseline estimates. This result confirms that trust is a channel that links ethnic diversity to informal work.

Table 6: Ethnic diversity and trust

	(1)	(2)	(3)
Variables	Wave 1	Wave 2	Waves 1 and 2
Ethnic diversity	-0.388***	-0.403***	-0.392***
	(0.061)	(0.052)	(0.040)
Observations	7,033	6,008	13,041

Note: robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Source: authors’ construction based on own analysis.

Table 7: Potential channel analysis

	(1)	(2)	(3)
<i>Panel A—Wave 1</i>			
Ethnic diversity	0.061*** (0.018)	0.029** (0.014)	0.004 (0.004)
Trust	-0.012** (0.005)	-0.019*** (0.004)	-0.007** (0.003)
Controls	Yes	Yes	Yes
Observations	4,554	4,554	4,554
<i>Panel B—Wave 2</i>			
Ethnic diversity	0.003 (0.034)	0.007* (0.004)	-0.024 (0.029)
Trust	-0.019*** (0.005)	-0.014*** (0.004)	-0.004 (0.005)
Controls	Yes	Yes	Yes
Observations	3,690	3,690	3,690
<i>Panel C—Waves 1 and 2</i>			
Ethnic diversity	0.040* (0.021)	0.023** (0.010)	0.001 (0.018)
Trust	-0.017*** (0.004)	-0.015*** (0.003)	-0.011*** (0.003)
Controls	Yes	Yes	Yes
Observations	8,244	8,244	8,244

Note: Column 1 reports results for overall informal work, Column 2 results for informal wage employment, Column 3 results for informal self-employment; all regressions control for regional fixed effects; standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: authors' construction based on own analysis.

6 Conclusion

Drawing on two waves of the GSPS, we have examined the effects of ethnic diversity on informal work in Ghana. We find that ethnic diversity is associated with a higher probability of engaging in informal work. This result is robust to a suite of robustness checks. While a large body of literature presents evidence on the benefits of ethnic diversity, in this study we find that the positive effects of ethnic diversity are diminished by certain factors, including lower levels of trust. We find that while trust plays an important role in reducing the probability of engaging in informal work, it is lower in ethnically diverse communities.

Our findings show that understanding the impact of ethnic diversity on informal work is important because it provides a new perspective on factors worth considering when devising policies aimed at influencing the prevalence of informality. Ethnicity (and consequently ethnic diversity) has become a defining feature of society and presents implications at various levels, especially for countries like Ghana and other developing countries where diversity levels are high. We demonstrate that in addition to economic and institutional factors considered in the literature, sociocultural factors such as ethnic diversity have an important role in explaining the prevalence of informality and should thus be a factor of interest when devising policies. In an attempt to promote economic development, alleviate poverty, and reduce inequality, the World Bank and the International Monetary Fund have encouraged developing countries to implement various

economic policy reforms, including privatization and trade liberalization. The findings from this study demonstrate that, alongside these economic factors, attention should be given to ethnic diversity, which has not been a primary consideration in policies to enhance economic development (Miguel 2006).

The priority for policy-makers in developing countries is to promote economic growth accompanied by low levels of poverty and inequality. It is therefore important that policies are put in place to promote the productivity of informal sectors, and also to encourage the move to more productive sectors when relevant. Our findings suggest that policies to foster trust in diverse societies are important. While ethnic diversity has been associated with poorer public policy performance, slower financial development and economic growth, less infrastructure investment and development (Easterly and Levine 1997), and poorer institutional quality and governance (Alesina and Zhuravskaya 2011), evidence suggests that trust is an important channel through which diversity works to influence these outcomes. It is therefore important that policy is aimed at shaping this important outcome in ethnically diverse communities.

References

- Akay, A., A. Constant, C. Giuliatti, and M. Guzi (2017). 'Ethnic Diversity and Well-Being'. *Journal of Population Economics*, 30(1): 265–306. <https://doi.org/10.1007/s00148-016-0618-8>
- Aldrich, H.E., and R. Waldinger (1990). 'Ethnicity and Entrepreneurship'. *Annual Review of Sociology*, 16(1): 111–35. <https://doi.org/10.1146/annurev.so.16.080190.000551>
- Alesina, A., and E. La Ferrara (2000). 'Participation in Heterogeneous Communities'. *The Quarterly Journal of Economics*, 115(3): 847–904. <https://doi.org/10.1162/003355300554935>
- Alesina, A., and E. La Ferrara (2002). 'Who Trusts Others?' *Journal of Public Economics*, 85(2): 207–34. [http://doi.org/10.1016/S0047-2727\(01\)00084-6](http://doi.org/10.1016/S0047-2727(01)00084-6)
- Alesina, A., and E. Zhuravskaya (2011). 'Segregation and the Quality of Government in a Cross Section of Countries'. *The American Economic Review*, 101(5): 1872–911. <https://doi.org/10.1257/aer.101.5.1872>
- Alesina, A., R. Baqir, and W. Easterly (1999). 'Public Goods and Ethnic Divisions'. *The Quarterly Journal of Economics*, 114(4): 1243–84. <https://doi.org/10.1162/003355399556269>
- Alesina, A., A. Devleeschauwer, W. Easterly, S. Kurlat, and R. Wacziarg (2003). 'Fractionalization'. *Journal of Economic Growth*, 8(2): 155–94. <https://doi.org/10.1023/a:1024471506938>
- Arrow, K.J. (1972). 'Gifts and Exchanges'. *Philosophy & Public Affairs*, 1(4): 343–62.
- Aryeetey, E., I. Osei-Akoto, R. Darko-Osei, and C. Udry (2011). *Ghana Socioeconomic Panel Survey: Report of the Baseline Survey*. Accra: Institute of Statistical, Social and Economic Research (ISSER) and New Haven, CT: Yale University.
- Awaworyi Churchill, S. (2017a). 'Fractionalization, Entrepreneurship, and the Institutional Environment for Entrepreneurship'. *Small Business Economics*, 48(3): 577–97. <https://doi.org/10.1007/s11187-016-9796-8>
- Awaworyi Churchill, S. (2017b). 'Microfinance and Ethnic Diversity'. *Economic Record*, 93(300): 112–41. <https://doi.org/10.1111/1475-4932.12310>
- Awaworyi Churchill, S., and E. Laryea (2019). 'Crime and Ethnic Diversity: Cross-Country Evidence'. *Crime & Delinquency*, 65(2): 239–69. <https://doi.org/10.1177/0011128717732036>
- Awaworyi Churchill, S., and R. Smyth (2017). 'Ethnic Diversity and Poverty'. *World Development*, 95: 285–302. <https://doi.org/10.1016/j.worlddev.2017.02.032>

- Awaworyi Churchill, S., and R. Smyth (2020). 'Ethnic Diversity, Energy Poverty and the Mediating Role of Trust: Evidence from Household Panel Data for Australia'. *Energy Economics*, 86: 104663. <https://doi.org/10.1016/j.eneco.2020.104663>
- Awaworyi Churchill, S., L. Farrell, and R. Smyth (2019). 'Neighbourhood Ethnic Diversity and Mental Health in Australia'. *Health Economics*, 28(9): 1075–87. <https://doi.org/10.1002/hec.3928>
- Becker, G.S. (1957). *The Economics of Discrimination*. Chicago: University of Chicago Press.
- Belfield, C.R., and I.R. Kelly (2012). 'The Benefits of Breastfeeding across the Early Years of Childhood'. *Journal of Human Capital*, 6(3): 251–77. <https://doi.org/10.1086/667415>
- Benier, K., and R. Wickes (2016). 'The Effect of Ethnic Diversity on Collective Efficacy in Australia'. *Journal of Sociology*, 52(4): 856–73. <https://doi.org/10.1177/1440783315599595>
- Blackburn, K., N. Bose, and S. Capasso (2012). 'Tax Evasion, the Underground Economy and Financial Development'. *Journal of Economic Behavior & Organization*, 83(2): 243–53. <https://doi.org/10.1016/j.jebo.2012.05.019>
- Bonacich, E. (1973). 'A Theory of Middleman Minorities'. *American Sociological Review*, 38(5): 583–94. <https://doi.org/10.2307/2094409>
- Bridges, S., and D. Lawson (2009). 'A Gender-Based Investigation into the Determinants of Labour Market Outcomes: Evidence from Uganda'. *Journal of African Economies*, 18(3): 461–95. <https://doi.org/10.1093/jae/ejn017>
- Caliendo, M., and S. Kopeinig (2008). 'Some Practical Guidance for the Implementation of Propensity Score Matching'. *Journal of Economic Surveys*, 22(1): 31–72. <https://doi.org/10.1111/j.1467-6419.2007.00527.x>
- Campello, M., J.R. Graham, and C.R. Harvey (2010). 'The Real Effects of Financial Constraints: Evidence from a Financial Crisis'. *Journal of Financial Economics*, 97(3): 470–87. <https://doi.org/10.1016/j.jfineco.2010.02.009>
- Canavan, M.E., H.L. Sipsma, A. Adhvaryu, A. Ofori-Atta, H. Jack, C. Udry, I. Osei-Akoto, and E.H. Bradley (2013). 'Psychological Distress in Ghana: Associations with Employment and Lost Productivity'. *International Journal of Mental Health Systems*, 7(1): 9. <https://doi.org/10.1186/1752-4458-7-9>
- Capasso, S., and T. Jappelli (2013). 'Financial Development and the Underground Economy'. *Journal of Development Economics*, 101: 167–78. <https://doi.org/10.1016/j.jdeveco.2012.10.005>
- Cebula, R.J. (1997). 'An Empirical Analysis of the Impact of Government Tax and Auditing Policies on the Size of the Underground Economy: The Case of the United States, 1973–94'. *American Journal of Economics and Sociology*, 56(2): 173–85. <https://doi.org/10.1111/j.1536-7150.1997.tb03459.x>
- Charette, M.F., and R. Meng (1998). 'The Determinants of Literacy and Numeracy, and the Effect of Literacy and Numeracy on Labour Market Outcomes'. *The Canadian Journal of Economics/Revue canadienne d'Economique*, 31(3): 495–517. <https://doi.org/10.2307/136200>
- Chen, M., J. Vanek, and J. Heintz (2006). 'Informality, Gender and Poverty: A Global Picture'. *Economic and Political Weekly*, 41(21): 2131–39.
- Collier, P. (2001). 'Implications of Ethnic Diversity'. *Economic Policy*, 16(32): 129–66. <https://doi.org/10.1111/1468-0327.00072>
- Dabla-Norris, E., M. Gradstein, and G. Inchauste (2008). 'What Causes Firms to Hide Output? The Determinants of Informality'. *Journal of Development Economics*, 85(1): 1–27. <https://doi.org/10.1016/j.jdeveco.2006.05.007>

- Danquah, M., S. Schotte, and K. Sen (2019). 'Informal Work in Sub-Saharan Africa: Dead-End or Steppingstone?' WIDER Working Paper 107/2019. Helsinki: UNU-WIDER. <https://doi.org/10.35188/UNU-WIDER/2019/743-9>
- De Almeida, A.L.O., L. Alves, and S.E. Graham (1995). *Poverty, Deregulation and Employment in the Informal Sector of Mexico*. Washington, DC: The World Bank.
- De Soto, H. (1989). *The Other Path: The Invisible Revolution in the Third World*. London: IB Tauris.
- De Soysa, I., and C. Noel (2020). 'Does Ethnic Diversity Increase Violent Crime? A Global Analysis of Homicide Rates, 1995–2013'. *European Journal of Criminology*, 17(2): 175–98. <https://doi.org/10.1177/1477370818775294>
- Dehejia, R.H., and S. Wahba (2002). 'Propensity Score-Matching Methods for Nonexperimental Causal Studies'. *Review of Economics and Statistics*, 84(1): 151–61. <https://doi.org/10.1162/003465302317331982>
- Depetris-Chauvin, E., and Ö. Özak (2016). 'Population Diversity, Division of Labor and Comparative Development'. <http://dx.doi.org/10.2139/ssrn.2759121>
- Dustmann, C., and I. Preston (2001). 'Attitudes to Ethnic Minorities, Ethnic Context and Location Decisions'. *The Economic Journal*, 111(470): 353–73. <https://doi.org/10.1111/1468-0297.00611>
- Dustmann, C., F. Fabbri, and I. Preston (2005). 'The Impact of Immigration on the British Labour Market'. *The Economic Journal*, 115(507): F324–F341. <https://doi.org/10.1111/j.1468-0297.2005.01038.x>
- Easterly, W., and R. Levine (1997). 'Africa's Growth Tragedy: Policies and Ethnic Divisions'. *The Quarterly Journal of Economics*, 112(4): 1203–50. <https://doi.org/10.1162/003355300555466>
- Epprecht, M., M. Müller, and N. Minot (2011). 'How Remote Are Vietnam's Ethnic Minorities? An Analysis of Spatial Patterns of Poverty and Inequality'. *The Annals of Regional Science*, 46(2): 349–68. <https://doi.org/10.1007/s00168-009-0330-7>
- Fafchamps, M. (1998). 'Market Emergence, Trust and Reputation'. Working Paper 96016. Stanford, CA: Department of Economics, Stanford University.
- Fafchamps, M. (2000). 'Ethnicity and Credit in African Manufacturing'. *Journal of Development Economics*, 61(1): 205–35. [https://doi.org/10.1016/S0304-3878\(99\)00068-1](https://doi.org/10.1016/S0304-3878(99)00068-1)
- Fearon, J.D. (2003). 'Ethnic and Cultural Diversity by Country'. *Journal of Economic Growth*, 8(2): 195–222. <https://doi.org/10.1023/A:1024419522867>
- Friedman, E., S. Johnson, D. Kaufmann, and P. Zoido-Lobaton (2000). 'Dodging the Grabbing Hand: The Determinants of Unofficial Activity in 69 Countries'. *Journal of Public Economics*, 76(3): 459–93. [https://doi.org/10.1016/S0047-2727\(99\)00093-6](https://doi.org/10.1016/S0047-2727(99)00093-6)
- Fu, X., P. Mohnen, and G. Zanello (2015). 'Innovation, Informality, and Firms' Growth in Low-Income Countries'. TMCD Working Paper TMD-WP-72. Oxford: Technology and Management Centre for Development (TMCD), University of Oxford.
- Galiani, S., and F. Weinschelbaum (2012). 'Modeling Informality Formally: Households and Firms'. *Economic Inquiry*, 50(3): 821–38. <https://doi.org/10.1111/j.1465-7295.2011.00413.x>
- Gërçhani, K. (2004). 'The Informal Sector in Developed and Less Developed Countries: A Literature Survey'. *Public Choice*, 120(3): 267–300. <https://doi.org/10.1023/B:PUCH.0000044287.88147.5e>
- Ghana Statistical Service (2002). *2000 Population and Housing Census Report*. Accra: Ghana Statistical Service.
- Ghana Statistical Service (2014). *2010 Population and Housing Census Report*. Accra: Ghana Statistical Service.
- Ghebru, H., and I. Lambrecht (2017). 'Drivers of Perceived Land Tenure (In)security: Empirical Evidence from Ghana'. *Land Use Policy*, 66: 293–303. <https://doi.org/10.1016/j.landusepol.2017.04.042>

- Glennster, R., Miguel, E., and Rothenberg, A.D. (2013). Collective Action in Diverse Sierra Leone Communities. *The Economic Journal*, 123(568): 285–316. <https://doi.org/10.1111/eoj.12030>
- Greenberg, J.H. (1956). The Measurement of Linguistic Diversity. *Language*, 32(1): 109–15. <https://doi.org/10.2307/410659>
- Gustafsson, B., and D. Sai (2009). ‘Temporary and Persistent Poverty among Ethnic Minorities and the Majority in Rural China’. *Review of Income and Wealth*, 55: 588–606. <https://doi.org/10.1111/j.1475-4991.2009.00332.x>
- Harris, J.R., and M.P. Todaro (1970). ‘Migration, Unemployment and Development: A Two-Sector Analysis’. *The American Economic Review*, 60(1): 126–42. <https://doi.org/10.1111/j.1475-4991.2009.00332.x>
- Hart, K. (1973). Informal Income Opportunities and Urban Employment in Ghana. *The Journal of Modern African Studies*, 11(1): 61–89. <https://doi.org/10.1017/S0022278X00008089>
- Hatton, T.J., and M. Tani (2005). ‘Immigration and Inter-regional Mobility in the UK, 1982–2000’. *The Economic Journal*, 115(507): F342–F358. <https://doi.org/10.1111/j.1468-0297.2005.01039.x>
- Heintz, J., and L. Pickbourn (2012). ‘The Determinants of Selection into Non-agricultural Self-employment in Ghana’. *Margin: The Journal of Applied Economic Research*, 6(2): 181–209. <https://doi.org/10.1177/097380101200600205>
- Hofstede, G. (1984). *Culture’s Consequences: International Differences in Work-Related Values* (Vol. 5). Thousand Oaks, CA: Sage Publications.
- Ibrahim, G., and V. Galt (2011). ‘Explaining Ethnic Entrepreneurship: An Evolutionary Economics Approach’. *International Business Review*, 20(6): 607–13. <https://doi.org/10.1016/j.ibusrev.2011.02.010>
- ILO (International Labour Organization) (2019). ‘4.5: Informal Economy Workers’. In *Minimum Wages: ILO Minimum Wage Policy Guide*. Available at: https://www.ilo.org/global/topics/wages/minimum-wages/beneficiaries/WCMS_436492/lang--en/index.htm (accessed 17 October 2020).
- ILO (2002). *Decent Work and the Informal Economy*. Geneva: International Labour Organization.
- Johnson, S., D. Kaufmann, and P. Zoido-Lobaton (1998). Regulatory Discretion and the Unofficial Economy. *The American Economic Review*, 88(2): 387–92.
- Jovanovic, B. (1982). ‘Selection and the Evolution of Industry’. *Econometrica*, 50(3): 649–70. <https://doi.org/10.2307/1912606>
- Kanbur, R. (2017). ‘Informality: Causes, Consequences and Policy Responses’. *Review of Development Economics*, 21(4): 939–61. <https://doi.org/10.1111/rode.12321>
- Kanbur, R., P.K. Rajaram, and A. Varshney (2011). Ethnic Diversity and Ethnic Strife. An Interdisciplinary Perspective. *World Development*, 39(2): 147–58. <https://doi.org/10.1016/j.worlddev.2009.11.034>
- Khalid, M., and J. Serieux (2018). ‘Uptake of Voluntary Health Insurance and Its Impact on Health Care Utilization in Ghana’. *Health Policy and Planning*, 33(7): 861–69. <https://doi.org/10.1093/heapol/czy063>
- Kranton, R.E. (1996). ‘Reciprocal Exchange: A Self-Sustaining System’. *The American Economic Review*, 86(4): 830–51.
- La Porta, R., and A. Shleifer (2014). ‘Informality and Development’. *Journal of Economic Perspectives*, 28(3): 109–26. <https://doi.org/10.1257/jep.28.3.109>
- Lassen, D.D. (2007). ‘Ethnic Divisions, Trust, and the Size of the Informal Sector’. *Journal of Economic Behavior & Organization*, 63(3): 423–38. <https://doi.org/10.1016/j.jebo.2005.07.001>
- Leigh, A. (2006). ‘Trust, Inequality and Ethnic Heterogeneity’. *Economic Record*, 82(258): 268–80. <https://doi.org/10.1111/j.1475-4932.2006.00339.x>

- Levy, S. (2010). *Good Intentions, Bad Outcomes: Social Policy, Informality, and Economic Growth in Mexico*. Washington, DC: Brookings Institution Press.
- Lewbel, A. (2012). 'Using Heteroscedasticity to Identify and Estimate Mismeasured and Endogenous Regressor Models'. *Journal of Business & Economic Statistics*, 30(1): 67–80. <https://doi.org/10.1080/07350015.2012.643126>
- LiPuma, J., S. Newbert, and J. Doh (2013). 'The Effect of Institutional Quality on Firm Export Performance in Emerging Economies: A Contingency Model of Firm Age and Size'. *Small Business Economics*, 40(4): 817–41. <https://doi.org/10.1007/s11187-011-9395-7>
- Loayza, N.V., L. Servén, and N. Sugawara (2009). 'Informality in Latin America and the Caribbean'. Policy Research Working Paper 4888. Washington, DC: The World Bank. <https://doi.org/10.1596/1813-9450-4888>
- Longhi, S. (2014). 'Cultural Diversity and Subjective Well-Being'. *IZA Journal of Migration*, 3(1): 13. <https://doi.org/10.1186/2193-9039-3-13>
- Maertens, M., and J.F.M. Swinnen (2009). 'Trade, Standards, and Poverty: Evidence from Senegal'. *World Development*, 37(1): 161–78. <https://doi.org/10.1016/j.worlddev.2008.04.006>
- Maloney, W.F. (1999). 'Does Informality Imply Segmentation in Urban Labor Markets? Evidence from Sectoral Transitions in Mexico'. *The World Bank Economic Review*, 13(2): 275–302. <https://doi.org/10.1093/wber/13.2.275>
- Maloney, W.F. (2004). 'Informality Revisited'. *World Development*, 32(7): 1159–78. <https://doi.org/10.1016/j.worlddev.2004.01.008>
- Meghir, C., R. Narita, and J.-M. Robin (2015). 'Wages and Informality in Developing Countries'. *American Economic Review*, 105(4): 1509–46. <https://doi.org/10.1257/aer.20121110>
- McEvily, S.K., K.M. Eisenhardt, and J.E. Prescott (2004). 'The Global Acquisition, Leverage, and Protection of Technological Competencies'. *Strategic Management Journal*, 25(8-9): 713–22. <https://doi.org/10.1002/smj.425>
- Miguel, E. (2006). 'Ethnic Diversity and Poverty Reduction?'. In R.B. Abhijit Banerjee and D. Mookherjee (eds), *Understanding Poverty*. Oxford: Oxford University Press. <https://doi.org/10.1093/0195305191.003.0012>
- Mishra, V., and R. Smyth (2015). 'Estimating Returns to Schooling in Urban China using Conventional and Heteroskedasticity-Based Instruments'. *Economic Modelling*, 47: 166–73. <https://doi.org/10.1016/j.econmod.2015.02.002>
- Montalvo, J.G., and M. Reynal-Querol (2005). 'Ethnic Polarization, Potential Conflict, and Civil Wars'. *American Economic Review*, 95(3): 796–816. <https://doi.org/10.1257/0002828054201468>
- Montalvo, J.G., and M. Reynal-Querol (2017). 'Ethnic Diversity and Growth: Revisiting the Evidence'. Economics Working Papers 1585. Barcelona: Department of Economics and Business, Universitat Pompeu Fabra.
- Osei-Boateng, C., and E. Ampratwum (2011). *The Informal Sector in Ghana*. Accra: Friedrich-Ebert-Stiftung.
- Ottaviano, G.I., and G. Peri (2006). 'The Economic Value of Cultural Diversity: Evidence from US Cities'. *Journal of Economic Geography*, 6(1): 9–44. <https://doi.org/10.3386/w10904>
- Platteau, J.-P., and E. Seki (2007). 'Heterogeneity, Social Esteem and Feasibility of Collective Action'. *Journal of Development Economics*, 83(2): 302–25. <https://doi.org/10.1016/j.jdeveco.2006.03.005>
- Posner, D. (2004). 'Measuring Ethnic Fractionalization in Africa'. *American Journal of Political Science*, 48(4): 849–63. <https://doi.org/10.1111/j.0092-5853.2004.00105.x>
- Rauch, J.E. (1991). 'Modelling the Informal Sector Formally'. *Journal of Development Economics*, 35(1): 33–47. [https://doi.org/10.1016/0304-3878\(91\)90065-4](https://doi.org/10.1016/0304-3878(91)90065-4)

- Rosenbaum, P.R., and D.B. Rubin (1983). 'The Central Role of the Propensity Score in Observational Studies for Causal Effects'. *Biometrika*, 70(1): 41–55. <https://doi.org/10.2307/2335942>
- Schipper, T.C. (2020). 'Informality, Innovation, and Aggregate Productivity Growth'. *Review of Development Economics*, 24(1): 125–43. <https://doi.org/10.1111/rode.12626>
- Schneider, F., and D.H. Enste (2000). 'Shadow Economies: Size, Causes, and Consequences'. *Journal of Economic Literature*, 38(1): 77–114. <https://doi.org/10.1257/jel.38.1.77>
- Senge, P.M., G. Carstedt, and P.G. Porter (2001). 'Innovating Our Way to the Next Industrial Revolution'. *MIT Sloan Management Review*, 42(2): 24–38.
- Sipsma, H., A. Ofori-Atta, M. Canavan, I. Osei-Akoto, C. Udry, and E.H. Bradley (2013). 'Poor Mental Health in Ghana: Who Is at Risk?' *BMC Public Health*, 13(1): 288. <https://doi.org/10.1186/1471-2458-13-288>
- Sowell, T. (1981). *Ethnic America: A History*. New York: Basic Books.
- Trax, M., S. Brunow, and J. Suedekum (2015). 'Cultural Diversity and Plant-Level Productivity'. *Regional Science and Urban Economics*, 53: 85–96. <https://doi.org/10.1016/j.regsciurbeco.2015.05.004>
- Wickes, R., R. Zahnow, G. White, and L. Mazerolle (2014). 'Ethnic Diversity and Its Impact on Community Social Cohesion and Neighborly Exchange'. *Journal of Urban Affairs*, 36(1): 51–78. <https://doi.org/10.1111/juaf.12015>
- Wilson, K.L., and A. Portes (1980). 'Immigrant Enclaves: An Analysis of the Labor Market Experiences of Cubans in Miami'. *American Journal of Sociology*, 86(2): 295–319. <https://doi.org/10.1086/227240>
- Xin Li, S. (2010). 'Social Identities, Ethnic Diversity, and Tax Morale'. *Public Finance Review*, 38(2): 146–77. <https://doi.org/10.1177/1091142110369239>

Appendix

Table A1: Description of variables and summary statistics

Variables	Description	Wave 1		Wave 2	
		Mean	SD	Mean	SD
Ethnic diversity	Index of ethnic fractionalization for Ghanaian districts	0.618	0.210	0.618	0.210
Polarization	Index of ethnic polarization for Ghanaian districts	0.579	0.143	0.579	0.143
Religious diversity	Index of religious fractionalization for Ghanaian districts	0.735	0.136	0.735	0.136
Informal work	Binary variable equals 1 if respondent engages in informal work (i.e., wage or self-employed)	0.212	0.409	0.223	0.416
Informal wage employment	Binary variable equals 1 if respondent engages in informal wage employment	0.0715	0.258	0.0873	0.282
Informal self-employment	Binary variable equals 1 if respondent engages in informal self-employment	0.145	0.352	0.147	0.354
Age	Age of respondent	34.17	13.78	35.78	14.40
Age squared	Square of age/100	13.58	10.34	14.88	11.01
Male	Binary variable equals 1 if respondent is male	0.457	0.498	0.456	0.498
Female	Binary variable equals 1 if respondent is female	0.543	0.498	0.544	0.498
Urban	Binary variable equals 1 if respondent lives in urban area	0.363	0.481	0.368	0.482
Primary	Binary variable equals 1 if highest level of education for respondent is primary education	0.0952	0.294	0.0844	0.278
Post-primary	Binary variable equals 1 if highest level of education for respondent is post-primary education	0.601	0.490	0.553	0.497
Secondary	Binary variable equals 1 if highest level of education for respondent is secondary school	0.0966	0.295	0.117	0.321
Post-secondary	Binary variable equals 1 if highest level of education for respondent is post-secondary school	0.0184	0.135	0.0127	0.112
Tertiary	Binary variable equals 1 if highest level of education for respondent is primary school	0.0198	0.139	0.0425	0.202
Married	Binary variable equals 1 if respondent is married	0.507	0.500	0.487	0.500

Source: authors' construction based on own analysis.

Table A2: Full results for the effects of ethnic diversity on informal work (Wave 1)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
		Informal work		Informal work (wage employment)		Informal work (self-employment)
Ethnic diversity	0.194*** (0.023)	0.062** (0.029)	0.071*** (0.015)	0.014 (0.018)	0.128*** (0.020)	0.040* (0.022)
Diversity squared	-0.214* (0.115)	-0.027 (0.154)	0.007 (0.081)	0.035 (0.099)	-0.192** (0.096)	-0.047 (0.109)
Age		0.071*** (0.003)		0.022*** (0.002)		0.043*** (0.002)
Age squared		-0.084*** (0.004)		-0.027*** (0.002)		-0.050*** (0.003)
Female		0.033*** (0.011)		-0.075*** (0.007)		0.103*** (0.008)
Married		-0.033** (0.013)		-0.025*** (0.008)		-0.002 (0.010)
Urban		0.113*** (0.012)		0.044*** (0.007)		0.049*** (0.009)
Primary		0.009 (0.024)		0.015 (0.016)		0.004 (0.017)
Post-primary		0.006 (0.017)		0.022** (0.010)		-0.005 (0.012)
Secondary		0.015 (0.023)		0.055*** (0.014)		-0.035* (0.018)
Post-secondary		0.015 (0.042)		0.083*** (0.021)		-0.064* (0.033)
Tertiary		-0.093** (0.043)		0.052** (0.022)		-0.152*** (0.039)
Observations	8,576	5,618	8,576	5,618	8,576	5,618

Note: all regressions control for regional fixed effects; standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Source: authors' construction based on own analysis.

Table A3: Full results for the effects of ethnic diversity on informal work (Wave 2)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
		Informal work		Informal work (wage employment)		Informal work (self-employment)
Ethnic diversity	0.439*** (0.107)	0.487*** (0.169)	0.142* (0.075)	0.285*** (0.108)	0.314*** (0.089)	0.245* (0.140)
Diversity squared	-0.329*** (0.121)	-0.551*** (0.195)	-0.066 (0.086)	-0.311** (0.125)	-0.273*** (0.101)	-0.296* (0.161)
Age		0.037*** (0.005)		0.005 (0.003)		0.044*** (0.004)
Age squared		-0.040*** (0.005)		-0.008** (0.004)		-0.045*** (0.005)
Female		-0.220*** (0.015)		-0.108*** (0.010)		-0.131*** (0.013)
Married		-0.065*** (0.017)		-0.027** (0.011)		-0.021 (0.013)
Urban		0.101*** (0.016)		0.064*** (0.010)		0.041*** (0.014)
Primary		-0.026 (0.034)		-0.004 (0.024)		-0.027 (0.028)
Post-primary		0.034* (0.021)		0.026* (0.014)		0.014 (0.017)
Secondary		0.052* (0.029)		0.063*** (0.018)		-0.027 (0.025)
Post-secondary		0.002 (0.060)		0.037 (0.037)		-0.056 (0.050)
Tertiary		-0.059 (0.038)		0.011 (0.023)		-0.072** (0.032)
Observations	6,850	3,824	6,850	3,824	6,850	3,824

Note: all regressions control for regional fixed effects; standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Source: authors' construction based on own analysis.

Table A4: Full results for the effects of ethnic diversity on informal work (Waves 1 and 2)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
		Informal work		Informal work (wage employment)		Informal work (self-employment)
Ethnic diversity	0.400*** (0.073)	0.245** (0.105)	0.096* (0.051)	0.094 (0.068)	0.301*** (0.062)	0.154* (0.082)
Diversity squared	-0.266*** (0.083)	-0.238** (0.121)	-0.026 (0.059)	-0.092 (0.079)	-0.231*** (0.070)	-0.154 (0.095)
Age		0.060*** (0.002)		0.021*** (0.001)		0.041*** (0.002)
Age squared		-0.069*** (0.003)		-0.025*** (0.002)		-0.045*** (0.002)
Female		-0.067*** (0.009)		-0.089*** (0.006)		0.017** (0.007)
Married		-0.043*** (0.011)		-0.029*** (0.007)		-0.004 (0.008)
Urban		0.105*** (0.010)		0.052*** (0.006)		0.046*** (0.008)
Primary		0.002 (0.020)		0.007 (0.013)		-0.000 (0.016)
Post-primary		0.023* (0.013)		0.024*** (0.009)		0.007 (0.010)
Secondary		0.044** (0.019)		0.066*** (0.011)		-0.026* (0.015)
Post-secondary		0.030 (0.035)		0.072*** (0.020)		-0.044 (0.029)
Tertiary		-0.063** (0.027)		0.033** (0.016)		-0.087*** (0.023)
Observations	15,426	9,442	15,426	9,442	15,426	9,442

Note: all regressions control for regional fixed effects; standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Source: authors' construction based on own analysis.