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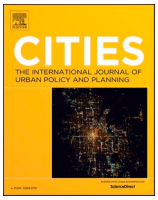

Determinants of the level of informality amongst female street food vendors in sub-Saharan Africa: Evidence from two regions in Ghana

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A B S T R A C T

This paper relied on data from the food service industry in Ghana to measure the extent of informality as well as to determine the motivations and challenges that influence selection into informal entrepreneurship. Because of the need to guarantee food safety and hygiene and protect the consuming public, enterprises in the food service industry are required to undergo some practices and procedures that limit the conventional measures of informality in describing them correctly. By varying this conventional definition, we showed that informality can more appropriately be measured in the food service industry. Using data from 406 female street food vendors in Ghana's Greater Accra and Central regions, we show that approximately 62 % of enterprises in the food service industry tend to be wholly informal. We again found that higher levels of informalization tend to be associated with survivalist and opportunist motivations as well as some economic and spatial challenges, and this is similar to characteristics of informal firms measured using the well-known conventional definitions. One practical implication of our finding is that a sector-specific definition may be appropriate when measuring informality in the food service industry. Our findings show that by varying this definition, many of the known characteristics of informalization can still be realized.

1. Introduction

The notion of informality has been conceptualized in relation to formality, albeit implicitly. The 1940s witnessed an attempt to define the concepts based on the dual economy model of the Dutch anthropologist Boeke (1942), where a distinction was made between a modern capitalist economy (i.e., the formal economy) and a traditional segment (i.e., the informal economy). In the 1950s, Lewis (1954) conceptualized a two-sector model of development in which one sector had productive modern capitalist firms, while the other featured peasant households that operated mainly on a subsistent basis. In the 1970s, the model by Harris and Todaro (1970) formally brought the dual economy into the standard two-sector framework of equilibrium in the development economics literature. Harris and Todaro (1970) distinguished between an industrialized urban sector and a traditional rural sector.

Relying on this dichotomy or dual economy types, the scholarly works of the British anthropologist, Hart (1973), and the ILO's (1972) mission to Kenya described informality as one that encompasses economic activities of the urban poor that were laid outside the formal one, are clandestine in nature and are not registered with a national government or authority (Sinha & Kanbur, 2012). The OECD (1997) also defined the informal sector as consisting of economic activities that circumvent cost and are excluded from the benefits and rights incorporated in laws and administrative rules covering property relationships, commercial licensing, labour contracts, torts, financial credit and social systems. More recent conceptualizations of informality have related it to the rise in the markets of developing cities given that most of the activities are small-scale and in low-income self-employment ventures.

Influenced mostly by the contributions/definitions of the ILO and the OECD, three broad measures (computation) of informality can be found in the literature (Webb et al., 2009; Thai & Turkina, 2014; Williams et al., 2016). The activity-based measures quantify informality by using "all legal production activities that are deliberately concealed from public authorities for the following reasons: to avoid payment of income, value-added and other taxes; to avoid payment of social security contributions; to avoid having to meet certain legal standards such as minimum wages, maximum hours, safety and health standards (OECD, 2004:139; Williams & Round, 2008:2). The job and enterprise-based measure compute informality as encompassing all "economic activities by workers or economic units that are in law or practice not covered by or insufficiently covered by formal arrangements (ILO, 2002:2).

There have been some general criticisms of these measurements because of the ambiguity and the conceptual difficulties associated with them. For instance, Hart (2006), Roy (2009) and Nguimkeu (2014) argued about the difficulty of relying on the ILO/OECD measures. They

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argued that relying on such measures is problematic because of the shrinking role of the state, especially in terms of the provision of social protection in more recent economies. Hart (2006) contended that the concept of informality/formality was created during the period when the state played a very central and fundamental role in developing economies. Therefore, the validity of the term has been undermined by the preponderant role of the market particularly in the face of economic liberalisation, where the private sector other than the state is privileged. Kanbur (2009), Chen (2014), Williams and Shahid (2016), Pratt (2019), Rigon et al. (2020) and Williams et al. (2020) shared similar concerns by suggesting that measuring informal and formal entrepreneurship in terms of adherence to state institutional arrangements leads to them being viewed as distinct and separate categories instead of a continuum. They argued that using the extent of regulation instead of sheer regulation status may be ideal.

There is another criticism, fuelled by an emerging literature that describes economic activities that fall between informal and formal sectors of the economy (De Mel & McKenzie, 2013; Williams & Shahid, 2016; Williams et al., 2020). Relying on evidence from Africa, they showed that a typical African economy is mainly characterised by a small formal sector, a large informal sector, and a small-medium scale sector; described as a missing middle (Spring, 2009:15; Langevang et al., 2015). These enterprises are neither wholly informal nor formal, but operate in the middle, exhibiting different levels of informality and formality (Williams et al., 2020).

Fields (1990), in his study of the urban informal sector within the context of developing economies, distinguished between what he termed the "lower tier" and "upper tier." The lower tier is characterised by ease of entry, low human and financial capital, lower level of earnings and necessity driven, while the upper tier, although may be operating on a smaller scale, displayed significant barriers to entry with a higher level of capital and skill, higher earnings and opportunity driven. Arimah (2001) examined the nature of informal sector linkages with that of the formal sector in Nigeria and reported that some informal sector firms made use of formal sector workers who have been registered with the social security administration. Djankov et al. (2002) opined that in many developing countries, some registered firms keep parts of their businesses informal and that such firms can be perceived as semi-formal.

Kamete (2004) in his study of home industries in Harare, Kenya, observed that while some informal economic activities paid taxes, none of them complied with labour laws such as minimum wage, pensions and business laws such as opening and closing hours, sales taxes, standards and trading licenses. De Castro et al. (2014), in a qualitative study of 30 enterprises in the Dominican Republic identified a continuum of informality and investigated the key features and motivations for operating at varying levels of informality. Williams et al. (2016) recognised various degrees and levels of informality of three hundred microenterprises in the city of Lahore, Pakistan. More recently, Williams et al. (2020) noted that in Ghana while only 21 % and 16 % of enterprises were, respectively, totally informal and formal, 63 %, constituting nearly two-thirds were neither completely informal nor formal.

Similar to the literature that has provided some criticism of the traditional measures of informality, which are based on compliance with rules and regulations established by formal institutions of the state, this paper focused on the case of the food service industry to measure the extent of informality. We argue that because of the need to guarantee food safety and hygiene as well as to protect the consuming public, enterprises in this industry are required to undergo some practices and procedures such that conventional measures of informality may fail to describe them appropriately. These firms need to register at their local district assemblies, are required to pay for inspection by the tax agencies and do keep some records for safety reasons. Relating this to the traditional measurements of informality described above, all such enterprises are likely to be labelled as formal enterprises even though they may not necessarily possess all the characteristics of formal firms. This paper aims to show that elements of informality are still admissible in the food service industry. In order to validate our findings with the larger literature on informality, the paper further explored the motivations and challenges that influence selection into the informal food service industry.

In coming up with an appropriate measure of informality in the food service industry, we take a cue from the Food and Agriculture Organization (FAO) (2007; 2011, 2012a, 2012b, 2016) which relied on 'physical structure' to describe heterogeneity within the food service industry as well as identify the continuum of activities described as having characteristics of informality at varying levels. For instance, the FAO (2011:2) described food vendors that used pushcarts, bicycles, baskets or balance poles to be highly informal. Conversely, those that operated within four permanent walls including 'cafés', 'takeaways', 'chop bars' and restaurants were described as formal. The FAO (2016) also defined informal food service enterprises as comprising any food or beverage that is ready for consumption, sold and occasionally prepared in public places by both vendors and hawkers in both removable and semi-removable structures.

Similarly, Mudashiru et al. (2014:8) defined the informal food service industry as unstandardised outlets that are usually unregistered and made up of small operators providing informal casual table services to customers. Conversely, they defined the formal food service sub-sector as those standardised outlets that are registered with formalised business names and organized structures whose operations were usually large-scale and certified by appropriate regulatory authorities. Yasmeen (2001:33), however, contended that using compliance with established rules by the state to distinguish the informal food service sub-sector from the formal one could be misleading. In Yasmeen's (2001:33), view, this is mainly because in most developing countries many micro and small enterprises are regulated by the state, legally recognised and members of trading associations, cooperatives and unions. This, therefore, seems to suggest that in the food service industry physical structure constitutes a significant parameter for distinguishing informal food service enterprises from formal ones.

In this paper, we complement the ILO definition of informality (legal registration status, tax registration status, account ownership) with measures of physical structure to measure the degree of informality in the food service industry. We narrowed our discussion to female food vendors as they constitute a large share of food vendors in the country. We again focused on two regions in Ghana (the Central and the Greater Accra Regions) as they have the highest proportion of female entrepreneurial activities in the food service industry (GSS, 2014). Further, the two regions typify the major localities in Ghana, urban and rural. More importantly, the two regions represent major areas in the country where poverty is respectively lower (Greater Accra Region) and higher (Central region). Also, the localities exhibit female food enterprises situated within permanent and non-permanent structures with a diverse disparity in terms of the number of employees and regulatory arrangements. This helps to situate the entire entrepreneurial landscape of the industry along informal and formal lines.

Our findings generally showed that approximately 62 % of female street food vendors are wholly informal when relying on our relatively new measure. We again found higher levels of informalization in the food service industry to be associated with some survivalist and opportunist motivations as well as some economic and spatial challenges, which is similar to characteristics of informal firms defined using conventional definitions. One practical implication of our finding is that a sector-specific definition may be appropriate when measuring informality in the food service industry. Our findings show that by varying this definition, many of the known characteristics of informalization can still be realized.

2. The determinants of informal entrepreneurship

2.1. The role of motivation

Most studies attempting to understand the motivation underlying entrepreneurial activities have relied on the self-determination theory. The theory describes the extent to which the motivation of an individual can be driven by both internal and external factors (intrinsic and extrinsic motivation) (Deci & Ryan, 1985; Ryan & Deci, 2000). According to Ryan and Deci (2000), individuals are extrinsically motivated when they perform activities in order to obtain a tangible reward or a reward that is of instrumental value. Extrinsic motivation involves performing an activity, not because of its mere enjoyment but because it brings benefits which are of "separable value". This kind of motivation is usually controlling or involuntary and thus has some elements of compulsion or it is undertaken to avoid sanctions or punishments, which is akin to some push factors. People perform such actions under compulsion and pressure to circumvent sanctions and sometimes guilt and anxiety. The activity is thus carried out with "resentment", "resistance" and "disinterest" (Ryan & Deci, 2000:56). Some aspects of the literature have described extrinsic motivation as an economic necessity or an element having a survivalist inclination, while others have labelled it "negative", "pale" and "impoverished".

Ryan and Deci (2000) further intimated that despite its compulsive nature, extrinsic motivation harbours within its ambit some features of volition. These include external regulation, introjection regulation, identification, and integration. External regulation describes the core definition of extrinsic motivation where an activity or action is undertaken to satisfy an external reward or to obtain an externally imposed reward. Introjected regulation describes actions that are performed out of self-esteem or personal ego. Identification, as the name connotes, is when an individual has identified him/herself with the behavior and has accepted it. The integrated form of autonomy is when the action is considered an integral part of the person. The individual fully accepts that the activity constitutes an essential aspect of the self.

In the same vein, existing knowledge on motivation has acknowledged the variability embedded within extrinsic motivation. The extrinsic motivation that is caused by economic necessity is no longer seen as a "unitary phenomenon" that expresses only compulsion and tangible rewards. In addition to its compulsory nature, economically necessitated motivation sometimes exhibits some forms of autonomy. Others also simultaneously display both economic necessity and opportunistic motivations (Williams, 2009; Williams & Gurtoo, 2011; Adom, 2014). The last category display more economical rather than opportunistic inclinations and vice versa (Aidis et al., 2007; Williams & Nadin, 2012).

Intrinsic motivation occurs when individuals are driven to perform an activity in order to satisfy an inner psychological need or desire. The activity is performed out of choice or voluntarily and the satisfaction that is derived from the performance of the activity itself and not based on any separable reward. It can be argued that the decision to become an entrepreneur may not only be influenced by the internal and psychological desire to be in charge of one's destiny. Besides, the decision depends on the desire to be independent, the ability to create wealth, prove one's worth, attain social status to continue a family business, and balance family responsibilities while earning an income (Orhan & Scott, 2001; Williams, 2009; Williams & Gurtoo, 2011; Adom & Williams, 2014; Adom, 2014; Williams & Youssef, 2014).

The self-determination theory has been applied variedly in the literature. Particularly in relation to studies on informality, both intrinsic and extrinsic motivation has been described as good predictors in the decision to either fully comply with tax obligations or otherwise; and advance informality (Ianole-Călin et al., 2022; Onu et al., 2019). Onu et al. (2019) showed that internalized motivation, which is largely underpinned by an individual's value systems, induces tax compliance. They showed that it is a personal and inborn attribute that compels citizens to consider or regard the payment of taxes as a moral duty that would ultimately enhance the well-being of the citizenry and advance the notion of formality. Conversely, extrinsic motivation, which is subsumed under three main external factors, influences the appropriate behaviours of individuals: fear of sanctions and audits, social pressure and lack of tax knowledge. They finally showed that when internalized and extrinsic motivations are considered together, the former better predicts self-reported tax compliance. Ianole-Călin et al. (2022) also relied on the self-determination theory to explain participation in undeclared work and under-declared employment. Similar to Onu et al. (2019), they showed that only intrinsic motivations have a significant and negative effect on the likelihood of engaging in undeclared work practices. They also showed that deterrence measures do not have a significant impact on the younger population.

From the female entrepreneurship literature, some evidence of the application of the self-determination theory exists, and in some instances implicitly. For instance, it has been suggested that female entrepreneurs are mostly compelled into entrepreneurship to earn more income and as a survival strategy due to the absence of alternative means of livelihood (Adom, 2014; Otoo et al., 2012; Quartey et al., 2018; Williams & Youssef, 2014). The decision to operate in either the informal or formal sectors is, therefore, likely to be borne out of some form of obligation. This could be triggered by several factors including lack of formal employment, insufficient income, frustration with a previous formal job, and the need for a flexible work schedule and autonomy (Adom, 2014). It has also been shown that some female entrepreneurs who are supposed to display the pure form of economic necessity, contrarily, show opportunistic inclinations (Adom, 2014; Adom, 2015; Snyder, 2004).

2.2. The role of business challenges

The challenges that informal enterprises encounter have long been acknowledged in the literature. Research that has been conducted on female informal entrepreneurship has highlighted some of the challenges and this includes various socio-economic and institutional challenges such as the low level of formal education and managerial skills of owners (Babbitt et al., 2015; Spring, 2009), limited access to financial resources, business location, market space and transportation (Baah-Ennumh & Adom-Asamoah, 2012; Peprah et al., 2019; Steel et al., 2014) and high cost of taxes and fees (Baah-Ennumh & Adom-Asamoah, 2012; Peprah et al., 2019). There are some other challenges related to volatility in the economy and the market in terms of low demand for their goods and services, seasonality, price fluctuations and competition (FAO, 2012a, 2012b; and Peprah et al., 2019). It is important to mention that the presence or otherwise of these challenges affect entry into informality differently.

For the purposes of this paper and given that we are focusing on the food service industry, we focus the discussion on the extent to which challenges affect entry into informality by relying on four unique measures as follows: (i) institutional, (ii) social, (ii) spatial and (iv) economic. More generally, institutional challenges encapsulate those associated with complying with institutional arrangements, such as the costly and time-consuming nature of licensing procedures and the time-consuming nature of monitoring (Djankov et al., 2002; Tinker, 2003; Bobodu, 2010; FAO, 2012a, 2012b; Babbit et al., 2015; Williams & Nadin, 2012; FAO, 2016; Williams et al., 2016; Peprah et al., 2019). Social challenges include the lack of association, inadequate training and services such as potable water (Baah-Ennumh & Adom-Asamoah, 2012; Koto, 2015; Osei-Boateng & Ampratwum, 2011; Peprah et al., 2019). Naturally, informal firms by their nature operate without compliance with institutional arrangements. Similarly, they do not require any sophisticated training to commence business, However, access to some social facilities may be very critical. We, therefore, do not expect institutional challenges to significantly affect entry into informality. In the case of social challenges, the expectation is mixed as it

depends critically on which factors overweighs the others.

Spatial challenges, on the other hand, relate to the challenges of location, infrastructure and market. All these indicators affect entry into informality differently. For instance, while some scholars argue that the availability, accessibility and more importantly quality of these services offer substantial gains to entrepreneurs; in many developing countries, such services are virtually inaccessible to both informal and formal firms (Fallah, 2014). Even where they could be accessed, the quality tends to be poor (Fallah, 2014). In quite a different spectrum, a large informal sector inadvertently mirrors substantial government revenue losses because of tax evasion (Schneider & Enste, 2000; Djankov et al., 2002; Fallah, 2014). In countries with relatively large informal sectors, revenue losses may further be heightened by the fact that formal firms tend to evade taxes (Woodruff, 2013). This is likely to undermine the state from providing high-quality infrastructure and public services and other incentives. Further, the situation is likely to compel the government to overburden the small formal sector to make up for the tax losses. Excessive tax burden coupled with poor public services might serve as a disincentive to both informal and formal businesses, culminating in a vicious circle of expanding the informal sector and inadequate provision of public services (Fallah, 2014).

Competition, seasonality, limited access to credit and price hikes, and low demand for goods fall under the ambit of economic challenges (Dzisi, 2008; Orhan & Scott, 2001). It has been argued that these economic challenges generally discourage formalization (Richardson et al., 2004; Dzisi, 2008; Okafor & Amalu, 2010; FAO, 2012a, 2012b; Mumuni et al., 2013).

From the above discussions, we expect the informal food service subsector to be more constrained by social challenges (such as limited access to training, association, water and electricity), economic challenges (such as inadequate access to credit, price hikes, competition and seasonality) and spatial challenges (such as improper market location and space). On the other hand, it is expected that the informal food service sub-sector will not be significantly affected by institutional challenges such as the time-consuming and expensive nature of licensing procedures, and the time-consuming nature of monitoring.

Based on the literature that was discussed, we make the following hypotheses:

Hypothesis 1. Economic motivation tends to positively influence the decision to operate informally.

Hypothesis 2. Personal motivation will negatively affect the decision to operate informally.

Hypothesis 3. Social motivation tends to positively influence the decision to operate informally.

We are again interested in exploring the challenges associated with becoming informal. Since we are using a more abridged definition of informality, the idea is to find out whether the challenges that are typical of most informal enterprises are in line with our definition. Based on the literature that was discussed, we make the following hypotheses:

Hypothesis 4. Institutional Challenges will not impede the choice of becoming informal.

Hypothesis 5. Social Challenges will negatively influence the decision to operate informally.

Hypothesis 6. Economic Challenges will impede becoming informal.

Hypothesis 7. Spatial Challenges will impede the choice of operating informally.

3. Data, variables and methods

3.1. Data

The data used for the paper was obtained from a survey of 406 female street food vendors in two regions in Ghana: the Greater Accra and Central regions. These two regions were strategically selected as they have the highest proportion of female entrepreneurial activities in the food service industry (GSS, 2014). Further, the two regions typify major localities in the country, urban and rural. The two regions represent major areas in the country where poverty is respectively lower (Greater Accra Region) and higher (Central region). Also, the localities exhibit female food enterprises situated within permanent and non-permanent structures with a diverse disparity in terms of the number of employees and regulatory arrangements.

In selecting the required sample for the study, reference is made to the National Analytical Report of the 2010 Population and Housing Census (GSS, 2013), in which the female population within the private informal sector constituted 702,680 representing 79.7 % of the total informal sector. This figure rose to 1,286,814 in 2010, representing 88.6 % of the total sector. The female population of the private informal food sub-sector in 2010 was 161,219 representing 11.1 % of the total population of 14,523,386 in the food sector. Applying the ten years sector growth rate of 83.12 % to the 161,219 population of the food service industry in 2010 gave a projected private female informal food service population of 295,023 in another decade. Saunders et al. (2016) assert that a sample of 383 is representative of 100,000 respondents and, 384 respondents are representative of a population of 1,000,000 at a 95 % level of significance with a 5 % margin of error. Given that the research population of the food sector is projected at 295,023, it implies that a sample in the region of 384 is representative and ideal to measure the size of informality in the food service industry. To account for surveying errors, a proportion of 5 % of the sample was added to obtain 406. To select participants for the survey, a maximum variation sampling method was used. This sampling method is used commonly as a substitute for random probability sampling in contexts where the target population is invisible or relatively inaccessible (Adom and Williams, 2014; Williams & Gurtoo, 2011). This sampling method was used to select localities in the Greater Accra and Central regions: namely, La-Nkwantanang Madina Municipality and Okaikoi South Sub-Metropolitan Area (Greater Accra Region), Awutu Senya East Municipality and Agona West Municipality (Central Region). Within each of these communities, a spatially stratified sampling technique was used to obtain the required sample of female business owners or entrepreneurs based on several common features: physical structure and extent of registration. In doing this, a list of female food business owners was generated. Subsequently, business zones were created and labelled strata to facilitate the sample selection procedure. A ratio of the population of each identified stratum to the general listed population led to the calculation of the sample fraction for the study. In this case, it is the ratio of the strata population to the total listed population in the four selected communities. In total, a minimum of 40 stratums were developed for each of the four communities and a sample of 2–4 female food vendors were selected and interviewed in each of the strata.

The survey, mainly face-to-face and organized in June–July 2020, comprised an enumerator asking a series of questions to which the respondents were required to respond. Each interview section lasted between 45 and 60 min depending on the respondent. The structure of the questionnaire was as follows. It began with asking the respondents about their demographic data as well as information about their incomes, number of employees and characteristics. The next section posed a series of questions concerning the motivation for undertaking their current business operations as well as the challenges associated with the current business. The last section posed questions related to the general business environment, the registration status of the businesses as well as any obstacles to doing business from a policy perspective.

3.2. Variables

3.2.1. Dependent variable

The main dependent variable in this paper is the sector of operation

for a female food vendor. In order to determine the different levels of informalization of the female food vendors, four variables were used to generate a dichotomous variable of informality by relying on (i) legal (registration) status, (2) tax (registration) status, (3) account ownership and (4) the type of physical structure of the enterprise. It is important to note that most studies rely only on the first three variables (see Adom and Williams, 2014) but given the uniqueness of the food service industry, the fourth variable is included. As explained earlier, almost all actors in the food sector may be considered formal if the definition is restricted to the first three variables and this is mainly because most of them are registered to meet local authority regulations about food safety and not necessarily because they meet the characteristics of formal firms. For this paper, a firm is considered formal if it is registered with local authorities (district assembly and Registrar General Department), tax authorities, keeps a formal account and has a physical structure in the form of cafés, 'takeaways', '*chop bars*' and restaurants.

3.2.2. Independent variables

For this paper and based on the main objectives, the main variables relied on as independent variables are defined in Table 1 as follows.

3.3. Descriptive findings

Out of the 406 enterprises surveyed, 152 (38 %) were found to be wholly formal, i.e., are legally registered by local authorities as well as tax authorities, keep a formal account of activities and have a physical structure of the form of a café, 'takeaways', 'chop bar' or restaurant. It is important to mention that all the firms classified as formal have varying degrees of physical structure, which implies that the firms can further be sub-categorised but that is not of current interest. Correspondingly, 254 (64 %) of the firms can be classified as informal firms.

To understand the main differences that exist between formal food vendors and informal food vendors, we relied on a set of variables that described the motivation for entry. We also relied on a set of business challenges that the respondents face in the operations. For instance, regarding motivation for entry, three sub-categories were relied on: economic, social and personal. These sub-categories were chosen based on the literature discussed in Section 2. To unearth the economic motivations behind the setting up of businesses in the food service industry, respondents were asked to indicate the extent to which they agreed to two statements (1) *Cannot find any work to do*, (2) *To accumulate wealth/ to make more money*. It was observed that although both the formal and informal enterprises disagreed with the statement about not finding any work to do, the extent of disagreement was much higher in formal enterprises relative to the informal ones (Table 2). Also, both enterprises agreed mostly to the statement of venturing into the food service industry because of the need to make wealth or make more money. An important conclusion that can be made so far is that the female entrepreneurs in both the informal and formal sectors were economically motivated into entering the food service industry, not because of the lack of other alternative sources of livelihood, but rather the desire to make more money to supplement household incomes.

With regards to the measures for social motivation, the respondents were asked to respond to the extent to which they agreed to the following statements (1) *To continue a family tradition*, (2) *To be able to cater for my children*, (3) *To be able to cater for other family members*, (4) *To be able to perform household chores* and (5) *Convenience*. Respondents from both the formal and informal firms generally agreed to all of the statements with the exception of continuing a family tradition. By intuition, the respondents did not show a strong social motivation for entering the food service industry. This notwithstanding, we find that a higher proportion of informal firms generally agreed with the statements relative to the formal firms. It is important to mention that this finding is not entirely surprising due to the primary roles of females as caregivers for their families. Females typically experience disruptions and interruptions in their career development. They, therefore, view entrepreneurship as an avenue that would enable them to combine work and their reproductive roles.

For personal motivation, the respondents were asked to respond to the extent to which they agreed with the following statements: (1) *To be independent*, (2) *To develop a hobby into a commercial enterprise* and (3) *To get more respect working for oneself*. Respondents in both the formal and

Table 1
Definition of variables.

Independent variable	Definition
Motivation	
Economic Motivation	An index from two variables: (1) Cannot find any work to do (2) To accumulate wealth/ to make more money
Social Motivation	An index from four variables: (1) To continue a family tradition (2) To be able to cater for my children (3) To be able to cater for other family members (4) To be able to perform household chores (5) Convenience
Personal Motivation	An index from three variables: (1) To be independent (2) To develop a hobby into a commercial enterprise (3) To get more respect working for oneself
Challenges	
Institutional Challenges	An index from five variables: (1) Licensing procedures are costly (2) Licensing procedures are time-consuming (3) Food safety inspection tests are costly (4) Food safety tests are time-consuming (5) Monitoring by authorities is time-consuming
Social Challenges	An index from three variables: (1) Lack of business groups and association negatively affect business (2) Non-availability of potable water badly affects business operation (3) Lack of Refrigerators badly affects business operation (4) Lack of Training badly affects business operation (5) Employees' attitudes badly affect business operations
Economic Challenges	An index from five variables: (1) Inadequate Access to cheap credit badly affects business (2) Competition badly affects business (3) Inflation badly affects business operations (4) Low level of sales badly affects business (5) Seasonality badly affects business operations
Spatial Challenges	An index from four variables: (1) Business is poorly located (2) Physical Structure of the business badly affects business operation
Other control variables	
Age	Age in years
Educational Attainment	A categorical variable, defined as follows: 0 = A worker with up to primary education 1 = A worker with secondary education 2 = A worker with post-secondary education
Marital Status	A dummy equal to one if the vendor is married and zero otherwise
Nationality of Entrepreneur	A dummy for a Ghanaian National; generally defined as Ghanaians either by birth or by naturalization.
Number of Employees	Total number of fulltime and parttime employees
Municipality	A categorical variable, defined as follows: 0 = La-Nkwantanang Madina Municipality 1 = Okaikoi South Sub-Metropolitan Area 2 = Awutu Senya East Municipality 3 = Agona West Municipality

Table 2
Descriptive statistics - measures for motivation.

	Formal (152)					Informal (254)				
	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree
Economic motivation										
Cannot find any work to do	64 %	20 %	3 %	9 %	4 %	42 %	20 %	6 %	11 %	22 %
To accumulate wealth/ to make more money	5 %	4 %	5 %	17 %	69 %	0 %	3 %	0 %	11 %	86 %
Social motivation										
To continue a family tradition	63 %	11 %	1 %	8 %	18 %	50 %	6 %	1 %	9 %	34 %
To be able to cater for my children	7 %	1 %	4 %	20 %	69 %	2 %	2 %	2 %	3 %	90 %
To be able to cater for other family members	12 %	3 %	27 %	31 %	27 %	3 %	3 %	36 %	16 %	42 %
To be able to perform household chores	19 %	11 %	11 %	34 %	25 %	0 %	3 %	2 %	38 %	57 %
Convenience	18 %	12 %	6 %	26 %	38 %	2 %	2 %	2 %	35 %	59 %
Personal motivation										
To be independent	3 %	37 %	11 %	22 %	27 %	6 %	33 %	7 %	15 %	39 %
To develop a hobby into a commercial enterprise	5 %	5 %	16 %	34 %	41 %	13 %	13 %	13 %	36 %	25 %
To get more respect working for oneself	3 %	5 %	17 %	38 %	37 %	1 %	3 %	29 %	26 %	41 %

informal enterprises mostly agreed with these statements, although the proportions were slightly higher for informal enterprises relative to the formal ones.

With regard to the challenges, three sub-categories were used: institutional, social, economic and structural/spatial. The respondents were asked to indicate the extent to which they agreed to a set of questions which were generated based on the literature discussed in Section 2. In summary, we find both formal and informal enterprises not

Table 3
Descriptive statistics - measures for business challenges.

	Formal (152)					Informal (254)				
	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree
Institutional Business Challenges										
Licensing procedures are costly	8 %	13 %	10 %	24 %	45 %	7 %	20 %	44 %	14 %	14 %
Licensing procedures are time-consuming	41 %	38 %	9 %	9 %	3 %	42 %	23 %	19 %	11 %	6 %
Food safety inspection tests are costly	12 %	34 %	24 %	16 %	14 %	16 %	24 %	44 %	9 %	7 %
Food safety tests are time-consuming	47 %	30 %	10 %	10 %	4 %	48 %	24 %	11 %	12 %	4 %
Monitoring by authorities is time-consuming	62 %	25 %	7 %	3 %	3 %	59 %	26 %	8 %	3 %	4 %
Social Challenges										
Lack of business groups and association negatively affect business	55 %	18 %	22 %	3 %	1 %	80 %	9 %	6 %	3 %	2 %
Non-availability of potable water badly affects business operation	49 %	22 %	14 %	5 %	9 %	65 %	13 %	11 %	4 %	8 %
Lack of Refrigerators badly affect business operation	42 %	26 %	12 %	8 %	12 %	67 %	16 %	5 %	3 %	10 %
Economic challenges										
Inadequate Access to cheap credit badly affects business	50 %	9 %	11 %	17 %	13 %	47 %	18 %	12 %	9 %	13 %
Competition badly affects business	30 %	16 %	32 %	12 %	11 %	27 %	9 %	35 %	13 %	16 %
Inflation badly affects business operations	9 %	9 %	15 %	11 %	55 %	4 %	4 %	4 %	11 %	77 %
Low level of sales badly affects business	1 %	14 %	0 %	9 %	75 %	1 %	7 %	2 %	13 %	78 %
Seasonality badly affects business operations	7 %	14 %	8 %	11 %	60 %	3 %	14 %	12 %	3 %	69 %
Structural/Spatial Challenges										
Business is poorly located	41 %	24 %	26 %	7 %	3 %	25 %	15 %	44 %	11 %	5 %
Lack of Training badly affects business operation	43 %	13 %	28 %	13 %	3 %	52 %	15 %	16 %	8 %	10 %
Employees' attitudes badly affect business operations	16 %	11 %	37 %	11 %	26 %	45 %	13 %	33 %	4 %	4 %
Physical Structure of the business badly affects business operation	45 %	24 %	9 %	3 %	20 %	21 %	9 %	8 %	11 %	50 %

to be satisfied with licensing procedures, the time required for food safety tests and monitoring by authorities (Table 3). Most of the respondents were indifferent about the cost of licensing and food safety inspections. In addition, both formal and informal enterprises disagreed with questions related o social challenges, i.e., lack of business groups, non-availability of potable water, and lack of refrigerators Table 3). Further, the respondents generally agreed to questions related to economic challenges (access to credit, competition, the effects of inflation as well as seasonality in business relations). Similar responses were found for the structural challenges.

In Table 4, where we present the differences that exist between formal food vendors and informal food vendors using some demographic characteristics, we find very marginal differences between the two sets of enterprises. For instance, the average number of employees was observed to be approximately 4 in both sectors. While about 70 % of enterprises in the formal sector had some form of experience in the food service industry, about 72 % of enterprises in the informal sector indicated they had some prior experience in the industry. When it comes to access to credit, only 23 % of enterprises in the formal sector indicated they had some form of access, with that of the informal sector being 30 %. Once again, not much difference can be observed in the educational pattern of the females in both the formal and informal sectors. While about 36 % of females in both sectors had no education, almost 41 % had primary education. In addition, we find about half of the enterprises interviewed had owners between 31 and 40 years. It is important to finally note that a statistical test to confirm any differences between these statistics was found to be significant only for the number of employees, some age categories (<30 and 41–50) and location.

3.4. Methods

Given the nature of the dependent variable (dichotomous), the main estimation relied on is the Probit estimator. The main independent variables (motivation and challenges) were constructed as indexes. The principal component analysis was used to construct these variables.

4. Results

4.1. Multivariate analysis

We present in Table 5, the marginal effects of the Probit model estimator explaining the likelihood of a female food vendor choosing to be in the informal sector. Specifications (1) and (2) include economic motivation which is decomposed into survivalist and economic opportunity. In specifications (3) and (4), motivation is divided into personal and social challenges respectively. For specification (5), all four motivation variables are included.

From the first five (5) specifications, it can be observed that survivalist and opportunistic motivations seem to be positively associated with the probability of becoming informal. In the case of personal motivation, the association is negative and insignificant. The case of social motivation is positive and significant. As a robustness check, all four motivation variables are included in the specification (4). The finding of a positive association between survivalists and social motivations is maintained. Furthermore, personal motivation which was earlier insignificant became statistically significant. The results generally tend to show that economic and social factors underpin the decision to operate in the informal sub-sector of the food service industry. That is, female entrepreneurs in the informal sub-sector are motivated to venture into food vending because the industry is the only avenue of employment that would enable them to generate income. Also, this decision is underlined by the desire to cater for their children and other family members, perform household chores and continue a family business.

Specifications 5–8 contained individual measures of business challenges, while specification 9 include all the measures of business challenges. Some variables denoting various forms of business challenges have been found to influence the likelihood of selection into the informal sub-sector. For instance, we found that institutional and social challenges tend to lessen the likelihood of a female food vendor choosing the informal sector. Institutional challenges encapsulated the institutional arrangements of the state, such as the costly and time-consuming nature of licensing procedures and the time-consuming nature of monitoring. Social challenges included a lack of association, inadequate training and services such as potable water. Intuitively, the informal sector in Ghana tends to be characterised by the absence of such social facilities (Baah-Ennumh & Adom-Asamoah, 2012; Peprah et al., 2019). Therefore, their presence should not be an essential factor in determining selection into the informal sub-sector.

In column 10, where we combined measures for both motivation and challenges, we find that the results for survivalist motivation, personal motivation and social motivation remain unchanged. Similarly, the results for spatial challenges were maintained. It is important to note that analysing the business challenges of both sectors along institutional, economic, social and spatial, offered some considerable level of insights into the challenges of the two sectors.

Based on specifications 1, 4 and 10, our first hypothesis of economic motivation being an important predictor of the decision to operate informally is confirmed. Specifications 4 and 10 completely reject the

Table 4
Descriptive statistics - other control variables.

Variable	Formal					Informal					Pearson Chi2
	Obs	Mean	Std. dev.	Min	Max	Obs	Mean	Std. dev.	Min	Max	
Number of Employees	152	3.0526	2.5703	1	11	254	4.4094	3.1619	1	19	49.90***
Years of experience	152	0.6974	0.4609	0	1	254	0.7205	0.4497	0	1	0.42
Have Access to Credit	152	0.2303	0.4224	0	1	254	0.2992	0.4588	0	1	2.07
Education						254					
No Education	152	0.3684	0.4840	0	1	254	0.3504	0.4780	0	1	0.09
Primary/Middle	152	0.4342	0.4973	0	1	254	0.4094	0.4927	0	1	0.51
Secondary	152	0.1184	0.3242	0	1	254	0.1614	0.3686	0	1	1.07
Post-Secondary	152	0.0789	0.2705	0	1	254	0.0787	0.2699	0	1	0.22
Age category						254					
≤30	152	0.3224	0.4689	0	1	254	0.2087	0.4072	0	1	6.51***
31–40	152	0.3289	0.4714	0	1	254	0.3858	0.4878	0	1	1.26
41–50	152	0.2237	0.4181	0	1	254	0.3189	0.4670	0	1	3.90**
Above 50	152	0.1250	0.3318	0	1	254	0.0866	0.2818	0	1	1.12
Municipality						254					
La-Nkwantanang Madina Municipality	152	0.4934	0.5016	0	1	254	0.2598	0.4394	0	1	22.27***
Okaikoi South Sub-Metropolitan Area	152	0.0329	0.1790	0	1	254	0.4606	0.4994	0	1	75.48***
Awutu Senya East Municipality	152	0.0724	0.2600	0	1	254	0.2362	0.4256	0	1	22.41***
Agona West Municipality	152	0.4013	0.4918	0	1	254	0.0433	0.2039	0	1	88.72***

Table 5
Marginal effects for informality amongst female food vendors.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Motivation										
Economic (survivalist)	0.065***			0.059***						0.058***
	(0.013)			(0.013)						(0.012)
Economic (opportunistic)	0.128***			0.048						0.020
	(0.022)			(0.030)						(0.029)
Personal		−0.006		−0.056***						−0.037**
		(0.018)		(0.019)						(0.018)
Social			0.115***	0.116***						0.126***
			(0.017)	(0.026)						(0.022)
Challenges										
Institutional					−0.047*				−0.036	−0.020
					(0.025)				(0.024)	(0.021)
Social						−0.040**			−0.044***	−0.014
						(0.017)			(0.016)	(0.014)
Spatial							0.100***		0.096***	0.114***
							(0.015)		(0.015)	(0.014)
Economic								0.106***	0.045	0.031
								(0.029)	(0.029)	(0.027)
Log of Employment	0.056**	0.061***	0.065***	0.052**	0.062***	0.057**	0.050**	0.059***	0.043**	0.033*
Municipality										
Okaikoi South Sub-Metropolitan Area	0.437***	0.475***	0.394***	0.381***	0.470***	0.470***	0.431***	0.463***	0.414***	0.294***
	(0.046)	(0.047)	(0.052)	(0.049)	(0.048)	(0.047)	(0.047)	(0.047)	(0.048)	(0.051)
Awutu Senya East Municipality	0.312***	0.348***	0.310***	0.301***	0.358***	0.365***	0.290***	0.365***	0.329***	0.223***
	(0.058)	(0.061)	(0.058)	(0.054)	(0.061)	(0.060)	(0.059)	(0.057)	(0.056)	(0.054)
Agona West Municipality	−0.228***	−0.295***	−0.299***	−0.218***	−0.296***	−0.285***	−0.285***	−0.297***	−0.265***	−0.182***
	(0.068)	(0.064)	(0.066)	(0.071)	(0.064)	(0.065)	(0.064)	(0.064)	(0.063)	(0.061)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	406	406	406	406	406	406	406	406	406	406
AUC	0.90	0.88	0.89	0.91	0.88	0.88	0.90	0.88	0.91	0.95
pR2	0.42	0.35	0.41	0.46	0.35	0.36	0.42	0.37	0.44	0.57
AIC	343	378	346	326	431	428	341	365	332	271

Robust Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Control Variables (age, access to credit, experience and education) excluded for brevity.

second hypothesis about the importance of personal motivation in predicting the choice of becoming informal. However, specifications 3, 4 and 10 support the third hypothesis about the importance of social motivation in predicting informality. Regarding the hypotheses about challenges associated with becoming informal, specifications 5, 6 and 9 reject the importance of institutional and social challenges in becoming informal. Conversely, 7–10 accept the hypothesis about the importance of spatial and economic challenges.

4.2. Discussions of findings

This paper sought to measure the extent of informality in the food service industry and determine the factors that serve as motivations or challenges with selection. This is motivated by the different conceptualizations of informality in the literature and the fact that the conventional ILO definitions, based on registration, appear limiting in describing informal firms in the food service industry. Because of the need to guarantee food safety and hygiene as well as to protect the consuming public, enterprises in the industry are usually required to undergo some practices or procedures before operating. Usually, these firms need to register at their local district assemblies, are required to pay for inspection and are thereby covered by the tax agencies and do keep some records for safety reasons. Relating this to the traditional ILO measurements of informality, all such enterprises are likely to be labelled as formal enterprises even though they may not necessarily possess characteristics of formal firms. This paper aimed to show that elements of informality are still admissible in the food service industry.

In doing the analysis, a survey was organized for 406 enterprises in two regions, the Central and the Greater Accra Regions. By defining informality using the ILO measurement of registration status with local authorities (district assembly and Registrar General Department) and tax authorities as well as the ownership of a formal account and complementing it with the FAO measure of physical structure (which was used to describe informality in food services), we established that approximately 62 % of them tend to be wholly informal. This definition appeared very robust as it relates to the typical determinants of informality.

In exploring the determinants of informality, we relied exclusively on motivation and business challenges variables and some interesting observations were made. We established that the majority of female entrepreneurs in the food service industry were motivated by economic and social factors than by personal ones (see Table 6). While some female entrepreneurs exhibited survivalist tendencies, many of them were economically opportunistic. Besides, the desire to cater for the material needs of children and families was more pervasive than personal factors. In terms of the challenges, institutional and social challenges inhibited the choice of becoming informal, while spatial and economic challenges

Table 6
Synthesis of hypothesis results.

	Informality
Motivation	
Hypothesis 1: Economic motivation tends to positively influence the decision to operate informally	Accepted
Hypothesis 2: Personal motivation will negatively affect the decision to operate informally	Accepted
Hypothesis 3: Social motivation tends to positively influence the decision to operate informally	Accepted
Challenges	
Hypothesis 4: Institutional Challenges will not impede the choice of becoming informal	Rejected
Hypothesis 5: Social Challenges will negatively influence the decision to operate informally	Rejected
Hypothesis 6: Economic Challenges will impede becoming informal	Accepted
Hypothesis 7: Spatial Challenges will impede the choice of operating informally	Accepted

promoted it (see Table 6). We find the results for spatial challenges to be relatively robust when accounting for the other challenges.

The paper adds to the literature in different respects. First, our paper supports the contribution of the FAO (2007; 2011, 2012a, 2012b, 2016) that described informality in the food service industry using physical structure. Our findings further showed that with this classification of informality, we still find the economic and social motivations as well as economic and social challenges, that can be found in the informality literature to be tenable.

Second, our paper supports the application of the self-determination theory to informality. Like Onu, Oats and Kirchler, (2019) and Ianole-Călin et al. (2022), we have shown the importance of intrinsic and extrinsic motivation in describing informality. Particularly in the female entrepreneurship literature, the findings about economic and social motivation being important in choosing to be informal support the prevailing thought as suggested by Otoo et al. (2012), FAO (2012a, 2012b), Ramani et al. (2013) and Babbit et al. (2015). The desire to earn income for the sustenance of the family has mostly been touted as the primary underlying factor of female entrepreneurial motivations (Otoo et al., 2012).

Third, we find that contrary to the earlier conception that female entrepreneurial motivation is mostly survivalist (Otoo et al., 2012; Quartey et al., 2018), there are some other economic motivations, and this is the opportunity to make money for other means. For many female entrepreneurs in the food service industry, the decision to enter into business was mainly underpinned by economic opportunity reasons, amid other available livelihood options.

Finally, spatial and economic challenges are found to increase an individual's likelihood of being selected for the informal sector. The variables used to construct the spatial challenges included location and physical space issues. Ideally, when issues related to location and physical space are challenges, an individual is more likely to sell at unapproved places. Inherently, this is a vital characteristic of the informal sector, including the informal food service sub-sector in Ghana (Otoo et al., 2012). Economic challenges in the form of competition, access to cheap credit, price hikes and low levels of sales increased the likelihood of selection into the informal sub-sector. This is similar to the findings of Peprah et al. (2019). It is crucial to indicate that these results remain unchanged if they are estimated separately or when they are estimated together as separate variables in the same model.

Our paper has some implications for urban policy. For instance, our findings have shown that policymakers in a typically urban economy, such as those in developing Africa, need to recognize that informality can be sector-specific and evolving in terms of its classification. Therefore, in the quest to promote the formalization of enterprises in their urban economies, some more careful consideration is needed to address sectoral issues of classification and to ensure its operationalization becomes fully holistic. Also, given the possibility that some sectors can be more gender-specific, it is critical that these specific issues are incorporated to address the issues of inclusivity in governance and minimize any issues of discernment.

It is important to mention that this paper did not incorporate other notable rational choice factors such as penalties or audits. While this was not done intentionally, our intuition was that because food vendors have no choice but to comply with food safety and hygiene, the systems for penalties and audits will not be keen on the decision of becoming informal. This notwithstanding, it constitutes one of the main limitations of the paper.

5. Conclusions

Our findings have some theoretical and managerial implications. We have shown that the definition of informality needs to be properly contextualised as the definitions vary by sector and earlier measures can be limiting in describing certain specific sectors. In this study, we have complemented the ILO definition with a unique characteristic of the food service sector as identified by the FAO to measure informality. With these measures, we found informality to be persistent in the food service industry. We also established factors that are consistent in describing informality in the literature to still prevail with our definition. The paper has thus unveiled the nuances that are required in understanding informality and the fact that the definitions need to be continuously improved to enhance their relevance for policy decisions.

Given the complexities involved in measuring informality, it is important that policymakers take cognisant of these intricacies when designing policies and measures of informality. For instance, with regard to the food service industry, any policy on informality that relies on the ILO definition may be insufficient. The sector, meanwhile, cannot be completely described as formal either. Therefore, when policymakers are designing policy interventions for informality, it is important that sectoral contextualization is incorporated. This also implies that the different sectoral perspectives are known and continuously studied. We have also shown the importance of location in the classification of informality, and this cannot be ignored by policymakers, especially with regard to implementing policies in urban areas in the developing world.

The study has shown the importance of physical structure in differentiating formal and informal firms in the food service industry. This can serve as a strong basis for supporting policies regarding informality and this includes calculating relevant taxes/fees. This important parameter could be used by industrial and policy players to engage female entrepreneurs on modalities in the calculation of their taxes and fees. This move would go a long way to solve the problem of the non-involvement of entrepreneurs in the calculation of taxes and fees and the perception of its expensive nature, particularly amongst the formal sub-sector.

Finally, the paper has shown that female entrepreneurs show positive attitudes towards self-employment and entrepreneurship. Most female entrepreneurs exhibit strong economic opportunities and social motivational inclinations. This contradicts earlier views that portray female entrepreneurial motivations including those of the informal sector as survivalist and marginal, invisible and less important. This is a wake-up call for policymakers and industrial players to change negative perceptions about the informal food service sub-sector and promulgate more amicable policies towards their welfare and socio-economic upliftment.

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Authors' contributions

There are only two authors for the paper. The first author (also a doctoral student) worked on the background as well as the estimations of the results. The second author worked on the literature review and discussion of the main results and implications for policy.

Declaration of competing interest

The authors have no competing interest.

Data availability

The data used for the analysis was obtained from a primary survey as part of a doctoral dissertation.

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CRediT authorship contribution statement

Juliana Ashaley-Nikoi: Conceptualization, Data collection and cleaning, Writing and reviewing, Formal analysis.

Emmanuel Abbey: Estimation, Writing and reviewing, Editing, Software Execution, Data Curation.

Appendix A. Steps for conducting the principal component analysis

In constructing the measures of motivation and challenges, we relied on the principal component analysis (PCA) to reduce the dimensions defined in Table 1 for each category to simple indexes. The basic steps involved in the computation of the indexes involve (1) computing a Cronbach Alpha to determine the reliability of the variables to be combined. For each of the components in Table 1, the relevant alpha was >0.7, which was satisfactory. The second step was the reliance on (2) a measure of sample adequacy (Kaiser-Meyer-Olkin - KMO) and Bartlett's test for sphericity to determine the appropriateness of the factor analysis. The main outcome for this step is a KMO measure being >0.5 and Bartlett's test being significant to show that the variables are appropriately correlated for the factor analysis. In all the cases related to Table 1, these tests were passed. The next step was (3) the computation of the factors. The extraction technique that was used is the varimax rotation and the latent root criterion that required that the factors that will be selected have eigenvalues greater than one was also used. The diagram below demonstrates how the components obtained load onto one of the variables: social motivation. For this variable, six questions that followed a Likert scale of 5 agreement levels were used. From the diagram, three components had eigenvalues >1 and the cumulative proportion explained is 71 %. The respective proportion explained were used as weights to obtain a single index for social motivation. The second part of the diagram shows the extent to which each of the six questions loads onto the components generated. More specifically, it can be observed that all six questions load positively onto component 1 with the first two having the highest correlation. Component 2 also positively loads the third and fourth questions with very high correlations.

```
. pca Q19_10 Q19_10 Q19_11 Q19_12 Q19_13 Hb2Com

Principal components/correlation                  Number of obs    =        406
                                                  Number of comp.  =          5
                                                  Trace            =          6
    Rotation: (unrotated = principal)             Rho              =     1.0000
```

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	2.0898	.925859	0.3483	0.3483
Comp2	1.16394	.148917	0.1940	0.5423
Comp3	1.01503	.0574752	0.1692	0.7115
Comp4	.957551	.183874	0.1596	0.8711
Comp5	.773677	.773677	0.1289	1.0000
Comp6	0	.	0.0000	1.0000

Principal components (eigenvectors)

Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Unexplained
Q19_10	0.6768	-0.1296	-0.1202	0.0324	0.0980	0
Q19_10	0.6768	-0.1296	-0.1202	0.0324	0.0980	0
Q19_11	0.2448	0.4001	0.3100	-0.5795	-0.5899	0
Q19_12	0.0541	0.7502	-0.0091	-0.1229	0.6473	0
Q19_13	0.1380	0.3695	0.3617	0.7957	-0.2837	0
Hb2Com	0.0433	-0.3270	0.8626	-0.1176	0.3651	0

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