



## Regular Research Article

## The cousin marriage tradition and performance of businesses during the economic crises in Nigeria

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## ABSTRACT

Strong kinship structures correspond to important informal institutions that provide some social insurance to businesses in developing economies. More specifically, we posit that, during an economic crisis, businesses located in areas characterised by an in-group supporting marriage tradition (cousin marriage) will experience weaker negative effects on their profitability. We speculate that the cousin marriage tradition is associated with dense structures of kinship-based contacts between individuals, which creates the basis for effective social sanctions that support the cooperation needed during crises. Such structures may enhance the resilience of the local social systems; and local businesses may draw on local, socially available resources, which will attenuate the impact of crises on their financial performance. We utilise the data from the 2018–2019 Nigeria Living Standard Survey and find support for our hypotheses.

## 1. Introduction

Crises are a persistent feature of the business environment around the world, with their effects particularly marked in emerging economies (Dabla-Norris and Gündüz 2014; Rijkers and Söderbom 2013; Chaudhary et al. 2024; Bundervoet, Dávalos and Garcia, 2022). While crises related to natural disasters and military conflicts have obvious negative consequences (Shen, Fu, Pan, Yu and Chen 2020), the impact of economic crises on firms is complex (Miklian and Hoelscher 2022; Rijkers and Söderbom 2013) and the implications for businesses and entrepreneurs have drawn the attention of researchers (e.g. Boudreaux, Escaleras and Skidmore, 2019). However, there has been little research on how these economic effects may vary with informal institutional arrangements.

In general, the literature has identified two conflicting broad perspectives on the impact of economic crises. The first, in the Schumpeterian tradition, emphasises the ‘process of creative destruction’ (Schumpeter 2012[1946]: 95). In this perspective, the cycles of expansion and contraction are associated with technological progress so that, if some businesses disappear during the crises, market space for new entrants is thereby created. Such entry may be closely associated with innovation: the introduction to the market of new products and methods

of production. Furthermore, the negative effects of crises on existing businesses are not equivalent to negative effects on entrepreneurs, who may move on to apply their business experience to new ventures characterised by better performance (Fuentelsaz et al. 2023). Indeed, for small and medium size enterprises (SMEs), the resilience approach (Osievskyy, Shirokova, Ritala 2020) views them as being more flexible, closer to their customers and so especially able to take advantage of economic crises (Cowling, Liu, Ledger and Zhang, 2015).

This view contrasts with a ‘vulnerability’ perspective that highlights the destruction of firms and capacities during the crises. Rather than being efficiency-enhancing or ‘creative’, firm closures may instead be a consequence of constraints in access to resources (Chaudhary et al. 2024) including finance, which transforms initial shocks into permanent effects and damages firms, even those with positive long-term prospects. Thus, Caballero and Hammour (2000) argue that recurring financial crises do not support the process of creative destruction and restructuring. Quite the contrary, crises amplify barriers in access to finance which slows down technological change. Indeed, the vulnerability view sees small and medium-sized enterprises (SMEs) as particularly sensitive to exogenous shocks because they suffer from the ‘liability of smallness’ (Aldrich and Auster, 1986; Gertler and Gilchrist, 1994). Hallward-Driemeier and Rijkers (2013) offer evidence that, at least in the

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developing economy context, crises are not associated with the improved reallocation of resources. Instead, negative shocks lead to the exit of more productive firms, and this effect is only partly counter-balanced by the higher productivity of new firms entering during the crises.

However, the literature has not considered the moderating effects of institutions of informal institutions on the impact of crises on business performance. This is especially true in the developing economy context, including in the SME sector, despite the emphasis placed by, for example by Banerjee and Duflo (2011), on the critical role of social insurance for business resilience in developing economies. It follows that understanding the informal institutional arrangements sustaining SMEs performance during crises is a rarely considered but important research question. Its importance relates especially to developing countries, as there is less potential to separate the economic consequences of crises from the social ones. In such environments, firms play both economic and social functions (Banerjee and Duflo, 2011). Yet we argue that the opposite is also true: the linkages from businesses to the social environment are two-way. During the crisis, it is not only the individual resources of the entrepreneur that matter for business resilience and performance while facing unexpected common shocks, but also social resources in the local community.<sup>1</sup>

We follow Zhang, Estrin, and Mickiewicz (2022) in proposing that it is the family system, in particular the norms related to practice of marriage, that represent a central and as yet under-explored way to understand the informal institutions in developing economies. We therefore adapt the argument from cultural anthropology that highlights the role of family systems and indicates the way that kinship influences the tightness and the strength of social ties (Todd, 2019; Enke, 2019). Thus, we agree with Todd (2019) that family systems are the fundamental building block of societies, creating norms and structuring social interactions through patterns of marriage, residence, and social behaviours (see also Goody, 1976; Henrich, 2020; Schulz et al., 2019). The moderating effect of family systems in times of crisis is mirrored by several African proverbs: 'In a time of test, family is best', 'A family tie is like a tree, it can bend, but it cannot break', and 'People are my clothes, people are my best support' ('Eriyan ni aso mi' in Yoruba).

We focus on a specific and critical element of family systems, namely marriage practices and taboos on cousin marriage. In particular, we posit that acceptance (or even support for) marriages between close cousins (example: uncle and niece) – reinforces kinship ties and therefore strengthens local social support. The latter may include the application of ingroup local resources to provide 'social insurance' for SMEs in times of crisis. We propose that both the practice itself and the heritage or legacy of cousin marriage norms creates dense networks of family connections and strong kinship ties, and that these strengthen obligations towards ingroups (Schulz et al., 2019; Srinivasan, 2005). In contrast, prohibiting cousin marriage while allowing and encouraging marriage outside the ingroup acts to weaken the same kinship ties. By facilitating relationships with the outgroup, taboos on cousin marriage may provide a supportive cultural basis for a wider range of market-based transactions (Henrich, 2020), but we argue that this comes at the cost of a lower provision of local social insurance in the face of crises. We follow the literature in assuming that the cultural legacy of marriage practice traditions continues to exert influence over present day behaviour (Zhang et al., 2022).

We focus our attention on Nigeria, a country that remains relatively understudied in management and entrepreneurship literature, along with other parts of the continent (Walsh, 2015; George, Corbishley, Khayesi, Haas, and Tihanyi 2016). Our analysis is undertaken on a large

sample of Nigerian non-farm enterprises (NFEs) from the 2018–2019 Nigeria Living Standard Survey (NLSS). In Nigeria, income generated from NFEs represents a significant portion of household livelihoods (Van den Broeck and Kilic, 2019). Approximately two-thirds of households in Nigeria are engaged in NFEs, with some regions reporting involvement as high as 80 % (NBS, 2020). While many of these NFEs resemble the typical small enterprises found in low-income countries, often not employing individuals from outside the household (Rijkers and Söderbom, 2013), they remain a crucial income source (Van den Broeck and Kilic, 2019). Therefore, studying these enterprises during economic crises is essential.

In undertaking this research, we make several contributions to the literature on small and micro businesses in developing countries. First, we explore the ways in which SMEs in developing economies might be negatively impacted by particular types of shocks, focusing on the distinction between internal shocks, from within the family, and external shocks, from the marketplace and the natural environment. Furthermore, we explore the sensitivity of the impact of these shocks on small business organisations to contextual (informal) institutional factors, namely the family systems tradition of cousin marriage. In so doing, we contribute to the analysis of the resilience of small businesses to economic crises and highlight the possible role of tightly knit kinship ties in providing some degree of social insurance.

Second, our study has implications for the literature on resilience of family-owned firms in developing economies. We focus on (very) small non-farm enterprises which rarely have accumulated buffer resources to sustain their operations when hit by major economic shocks. Moreover, the boundaries between the business and family are blurred because these businesses mostly overlap with households. In a recent review of the family business literature, Rovelli et al. (2022) conclude that 'scholars provided limited attention to how family businesses manage and survive crises' (Ibid.: 9).

Finally, our study responds to calls for a greater consideration of Africa in business research (e.g., George et al., 2016). We bring to the literature an analysis of a significant emerging economy, Nigeria, with a new focus on very small non-farm enterprises. Nigeria is the largest economy and the most populous country in Africa with a population of around 210 million individuals. Moreover, it is also the third most culturally diverse country in the world (Gören, 2013) and therefore an important and appropriate location in which to explore the impact of intra-country informal institutions.

## 2. A simple model and hypotheses

Family NFEs in developing economies are regularly hit by shocks, the nature of which vary greatly (Chaudhary et al., 2024; Dabla-Norris and Gündüz, 2014; Rijkers and Söderbom, 2013). Some are *internal*, that is specific to a given individual or family like for example death, disability, or illness in the household, especially if affecting an income-earning member. Similar effects may be caused by the departure from the household of an income-earning member due to marriage, separation, or divorce. Such events may cause income shocks to the household, though an extended family may have greater capacity to cope with them through informal social insurance. As an example, children, and more generally members of a younger generation, may be expected to take care of their parents and older relatives in the face of disability or infirmity. Some other shocks to family NFEs may be *external* in origin, and either man-made as for example theft, or from nature as for example fire or flood. Again, the extended family may be willing and able to help. Importantly, such informal obligations may partially substitute for formal institutions of social insurance that may be missing at the societal level in developing economies (Banerjee and Duflo, 2011).

Thus, not all shocks are *individual*, rather some are common in affecting the entire population in an area simultaneously, albeit not necessarily in a uniform manner (Bundervoet, Dávalos and Garcia, 2022). Prime examples of this are *economic* shocks. While their causes

<sup>1</sup> We use 'resilience' in the sense defined by Ostrom (2005): it is the extent of disruption that will not transform a system away from its stable domain. Here, 'the system' may relate to either business or local community. Chaudhary et al. (2024) offer a more elaborate discussion of the concept.

may be rooted in public sector insolvency, domestic financial collapse, or contagion from abroad, the impact, as felt by NFEs, will come in a form of a general fall in the prices of output made or sold by the family business, or by an increase in prices of inputs. Another important example of economic shocks relates to major common negative shocks affecting household consumption, such as an increase in the price of major food items that via income effect redirects household expenditure away from their business and towards food and other necessities. Since this is likely to imply a shift away from investment towards household consumption, it may therefore act to reduce the productivity of non-farm enterprise. Moreover, narrow family structures of support may alone be insufficient or unable (because of the generalized nature of the distress) to accommodate these common external shocks.

To analyse the impact of these shocks further, let us consider a simple model of the household NFE. We can think of the household NFE as maximising profit which is equal to price of a non-food product ( $p$ ) times output ( $q$ ) ( $pq = \text{revenue}$ ) minus cost ( $c$ ). If the NFE uses non-family hired workers ( $l$ ), they receive a wage ( $w$ ) but household members who work in the business ( $h$ ) do not, so costs are  $wl$ . Output depends on the production function linking output with the total number of workers ( $t$ ) where  $t = h + l$ . For simplicity, we assume that employees and household members are equally productive so  $q = f(t)$ . Household members do not earn a wage but receive jointly a share of the profit of the firm,  $\pi$ . We take the size of the working household ( $h$ ) to be exogenous in the short run under consideration and assume that each family member receives an equal share of the profit ( $\pi/h$ ). The size of the family working in the firm affects the profit share; earnings per family member are lower in larger families, *ceteris paribus*.

Therefore, the household NFE maximises:

$$\pi = pq - wl, \text{ where } q = f(l + h)$$

which given that  $h$  is exogenous is achieved when  $d\pi/dl = p dq/dl - w = 0$ . Because we do not want to consider the case of underemployment at this stage, we also assume that  $t \geq l^*$ , so the first order condition determines the equilibrium ( $*$ ) level of hired employment ( $l^*$ ) given exogenous prices, wages, and productivity ( $f(\cdot)$ ).

If prices of non-food products fall because of an external negative macroeconomic shock then, assuming diminishing returns in the short run production function  $f(\cdot)$ ,  $dl^*/dp$  and  $d\pi^*/dp < 0$ . Hence profits and therefore earning per family member decline when there is a negative price shock.

An economic shock may also cause an increase in food prices. Its diffusion from the macro-level to the household may lead to a decline in household real income, shifting family expenditure from investment to consumption (individual, household-specific income shocks, e.g. due to illness in family, will have similar effects, but may be easier to compensate by transfers from extended families). The shift in expenditure may further reduce profits because  $f(\cdot)$  itself may decrease: a given level of labour input will produce less output because less capital is employed ( $f(\cdot)$  is also an increasing function of capital). More generally, any factor decreasing household income which is not socially compensated, leads to a substitution of consumption for investment, and therefore may reduce productivity and profitability. This framework leads us to propose that:

*H1a – There will be a negative impact of economy and region-wide shocks on the profitability of NFEs.*

*H1b – There will be a negative impact of price shocks on the profitability of NFEs (where price shocks are a subset of economy- and region-wide shocks).*

While we argue that it is more difficult to counteract the impact of economic (price) crises compared to that of household (individual) crises, it is not impossible. Local communities are capable of a variety of collective action responses and may demonstrate resilience when facing external, unpredictable, new, difficult circumstances (Anderies,

Janssen, and Ostrom, 2004; Ostrom, 2005). This helps them to sustain performance. The reason for this is that in a crisis, the efficient handling of common-pool resources may become critical. The latter may relate for example to water, electricity supply, access to the internet, or transport facilities, and more generally maintenance of local infrastructure. In a developing economy context, the government administration cannot be relied upon in delivering the desired services, and a positive outcome, especially in a crisis, may critically depend on the local community potential for collective action. A crisis situation will create pressure on the extensive use of common-pool resources, and effective handling and resolution of potential conflicts can make a significant difference that will affect the local household business outcomes.

Effective use and sharing of common-pool resources and the possibility of effective management of those in case of major economic shocks will rely on the strength of social sanctions that support norms of cooperation (Anderies et al., 2004). In turn, the effectiveness of such sanctions depends on the density and strength of connections between individuals within the community, across which the social expectations and obligations are defined (Coleman, 1995). Thus, 'the closure of social networks can overcome free-rider activity through the creation of norms and sanctioning systems' (Ibid.: 277). Here, the closure is defined by the mutual interdependence between all actors. As they are affected by each other's actions, this creates a possibility of mutual influence which is a prerequisite for norms of cooperation to emerge and persist.

Again, the crisis situation will put additional pressure on the use of common-pool resources and this pressure is more likely to be resolved, and effective adaptation in the use of these resources implemented, in the communities characterised by a high degree of closure (as defined by Coleman, 1995). But which communities are likely to have this characteristic? Here we draw upon anthropology research to posit that the fundamental feature of the communities, affecting the degree of their closure, is the nature of the family systems, as defined historically. Todd (2019) argues that historical family systems imprint some lasting characteristics on local communities, even if these systems are themselves subject to evolution (see also Zhang et al., 2022).

A core foundation of the family system is the norm and practice of cousin marriage, which may be either accepted or prohibited (Henrich, 2020). Cousin marriage makes the linkages within the community stronger, that is it increases closure, yet also makes the linkages with outside communities weaker. The cousin marriage tradition may therefore come with negative business effects as it could make establishing connections with wider markets more difficult. By leading to societies that rely more on a clan structure, the tradition of cousin marriage can restrict the development of formal institutions (Todd, 1985).<sup>2</sup> However, the tight linkages within the community may also support the provision of social insurance in the face of difficult family business circumstances. Hence greater ingroup cooperation may have positive effects during crises, facilitating a more resilient community response to shock. Thus, there can be functional benefits of the cousin marriage tradition in building strong kinship networks and providing kin-based insurance (Hotte and Marazyan, 2020). The cousin marriage practice creates dense networks of family connections (closure), where everybody is somehow related to somebody else within the ingroup (Henrich, 2020). This plays a critical role in diminishing the likelihood of ingroup conflict, facilitates conflict resolution, and leads to stronger ingroup cooperation and solidarity which is of particular relevance at time of crisis. In other words, the cousin marriage tradition fosters social interdependence (Schulz et al., 2019), which is crucial to businesses with limited access to formal resources that could be drawn upon during a crisis. Therefore, we posit the following:

<sup>2</sup> Therefore, countries where cousin marriage is frequently practised may have a high level of state fragility and low institutional quality (Gutmann and Voigt 2022).

H2a – The negative impact of economy and region-wide shocks on the profitability of NFEs is attenuated by the cousin marriage tradition.

H2b – The negative impact of price shocks on the profitability of NFEs is attenuated by the cousin marriage tradition.

### 3. Data and methodological approach

#### 3.1. Main data source: Nigeria living standard survey

A list and descriptive statistics of all our variables are presented in Table 1, and the correlation matrix of key variables in Table 2. Non-farm enterprise and household data are from the 2018–2019 Nigeria Living Standard Survey. Between September 2018 and October 2019, the National Bureau of Statistics of Nigeria (NBS) collected household data for the NLSS. It is the first large-scale household survey of Nigeria in a decade. It is also the most recent household survey of Nigeria.

The NLSS provides a comprehensive and diverse set of socioeconomic and demographic data about Nigerian households and covers all 36 states of Nigeria, and its federal capital territory. The states are grouped into six geopolitical regions: the North-Central, North-East, North-West, South-East, South-South and South-West. The states in turn are also divided into 776 local government areas. All local government areas in Nigeria are single tier so that there is no internal differentiation within either rural, urban, or municipal councils. According to the NLSS, about 62 % of households in Nigeria are engaged in NFEs. Just 9.4 % of those NFEs are registered and on average, the NFEs employ 1.1 persons from their households and 0.4 non-household members (NBS, 2020). The NLSS data is restricted to households in the urban areas of Nigeria and our final sample consists of 6,394 NFEs, and comes from respondents that were all asked the same questions. The 2018–2019 round of the NLSS questionnaire includes demographic indicators, education, labour, and NFEs characteristics, and crucially for our research, it is the first round of NLSS to properly cover shock/crisis indicators. The 2018–2019 NLSS was collected by the NBS and produced by the World Bank (World Bank, 2021).

#### 3.2. Dependent variable

Our dependent variable ‘Log of NFE Profit’ is from the 2018–2019 NLSS question: ‘What was the total profit for the [non-farm enterprise] during the last month of operation?’. We use the logarithmic value of this variable because it enables us to improve on the distribution of the profitability of the NFEs in terms of normality.<sup>3</sup> We present a histogram of this variable’s distribution in Fig. 1.

#### 3.3. Key explanatory variables for hypotheses testing

##### 3.3.1. Cousin marriage

The cousin marriage rate in Nigeria is between 10 % to 19 % (Hamamy et al., 2011), and there is extant research showing that some ethnic groups in Nigeria historically preferred cousin marriage (Hampshire and Smith, 2001; Scott-Emuakpor, 1974). We control for this historical cultural preference by including the dummy ‘Cousin Marriage Tradition’ that takes on the value of 1 for local government areas in Nigeria with a historical tradition of cousin marriage preference according to the Database of Places, Language, Culture, and Environment (D-PLACE, 2016; Kirby et al., 2016) that in turn draws upon the Ethnographic Atlas (Murdock, 1967), which is an ethnic-area-level database providing information on the pre-industrial (mostly

<sup>3</sup> There were 35 NFEs in total that gave a negative value for profit. We equated the logarithmic value of the profit for these NFEs to one. Alternatively, we verified that dropping these observations as missing makes no difference for the main results.

**Table 1**  
Descriptive statistics.

Variable	Measurement	Mean (Std Dev)
Log of Profit	Log of total profit of the non-farm enterprise	10.14 (1.35)
Log of Revenue	Log of total revenue of the non-farm enterprise	11.13 (1.28)
Cousin Marriage Tradition	Local government area (LGA) with a historical tradition of cousin/consanguineous marriage preference [0 = No, 1 = Yes]	0.15 (0.36)
Cousin Marriage Tradition (State-Level Proportion)	State-level proportion of population living in areas with a historical tradition of cousin/consanguineous marriage preference [0 = No, 1 = Yes]	0.15 (0.35)
Years of Education	Number of years person in household who manages non-farm enterprise spent in education	4.09 (5.39)
Economy & Region-Wide Shock	Household has been affected by economy & region-wide shock [0 = No, 1 = Yes]	0.43 (0.49)
Common Community-Level Shock	Household has been affected by common community-level shock [0 = No, 1 = Yes]	0.075 (0.26)
Household-Specific Shock	Household has been affected by household-specific shock [0 = No, 1 = Yes]	0.32 (0.46)
Price Shock	Household has been affected by price shock [0 = No, 1 = Yes]	0.42 (4.9)
Male	Person in household who manages non-farm enterprise is male [0 = No, 1 = Yes]	0.49 (0.49)
Christian Religion Proportion	Proportion of the household that practices the Christian religion	0.52 (0.49)
Muslim Religion Proportion	Proportion of the household that practices the Muslim religion	0.48 (0.49)
Traditional Religion Proportion	Proportion of the household that practices Traditional religions	0.004 (0.055)
Other Religion Proportion	Proportion of the household that practices other religions	0.0001 (0.004)
Married: Monogamous	Person in household who manages non-farm enterprise is in monogamous marriage [0 = No, 1 = Yes]	0.39 (0.49)
Married: Polygamous	Person in household who manages non-farm enterprise is in polygamous marriage [0 = No, 1 = Yes]	0.11 (0.31)
Household Size	Number of individuals in the household	7.35 (4.09)
Hires Employees (a dummy)	Non farm enterprise hires employees from outside household [0 = No, 1 = Yes]	0.18 (0.38)
Total Number of Employees	Total number of employees of non-farm enterprise who are not household members	0.30 (0.61)
Capital Stock	Log of total current value of capital stock (inputs/supplies) for the non-farm enterprise	11.28 (1.73)
Potential Labour Stock	Household Size + Total Number of Employees – Number of children in the household	3.43 (0.04)
Registered	The non-farm enterprise is registered [0 = No, 1 = Yes]	0.18 (0.38)
Financial constraints (narrow def.)	Inability to borrow money declared as the most important constraint to star a business [0 = No, 1 = Yes]	0.19 (0.40)
Financial constraints (wide def.)	Inability to borrow money declared among the three most important constraints to star a business [0 = No, 1 = Yes]	0.29 (0.45)
Industry: Crop Related	The non-farm enterprise is in a crop related sector [0 = No, 1 = Yes]	0.01 (0.09)
Industry: Extraction and Mining	The non-farm enterprise is in an extraction or mining sector [0 = No, 1 = Yes]	0.02 (0.04)

(continued on next page)

**Table 1** (continued)

Variable	Measurement	Mean (Std Dev)
Industry: Manufacturing	The non-farm enterprise is engaged in manufacturing [0 = No, 1 = Yes]	0.13 (0.34)
Industry: Construction and Repairs	The non-farm enterprise is engaged in construction or repairs [0 = No, 1 = Yes]	0.05 (0.21)
Industry: Wholesale and Retail	The non-farm enterprise is engaged in wholesale or retail [0 = No, 1 = Yes]	0.52 (0.49)
Industry: Transport and Accommodation	The non-farm enterprise is engaged in transport or accommodation [0 = No, 1 = Yes]	0.07 (0.25)
Industry: Food and Beverages	The non-farm enterprise is engaged in food or beverages [0 = No, 1 = Yes]	0.71 (0.26)
Industry: Art and Publishing	The non-farm enterprise is engaged in art or publishing [0 = No, 1 = Yes]	0.01 (0.09)
Industry: Telecommunications and Finance	The non-farm enterprise is engaged in telecommunications or finance [0 = No, 1 = Yes]	0.03 (0.06)
Industry: Legal and Business Services	The non-farm enterprise is engaged in providing legal or business services [0 = No, 1 = Yes]	0.01 (0.09)
Industry: Others	The non-farm enterprise is engaged in a sector not already listed [0 = No, 1 = Yes]	0.12 (0.33)
State literacy level	Literacy level of the population over 6 of the state in which the household is located [%]	57.12 (20.47)
Region: North-Eastern	Household is in the north-eastern region of Nigeria [0 = No, 1 = Yes]	0.08 (0.26)
Region: North-Western	Household is in the north-western region of Nigeria [0 = No, 1 = Yes]	0.14 (0.35)
Region: North-Central	Household is in the north-central region of Nigeria [0 = No, 1 = Yes]	0.17 (0.38)
Region: South-South	Household is in the south-south region of Nigeria [0 = No, 1 = Yes]	0.10 (0.31)
Region: South-Eastern	Household is in the south-eastern region of Nigeria [0 = No, 1 = Yes]	0.11 (0.31)
Region: South-Western	Household is in the south-western region of Nigeria [0 = No, 1 = Yes]	0.38 (0.49)
Core North	Household is in the core Northern part of Nigeria [0 = No, 1 = Yes]	0.21 (0.41)
Sharia	Household is in a state in Nigeria where Sharia law is practised [0 = No, 1 = Yes]	0.23 (0.42)

nineteenth and early twentieth centuries) characteristics and traditions in 1,265 ethnic areas worldwide. 15.1 % of individuals in our sample live in areas representing cousin marriage practice, the variable we use. This falls to 5.8 % if we narrow it down to uncle-niece category. Furthermore, there are 3.5 % of observations in the father’s brother’s daughter category, but no areas with mother’s brother’s daughter category (again, based on D-PLACE)

A ‘society’ in D-PLACE represents a group of people in a particular locality, who often share a language and cultural identity (Kirby et al., 2016). Fig. 3 shows the map of Nigeria with regions where cousin marriage tradition was historically culturally preferred according to the D-PLACE (D-PLACE, 2016; Kirby et al., 2016). A comparison between Fig. 2 and Fig. 3 reveals that these historical cleavages do not correspond to regional boundaries; hence the cousin marriage tradition indicator was assigned at the local government area level.

**3.3.2. Crises/shocks: Context and measurement**

The economic downturn experienced by NFEs in Nigeria, which was prevalent during the study period, commenced in 2015. The causes of this crisis have been extensively detailed in the literature (see: Forrest, 2019; Onifade et al., 2020). In 2015, Nigeria’s economy faced a decline in revenue attributed to a reduction in both the price and production of crude oil, which stands as Nigeria’s primary export. Over approximately twenty months, the oil price plummeted from about \$130 per barrel to

**Table 2** Correlation matrix.

1 Log of Profit	1.000																							
2 Cousin marriage Tradition	0.052	1.000																						
3 Total Number of Employees	0.262	0.013	1.000																					
4 Capital Stock	0.462	0.010	0.313	1.000																				
5 Male	0.217	0.031	0.137	0.210	1.000																			
6 Years of Education	0.173	-0.064	0.120	0.263	0.195	1.000																		
7 Economy & Region-Wide Shock	-0.038	0.026	0.047	0.010	0.007	-0.045	1.000																	
8 Common Community-Level Shock	-0.037	0.075	-0.019	-0.018	-0.030	-0.067	0.149	1.000																
9 Household-Specific Shock	-0.055	0.071	0.018	-0.039	-0.043	-0.049	0.202	0.154	1.000															
10 Price Shock	-0.038	0.027	0.046	0.014	0.010	-0.034	0.978	0.124	0.185	1.000														
11 Married: Monogamous	0.055	-0.073	-0.010	0.084	0.006	0.096	-0.008	-0.007	-0.075	-0.006	1.000													
12 Married: Polygamous	0.059	0.099	0.111	0.043	0.033	-0.156	0.017	0.051	0.008	0.005	-0.484	1.000												
13 Household Size	0.172	0.180	0.37	0.095	-0.001	-0.138	0.119	0.120	0.102	0.098	-0.072	0.320	1.000											
14 Region: North-Eastern	-0.010	0.159	0.031	-0.017	0.050	-0.130	0.059	0.053	0.098	0.047	-0.064	0.081	0.247	1.000										
15 Region: North-Western	-0.020	0.359	0.107	-0.112	0.057	-0.109	0.112	0.084	0.020	0.114	-0.056	0.147	0.297	-0.118	1.000									
16 Region: North-Central	-0.033	-0.197	0.014	-0.032	-0.004	-0.009	-0.057	-0.005	0.021	-0.069	0.018	0.036	0.043	-0.136	-0.190	1.000								
17 Region: South-South	0.043	-0.145	-0.015	0.041	-0.024	0.076	-0.014	0.010	0.042	-0.013	-0.016	-0.110	-0.105	-0.140	-0.161	1.000								
18 Region: South-Eastern	0.036	-0.151	-0.083	0.046	0.016	0.050	0.122	0.013	-0.001	0.127	0.059	-0.109	-0.043	-0.105	-0.146	-0.168	1.000							
19 Region: South-Western	-0.005	0.001	-0.041	0.058	-0.062	0.076	-0.140	-0.100	-0.111	-0.128	0.033	-0.037	-0.289	-0.228	-0.319	-0.366	-0.282	1.000						
20 Core North	-0.027	0.421	0.106	-0.108	0.079	-0.174	0.145	0.110	0.084	0.141	-0.084	0.174	0.398	0.480	0.787	-0.242	-0.178	-0.186	-0.405	1.000				
21 Sharia	-0.022	0.395	0.103	-0.118	0.094	-0.176	0.165	0.112	0.097	0.162	-0.073	0.174	0.411	0.457	0.753	-0.158	-0.186	-0.194	-0.424	0.957	1.000			
22 Registered	0.249	-0.022	0.241	0.349	0.161	0.125	0.014	-0.013	-0.014	0.007	0.032	0.025	0.098	0.018	0.017	0.043	0.019	0.020	-0.081	0.022	0.027	1.000		

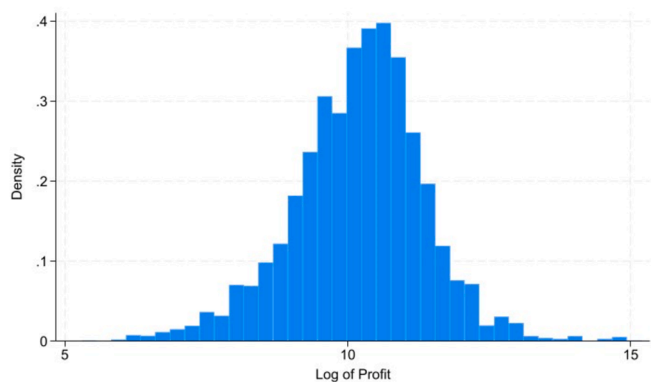


Fig. 1. Histogram of logarithm of profit for non-farm enterprises.

as low as \$28 per barrel, concurrently with production declining from 2.15 million to 1.81 million barrels per day in the initial months of 2016. Given that oil accounted for around 10 % of Nigeria's GDP and 90 % of export revenue in 2016, it comes as no surprise that this situation resulted in a significant recession (Gylych et al., 2020). The severity of the crisis was such that by 2018, Nigeria surpassed India as the 'world's poverty capital', with an estimated 87 million people living in extreme poverty, compared to India's 73 million. Nigeria maintained this position until 2020 (World Poverty, 2020).

The annual fluctuations in Nigeria's GDP growth rates during the study period were as follows:  $-5.45\%$  (2015),  $-13.65\%$  (2016),  $2.42\%$  (2017),  $1.12\%$  (2018),  $0.29\%$  (2019), and  $-4.00\%$  (2020) (Gylych et al., 2020; Macrotrends, 2023; NBS, 2021). Parallel to this, the oil industry crisis impacted Nigeria's unemployment rates, which rose from 9.9 % in the third quarter of 2015 to 13.9 % in the third quarter of 2016, further escalating to 18.8 % (2017), 23.1 % (2018), 25.6 % (2019), and peaking at 33.28 % in the third quarter of 2020 (CEIC, 2020; NBS,

2018). According to the Central Bank of Nigeria (CBN), inflation rates in December 2015 stood at 9.6 % overall and 9.9 % for food. By December 2016, the overall inflation rate surged to 18.6 %, with food inflation at 14.9 %. Despite a slight decline by December 2017, inflation remained in double digits at 15.4 %, with food inflation at 19.5 %. In the subsequent years of 2018 and 2019, inflation rates saw a reduction but remained in the double digits, averaging approximately 11.4 %, while food inflation averaged around 14.3 % (CBN, 2019).

This period was also a challenging period for Nigeria because of the abductions, suicide bombings, and attacks on civilian targets by Boko Haram, the Islamist militant organization based in North-East Nigeria. At least 1,200 people died from attacks by Boko Haram and nearly 200,000 were displaced between 2018 and 2019. Decades-old conflicts between nomadic herdsman and farmers in the Middle-Belt intensified during this period and further exacerbated insecurity. At least 1,600 people were killed and another 300,000 were displaced as a result of the violence (HRW, 2019).

Hence, among Nigerian NFEs, there were shared experiences of economic downturns and region-wide, community-level and household-specific crises. Using the NLSS survey data, we have categorized four types of crises (or adverse shocks) that affected households during this timeframe, as detailed in Table 3. The first category relates to shocks that are *economy and region wide*. A subgroup of this category omits natural disasters and relates to *price shocks*. Both these categories represent the widest shocks that are difficult to address relying on family resources alone, and we will use the corresponding variables to test our hypotheses as listed above. Two other groups of crises relate to *community level shocks*, and to shocks that specifically affect an *individual household alone*. In the third column of Table 3, we count the number of households that have experienced each shock in the last three years and in the fourth column, we present the percentage of households who reported that a given shock created the greatest crisis for them. The fourth column of Table 3 indicates that increase in price of major food items, an *economy and region wide* shock, was the one that households

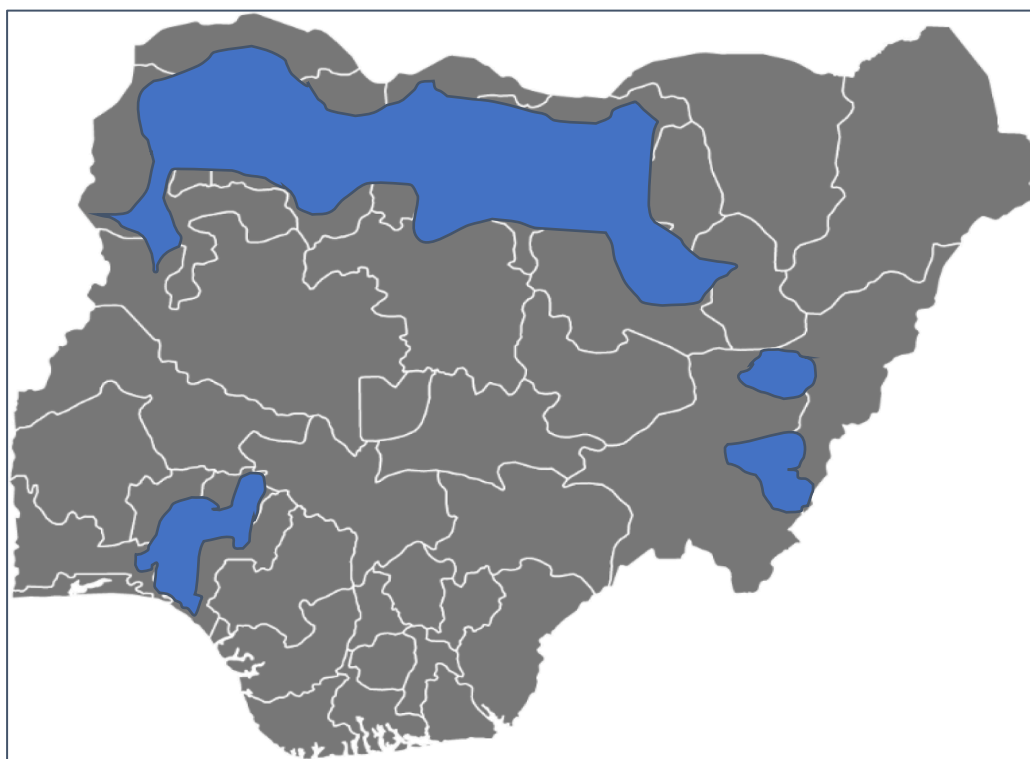
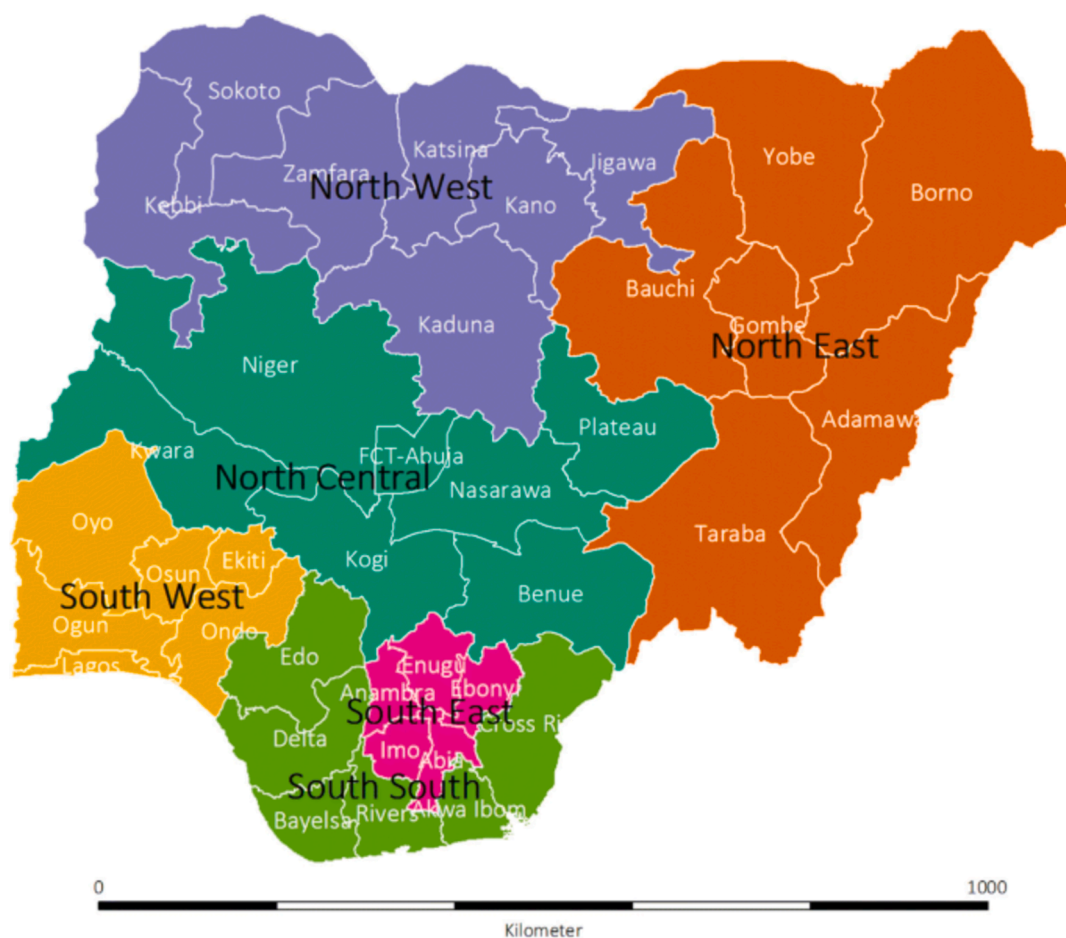


Fig. 2. Nigerian Map with Regions of Historical Cousin marriage Tradition Preference in Blue. Shapefile is obtained from gadm.org. The 2024 GADM license allows data re-use for academic and other non-commercial purposes (<https://gadm.org/license.html>, last accessed: 27th April 2024). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)



**Fig. 3.** Nigerian Map with Geopolitical Zones. Administrative map of Nigeria showing boundaries of six geopolitical zones, 36 states and Federal Capital Territory (FCT-Abuja). Shapefile is obtained from [gadm.org](https://gadm.org). The 2024 GADM license allows data re-use for academic and other non-commercial purposes (<https://gadm.org/license.html>, last accessed: 27th April 2024). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

most frequently reported as causing the greatest crisis (one third of the households).

### 3.4. Control variables

As our first step to mitigate concerns about omitted variables bias, we included several controls. At the individual level, we control for human capital. Education is argued to have a positive impact on the financial performance of NFEs and evidence of this has been found in Nigeria (Olawaju et al., 2019). We first operationalised education by using the number of years spent in the education of the individual in the household who manages the NFE. However, the results of RESET test suggested that improvement in functional form was needed, so we went on to allow for nonlinearity by categorising years of education with intervals corresponding to stages of education. That comes with a slight measurement error because of those who repeated classes, nevertheless, as an approximation of the level of education, the categorisation works well. More generally, this dummy variable approach is based on the assumption that there are threshold effects of education (Van der Sluis et al., 2005). We also include as controls the gender and the marital status of the individual in the household who manages NFE, while at the household level we control for the labour available to the household from household members, as well as their religion, to control for alternative cultural explanations. We calculated percentages of each religion in the household and made the Christian religion, which has the largest average share, the omitted benchmark category. At the enterprise level,

we control for the capital stock, industry classification, and registration status of the NFE. We also control for certain regional differences in addition to cousin marriage tradition. For the subsample that hire outside labour, we control for the number of employees of the NFE who are not members of the household, while for the whole sample, we include a dummy when outside labour is used; this follows improvement suggested by the RESET specification test, as for the whole sample, the continuous distribution is skewed due to presence of zeros. Finally at a broader regional level, in Nigeria, the North of the country is substantially poorer than the South and some states have also adopted Sharia law (Archibong, 2019). We control for these two contrasts, and also for the six geopolitical regions in the country, as shown in Fig. 3.

### 3.5. Empirical Methodology

Our empirical model can be represented as follows:

**Table 3**  
Categories of shocks.

Shock reported	Shock category	Number of households reporting shock	Percentage of households reporting shock category as most severe crisis
Increase in price of inputs	Economy & Region-Wide (Price)	751	3.89
Fall in the price of output	Economy & Region-Wide (Price)	242	0.62
Increase in price of major food items consumed	Economy & Region-Wide (Price)	2,677	33.21
Poor rains that caused harvest failure	Economy & Region-Wide	267	1.62
Destruction of harvest by fire	Common Community-Level	96	0.81
Flooding that caused harvest failure	Common Community-Level	196	1.77
Loss of property due to fire or flood	Common Community-Level	114	1.40
Pest invasion that caused harvest failure or storage loss	Common Community-Level	176	0.81
Death or disability of an adult working member of the household	Household-Specific	390	10.56
Death of someone who sends remittances to the household	Household-Specific	378	7.95
Illness of income-earning member of the household	Household-Specific	374	5.49
Theft of crops, cash, livestock, or other property	Household-Specific	580	6.11
Loss of land	Household-Specific	67	0.71
Death of livestock due to illness	Household-Specific	324	2.12
Loss of an important contact	Household-Specific	442	5.59
Job loss	Household-Specific	192	3.96
Departure of income-earning member of the household due to separation or divorce	Household-Specific	92	1.58
Departure of income-earning member of the household due to marriage	Household-Specific	72	0.76
Other	–	58	11.02

$$\begin{aligned}
 \text{LogofProfit} = & \alpha + \beta \text{CousinMarriage} + \delta \sum_1^n \text{Shocks} \\
 & + \vartheta \sum_1^n (\text{CousinMarriage} \times \text{Shocks}) \\
 & + \gamma \sum_1^4 \text{YearsofEducationDummies} \\
 & + \tau \sum_1^3 \text{Owner} / \text{ManagerControls} + \tau \sum_1^4 \text{NFEControls} \\
 & + \omega \sum_1^{11} \text{IndustryControls} + \rho \sum_1^9 \text{RegionalControls} + \varepsilon \quad (1)
 \end{aligned}$$

Here  $n$  relates to the number of categories of shocks considered in a given specification. We estimate this equation using linear regression models. In utilising the Stata software command, we clustered standard errors on Local Government Areas.

#### 4. Results

We present the results of our regression models in Tables 4 and 5. The first column of Table 4 presents our baseline model, which does not include shock variables. We find that NFE’s profitability is positively and significantly ( $p < 0.01$ ) associated with being in a location with historical cousin marriage tradition. Having a better educated manager for the NFE is also positively associated with profitability, albeit the effect is nonlinear: more than 12 years of education is not an advantage compared to less than 12 years. Respondents who are male, with employees who are not household members, and with greater capital stock also report higher profitability. These results are consistent with our theoretical model and other studies of SME financial performance, especially in developing economies (e.g., Nichter and Goldmark, 2009; Alemu and Adesina, 2017). We also find that being married increases performance, especially if it is a polygamous marriage, and the proportion of the household being Muslim has positive impact as well. But the coefficient on Sharia law at the state level is insignificant, in contrast to the state literacy rate, the coefficient of which is highly significant and positive. We also find that larger households and registered NFEs are positively associated with financial performance. Some regional and sectoral dummies are also significant.

##### 4.1. The impact of economy and region-wide crises on financial performance (H1)

The remaining columns in Table 4 augment our baseline model to include the measures of crises. We introduce the three shock categories we distinguished. These results are shown in Columns 2, 3, and 4. Household-specific and community level shocks dummies are insignificant. Region-wide shocks are marginally significant at  $p < 10\%$ . Thus, there is some weak support for Hypothesis 1a. In Column 5 we focus on the component of price shocks, and find these to have significant negative impact ( $p < 0.05$ ), consistent with Hypothesis 1b. Finally, Column 6 includes all three broad categories of shocks in one model. The economy- and region wide category comes out as significant ( $p < 0.05$ ), and the value of the negative coefficient is not much affected by adding other shocks to the model, compared with Column 2.

##### 4.2. The impact of crises on financial performance attenuated by cousin marriage tradition (H2)

In the models reported in Table 5, we included interactions terms, to test if the negative impact of shocks on profitability is attenuated by the cousin marriage tradition. For household-specific and common community-level shocks, the effects are insignificant (Columns 1 and 2). When cousin marriage tradition is interacted with economy and region-



**Table 4**  
Impact of crises on financial performance; dependent variable: log of profit.

	(1)	(2)	(3)	(4)	(5)	(6)
Cousin Marriage Tradition	0.230** (0.076)	0.230** (0.075)	0.228** (0.075)	0.222** (0.076)	0.222** (0.076)	0.220** (0.075)
Household-Specific Shock		-0.010 (0.041)				-0.005 (0.039)
Common Community-Level Shock			0.081 (0.072)			0.097 (0.071)
Economy- & Region-Wide Shock				-0.070+ (0.038)		-0.076* (0.037)
Price Shock					-0.079* (0.039)	
Hires employees (a dummy)	0.322*** (0.049)	0.322*** (0.049)	0.324*** (0.049)	0.321*** (0.049)	0.322*** (0.049)	0.324*** (0.049)
Capital Stock	0.294*** (0.013)	0.294*** (0.013)	0.294*** (0.013)	0.295*** (0.013)	0.295*** (0.013)	0.295*** (0.013)
Male	0.327*** (0.026)	0.327*** (0.026)	0.329*** (0.026)	0.326*** (0.026)	0.326*** (0.026)	0.327*** (0.026)
Years of Formal Education = 6	0.100* (0.043)	0.100* (0.043)	0.100* (0.043)	0.099* (0.043)	0.100* (0.043)	0.100* (0.043)
Years of Formal Education = 9	0.120* (0.059)	0.120* (0.059)	0.120* (0.059)	0.122* (0.059)	0.122* (0.059)	0.122* (0.059)
Years of Formal Education = 12	0.162*** (0.044)	0.162*** (0.044)	0.164*** (0.044)	0.161*** (0.044)	0.162*** (0.044)	0.163*** (0.044)
Years of Formal Education > 12	0.128* (0.056)	0.128* (0.056)	0.130* (0.056)	0.125* (0.056)	0.126* (0.056)	0.128* (0.056)
Potential Labour Stock (log)	0.249*** (0.033)	0.249*** (0.033)	0.248*** (0.033)	0.252*** (0.033)	0.251*** (0.033)	0.251*** (0.033)
Married: Monogamous	0.103** (0.032)	0.102** (0.031)	0.101** (0.032)	0.103** (0.032)	0.103** (0.032)	0.101** (0.031)
Married: Poligamous	0.186*** (0.053)	0.185*** (0.053)	0.184*** (0.054)	0.184*** (0.054)	0.183*** (0.054)	0.181*** (0.053)
Muslim Religion Proportion	0.128** (0.045)	0.128** (0.045)	0.128** (0.045)	0.125** (0.045)	0.124** (0.045)	0.124** (0.045)
Traditional Religion Proportion	0.372+ (0.210)	0.371+ (0.209)	0.371+ (0.211)	0.361+ (0.213)	0.360+ (0.213)	0.358+ (0.214)
Other Religion Proportion (Household)	-2.208 (3.795)	-2.213 (3.797)	-2.221 (3.788)	-2.310 (3.868)	-2.303 (3.877)	-2.334 (3.868)
Registration Status	0.236*** (0.042)	0.236*** (0.042)	0.237*** (0.042)	0.236*** (0.042)	0.236*** (0.042)	0.237*** (0.042)
Region: North-Eastern	0.062 (0.163)	0.060 (0.163)	0.066 (0.164)	0.026 (0.163)	0.018 (0.163)	0.027 (0.165)
Region: North-Western	0.027 (0.158)	0.024 (0.159)	0.030 (0.159)	-0.004 (0.158)	-0.009 (0.158)	-0.004 (0.160)
Region: North-Central	0.191* (0.080)	0.190* (0.080)	0.192* (0.080)	0.173* (0.081)	0.170* (0.081)	0.173* (0.081)
Region: South-South	0.271** (0.094)	0.272** (0.093)	0.268** (0.094)	0.270** (0.093)	0.269** (0.093)	0.266** (0.093)
Region: South-East	0.150 (0.098)	0.151 (0.098)	0.146 (0.098)	0.165+ (0.096)	0.167+ (0.096)	0.162+ (0.095)
Sharia	0.135 (0.128)	0.137 (0.128)	0.132 (0.129)	0.160 (0.128)	0.166 (0.127)	0.158 (0.129)
State Literacy Level	0.010*** (0.002)	0.010*** (0.002)	0.010*** (0.002)	0.009*** (0.002)	0.009*** (0.002)	0.009*** (0.002)
Industry: Crop Related	0.229+ (0.125)	0.229+ (0.125)	0.225+ (0.123)	0.230+ (0.123)	0.229+ (0.123)	0.224+ (0.121)
Industry: Extraction and Mining	0.202 (0.299)	0.202 (0.299)	0.201 (0.299)	0.196 (0.298)	0.197 (0.298)	0.195 (0.298)
Industry: Manufacturing	-0.156*** (0.041)	-0.156*** (0.041)	-0.157*** (0.041)	-0.157*** (0.041)	-0.157*** (0.041)	-0.158*** (0.041)
Industry: Construction and Repairs	-0.056 (0.060)	-0.056 (0.060)	-0.055 (0.060)	-0.053 (0.060)	-0.053 (0.060)	-0.051 (0.060)
Industry: Transport and Accommodation	-0.404*** (0.052)	-0.404*** (0.052)	-0.405*** (0.051)	-0.404*** (0.051)	-0.404*** (0.051)	-0.405*** (0.051)
Industry: Food and Beverages	0.038 (0.058)	0.038 (0.058)	0.040 (0.058)	0.035 (0.058)	0.035 (0.058)	0.037 (0.058)
Industry: Art and Publishing	-0.359** (0.122)	-0.358** (0.122)	-0.358** (0.122)	-0.349** (0.121)	-0.348** (0.121)	-0.347** (0.121)
Industry: IT, Telecom., Finance	-0.031 (0.201)	-0.032 (0.201)	-0.031 (0.202)	-0.034 (0.202)	-0.033 (0.203)	-0.034 (0.203)
Industry: Legal and Business Services	0.113 (0.122)	0.113 (0.122)	0.112 (0.122)	0.107 (0.123)	0.107 (0.123)	0.105 (0.124)
Industry: Others	-0.108** (0.041)	-0.108** (0.041)	-0.108** (0.041)	-0.107** (0.040)	-0.107** (0.040)	-0.107** (0.040)
Constant	5.476*** (0.191)	5.484*** (0.194)	5.463*** (0.192)	5.542*** (0.193)	5.548*** (0.192)	5.535*** (0.196)
Observations	6,359	6,359	6,359	6,359	6,359	6,359
R-squared	0.399	0.399	0.400	0.400	0.400	0.401

Robust standard errors clustered on local government areas in parentheses.

\*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$ , +  $p < 0.10$ .

wide shocks (Column 3), the effect on profitability is attenuated significantly (below the 5 % level) with the coefficient for interactive term,  $\beta = 0.251$ ; and standard error,  $SE = 0.121$ . When all three terms that form the interaction are evaluated jointly, we obtain  $F = 6.25$  ( $p < 0.001$ ), consistent with Hypothesis 2a. Finally, when cousin marriage tradition is interacted with price shocks (Column 4), the effect on profitability is attenuated significantly below the 5 % level ( $\beta = 0.279$ ;  $SE = 0.129$ ), and the joint test of all three terms produces  $F = 6.98$  ( $p < 0.001$ ), consistent with Hypothesis 2b. Summarising the results from this and the previous section, we find tentative support for all our hypotheses (albeit slightly weaker for Hypothesis 1a).

Following good practice, we also plot the marginal effects corresponding to the interactions we used to test Hypotheses 1a and 1b, correspondingly in Figs. 4 and 5. The pattern on both graphs is very similar.

On the left-hand side we see the contrast between the areas with (red) and without (blue) cousin marriage tradition, when there is no economy- or regionwide crisis. There is no significant difference between the two. However, as postulated in Hypothesis 2a, there is a significant profit premium for cousin marriage areas at time the respondents face economy and region wide crises (Fig. 4). In contrast, on the right-hand side of both graphs we see outcomes for areas with cousin marriage tradition. The latter communities seem more resilient at time of crises. Exactly the same pattern emerges for price shocks, as Fig. 5 illustrates.

#### 4.3. Robustness tests

We further estimate these equations separately for (i) NFEs with employees who are not household members in Table A1, and (ii) those NFEs with only employees who are household members in Table A2 (Appendix). The reason for this is that the cousin marriage tradition may affect NFEs which hire employees who are not household members differently, because those workers represent interactions of the NFE with the local community outside of the household. An alternative implication could also be that these are larger businesses that potentially benefit more from community support.

For NFEs that hire employees OUTSIDE the household, the results on cousin marriage tradition show that both its direct effect and the moderating effect on economy and regional shocks and on price shocks remain strong and significant, despite the number of observations now being reduced to about a quarter of the original sample. For NFEs without outside household employees, the results remain similar but weaker, as expected. Saying that, the joint significance tests for all interaction terms remain significant at  $p < 0.05$  for both economy and regional shocks, and for price shocks interactions (F-test values are 2.64, and 3.43, correspondingly).

Given that the firms in our sample are typically very small, one might be concerned that the performance might be poorly measured in some cases. It might be that for such firms, the measure of revenue is a more accurate one. There is an argument in the literature that profits are an inadequate measure for firms in developing countries, especially for the environments where those firms are predominantly informal (Khayesi et al. 2014; Haarman et al. 2022). This leads us to re-estimate our models using the log of revenue rather than profits as the dependent variable. The results can be seen in Table A3. The difference between revenue and profits models is that now we see no significant general effect for cousin marriage tradition (Model 1 and 2 in Table A3). The interactive effects we postulated are a bit weaker but still there. In both Models 3 and 4, the interactive term is significant at  $p < 0.05$ , while the joint tests for interactive terms are borderline significant at  $p < 0.10$  ( $F = 2.25$ , and  $F = 2.21$ , correspondingly).

We also experimented with a different proxy for cousin marriage

tradition. That is, instead of the measure at the local government area, we averaged it up to state level, using population weights. This implies we now have a continuous measure illustrating a percentage of population in the state living in cousin marriage tradition areas. While for the core models we assume that the family system effects are local, this need not to be the case – they may also be wider in geographic scope, hence the experiment with the state level measure. The results are reported in Table A4. It turns out that the cousin marriage tradition works equally well at the higher geographical level. The results support all four hypotheses albeit, again, support for H1a is slightly weaker.

Last but not least, Angrist and Pischke (2009) argue that, for the types of models we apply, with explanatory variables at higher level (in our case: local government areas) and dependent variables at lower level (in our case: non-farm enterprises), the omitted variables bias is particularly serious, as there may be many higher-level variables we do not account for. Therefore, they recommend instrumenting. We found two suitable geography variables that are not correlated with the error term in the profitability equation but have explanatory power in the cousin marriage equation. The first of them is distance to the capital city. This is based on the argument presented by Korosteleva et al. (2020) that the further the distance to the formal centre of power, the stronger the impact of informal institutions (in our case: cousin marriage tradition) compared to formal ones. The second variable is based on empirical research that explores factors of consanguineous marriage, and cousin marriage in particular, as reviewed by Fuster and Colantonio (2002). In many contexts, population density was found to correlate negatively with human inbreeding and cousin marriage, as density opens up wider alternatives for individual marriage decisions. We do not have historical data on population density, but we can rely on another conjunction, which links population density with the human-carrying capacity of the environment. In particular, this capacity increases with higher rainfall (Kalf et al., 1985). Combining the two, we postulate the link between the rainfall and historical practices of cousin marriage. We proxy rainfall with average annual number of rainy days in LGA.

The corresponding 2SLS models are reported in Table A5. The first two models (1 and 2) are without interactions and with cousin marriage being instrumented, and the second two models (3 and 4) add interactions with price shock. In the latter specifications, alongside cousin marriage, the interaction between price shock and cousin marriage is instrumented by interactions between the two instruments and the price shock. In each case, there is a pair of estimations. The only difference between them is the modelling of the standard errors: first, robust without clustering (Models 1 and 3), and second, with clustering on local government areas (2 and 4). Models 1 and 3 enable us to apply the test for overidentifying restrictions. In both cases we cannot reject the hypotheses that the instruments are valid, as we get  $\chi^2 = 0.005$  and  $\chi^2 = 1.344$  correspondingly ( $p = 0.942$  and  $p = 0.511$ ). The table also reports the statistics related to the quality of the first stage estimation, and the endogeneity tests. Interestingly, once we move from general robust standard errors to clustering at the appropriate level of geography, the endogeneity test results suggest fewer issues. For example, while in model 1, the corresponding F statistics is significant at  $p < 0.001$ , in model 2 it is only borderline significant at  $p < 0.10$ . The coefficients on instrumented variables in these models remain similar to models without instrumenting, reported in Tables 4 and 5, and they are significant. However, the coefficient on interaction between cousin marriage and price shock becomes insignificant in Model 4 (but the joint significance test of the two variables and the interaction is still highly significant:  $\chi^2(3) = 0.8179$ ,  $p < 0.001$ ).

Using a smaller number of instruments may be a more efficient approach (Angrist and Pischke, 2009), therefore we also explored models in which we only use average annual number of rainy days to instrument cousin marriage, and days raining and its interaction with

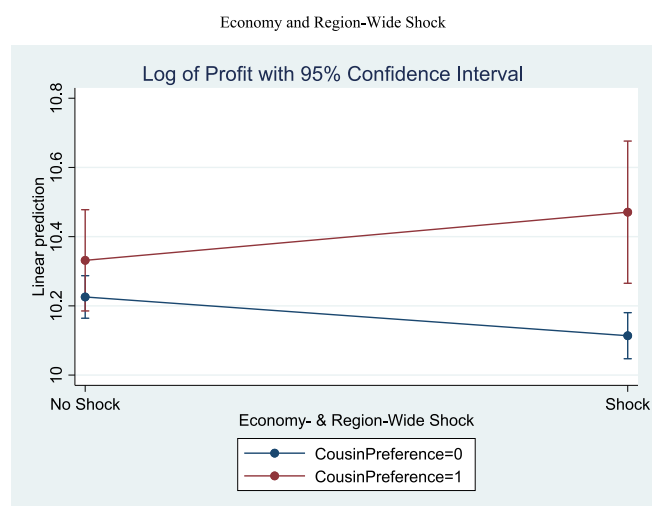
**Table 5**  
Effects of interaction between cousin marriage tradition and crises on financial performance; dependent variable: log of profit.

	(1)	(2)	(3)	(4)
Cousin Marriage Tradition	0.231** (0.080)	0.223** (0.072)	0.106 (0.084)	0.094 (0.086)
Household-Specific Shock	-0.010 (0.045)			
Cousin Marriage x Household Shock	-0.001 (0.112)			
Common Community-Level Shock		0.069 (0.072)		
Cousin Marriage x Community Shock		0.053 (0.204)		
Economy- & Region-Wide Shock			-0.112** (0.039)	
Cousin Marriage x Economy-Region Shock			0.251* (0.121)	
Price Shock				-0.126** (0.039)
Cousin Marriage x Price Shock				0.279* (0.129)
Hires employees (a dummy)	0.322*** (0.049)	0.323*** (0.049)	0.321*** (0.048)	0.322*** (0.048)
Capital Stock	0.294*** (0.013)	0.294*** (0.013)	0.295*** (0.013)	0.296*** (0.013)
Male	0.327*** (0.026)	0.329*** (0.026)	0.327*** (0.026)	0.327*** (0.026)
Years of Formal Education = 6	0.100* (0.043)	0.100* (0.043)	0.101* (0.043)	0.102* (0.043)
Years of Formal Education = 9	0.120* (0.060)	0.120* (0.059)	0.118* (0.059)	0.118* (0.059)
Years of Formal Education = 12	0.162*** (0.044)	0.163*** (0.044)	0.160*** (0.044)	0.161*** (0.044)
Years of Formal Education > 12	0.128* (0.056)	0.130* (0.056)	0.124* (0.056)	0.125* (0.056)
Potential Labour Stock (log)	0.249*** (0.033)	0.249*** (0.033)	0.252*** (0.033)	0.251*** (0.033)
Married: Monogamous	0.102** (0.031)	0.101** (0.032)	0.104** (0.032)	0.104** (0.032)
Married: Polygamous	0.185*** (0.053)	0.183*** (0.053)	0.181*** (0.053)	0.180*** (0.053)
Muslim Religion Proportion	0.128** (0.045)	0.128** (0.045)	0.123** (0.045)	0.121** (0.045)
Traditional Religion Proportion	0.371+ (0.210)	0.371+ (0.210)	0.361+ (0.212)	0.361+ (0.212)
Other Religion Proportion (Household)	-2.212 (3.796)	-2.210 (3.787)	-2.277 (3.860)	-2.264 (3.873)
Registration Status	0.236*** (0.042)	0.238*** (0.042)	0.234*** (0.042)	0.233*** (0.042)
Region: North-Eastern	0.060 (0.163)	0.065 (0.164)	-0.013 (0.167)	-0.027 (0.167)
Region: North-Western	0.024 (0.158)	0.027 (0.159)	-0.031 (0.159)	-0.039 (0.159)
Region: North-Central	0.190* (0.080)	0.191* (0.080)	0.156+ (0.082)	0.151+ (0.082)
Region: South-South	0.272** (0.093)	0.268** (0.094)	0.264** (0.092)	0.262** (0.092)
Region: South-East	0.151 (0.098)	0.146 (0.098)	0.169+ (0.095)	0.172+ (0.095)
Sharia	0.137 (0.128)	0.132 (0.129)	0.166 (0.130)	0.175 (0.130)
State Literacy Level	0.010*** (0.002)	0.010*** (0.002)	0.009*** (0.002)	0.009*** (0.002)
Industry: Crop Related	0.229+ (0.125)	0.225+ (0.123)	0.226+ (0.121)	0.230+ (0.121)
Industry: Extraction and Mining	0.202 (0.299)	0.201 (0.299)	0.193 (0.298)	0.194 (0.298)
Industry: Manufacturing	-0.156*** (0.041)	-0.157*** (0.041)	-0.158*** (0.041)	-0.159*** (0.041)
Industry: Construction and Repairs	-0.056 (0.060)	-0.055 (0.060)	-0.049 (0.060)	-0.048 (0.060)
Industry: Transport and Accommodation	-0.404*** (0.052)	-0.405*** (0.051)	-0.407*** (0.051)	-0.407*** (0.051)

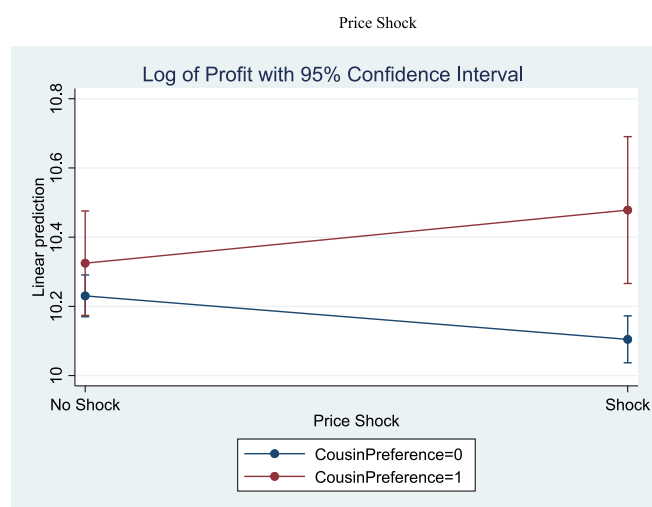
**Table 5 (continued)**

	(1)	(2)	(3)	(4)
Industry: Food and Beverages	0.038 (0.058)	0.039 (0.058)	0.031 (0.057)	0.032 (0.057)
Industry: Art and Publishing	-0.358** (0.122)	-0.358** (0.122)	-0.349** (0.120)	-0.347** (0.120)
Industry: IT, Telecommunications, Finance	-0.032 (0.201)	-0.031 (0.202)	-0.030 (0.203)	-0.029 (0.203)
Industry: Legal and Business Services	0.113 (0.122)	0.112 (0.122)	0.109 (0.123)	0.109 (0.123)
Industry: Others	-0.108** (0.040)	-0.108** (0.041)	-0.105** (0.040)	-0.104** (0.040)
Constant	5.484*** (0.194)	5.466*** (0.192)	5.591*** (0.194)	5.603*** (0.193)
Observations	6,359	6,359	6,359	6,359
R-squared	0.399	0.400	0.402	0.402

Robust standard errors clustered on local government areas in parentheses.  
\*\*\* p < 0.001, \*\* p < 0.01, \* p < 0.05, + p < 0.10.



**Fig. 4.** Effects of Interaction between Cousin marriage Tradition and Crises on Financial Performance.



**Fig. 5.** Effects of Interaction between Cousin marriage Tradition and Crises on Financial Performance.

price shocks for instrumenting both cousin marriage and cousin marriage – price shock interaction. These results are reported in Table A6. The coefficients on cousin marriage and its interaction with price shocks are now higher, and the interaction term between cousin marriage and price shock comes as significant also in Model 4. Also, based on this design, the case for instrumenting gets weaker. For Model 2, with clustered standard errors, the F statistics from the endogeneity test is 2.18, and is now insignificant,  $p > 0.10$ . However, for the interaction, in Model 4, endogeneity test produces  $F = 5.99$ , which is still significant at  $p < 0.05$ .

#### 4.4. Tentative evidence on mechanisms linking cousin marriage and profitability during the crises

In our theoretical discussion, we speculated that the closer kinship linkages may enable more effective cooperation and support during the crises. We can now supplement this with more specific evidence on financial constraints, as the corresponding questions were included in the survey. Table A7 presents logit models, with two versions of the dependent variable related to financial constraints. The first (narrow) version takes a value of one if a respondent declared the inability to borrow money as the most important barrier to start a business. The second (wider) version is if a respondent included inability to borrow money among the three most important barriers.

There are negative effects (odds ratios  $< 1$ ) for residents in cousin marriage tradition areas, significant at  $p < 0.01$ . Price shocks come with positive effects (make financial constraints more likely,  $p < 0.001$ ) as expected, and the interaction term with cousin marriage is negative as expected. However, as argued by Ai and Norton (2003), for interaction terms in logit models we should not only rely on coefficients or odds ratios but inspect the marginal effects. These are plotted in Fig. A1. In ‘good times’, there is no difference between areas with the cousin marriage tradition and those without it, in terms of perceptions of financial barriers. However, the latter shoot up during the crises in areas in which there is no tradition of cousin marriage. This does not happen in areas where there is a tradition of cousin marriage.

## 5. Discussion and conclusions

Small and micro enterprises, often informal, make up the vast majority of firms in developing economies. Moreover, developing economies are particularly exposed to the effects of shocks and crises, both from external macro-economic factors and arising because of individual problems within the family at the heart of such enterprises. However, while there has been research about the vulnerability of such organisations (Boudreaux, Escaleras and Skidmore, 2019), there has been less effort to evaluate the impact from different categories of shock. In this paper we develop the typology of shocks, ranging from strictly individual to economy wide, to consider the ways in which SMEs in developing economies might be negatively affected. Introducing Hypotheses 1a and 1b on the economy and region-wide shock, and especially price shocks, we argue that these shocks create the most difficult challenges that require local social cooperation beyond individual family. They may also require access to informal channels of finance. In Table 4 we show the negative impact of economy and regional category of shocks, and specifically price shocks on the performance of non-farm enterprises. This indicates the particular vulnerability of small and micro firms to the broader macroeconomic environment in Nigeria in the time of widespread economic crises.

We have also been concerned with how SME responses to shocks may vary with institutional arrangements. We argue that in the developing economy context and especially for small firms predominantly based in the informal sector, the appropriate institutional structures likely to influence organisational resilience (DesJardine, Bansal, and Yang, 2019) will be informal institutions. This led us to build on the work of cultural anthropologists like Henrich (2020), Todd (2019), and Goody (1976;

1983) to consider as the central informal institution the family system and the norms related to marriage practices, in particular the strength of taboos on cousin marriage. We see the corresponding distinction as representing a fundamental way to explore the relevant variation in informal institutions for businesses in the face of shocks because of its impact on the strength of social ties and therefore the potential provision of social insurance and informal finance within the local community (Todd, 2019; Enke, 2019).

Hence, we explore the sensitivity of the impact of crises on small and micro business organisations to contextual institutional factors, namely the heritage of the family systems. In so doing, we contribute to the analysis of the resilience of small businesses to economic crises and highlight the ways in which the tightly knit kinship ties may provide the basis for some degree of social insurance and continuing access to finance in the face of wide economic shocks. This is because cousin marriage is understood to create dense networks of family connections and thereby deepen obligations towards kinship groups and more broadly towards the local community – the ingroup (Schulz et al., 2019). We propose that these closer ties within and between families create a sense of mutual support in the face of difficult circumstances, and therefore make the community more effective in collective action and provide support to family firms in difficult times such as in the face of shocks. In contrast, prohibiting cousin marriage and encouraging marriage outside the ingroup acts to weaken the kinship ties. While supporting relationships with the outgroup provides a cultural basis for a more market-oriented system of transactions (Greif, 2006), communities without a tradition of cousin marriage will be less likely to support kinship groups in face of crises; and the provision of local social insurance and finance will be less. This led us to propose in Hypotheses 2a and 2b that the impact of crises would be contingent on local informal institutions, specifically that the tradition of cousin marriage would lessen the impact of crises on small firm performance.

We find evidence, reported in Table 5, in support of the social insurance effect of informal institutions in the form of the tradition of different marriage practices on the impact of economy- and region-wide shocks, and price shocks in particular. These results are further supported by 2SLS models presented in Tables A5 and A6. In contrast, the cousin marriage tradition plays no role in alleviating the impact of narrower community-wide and individual family level shocks. There are three possible interpretations of these contrasting results. First that Nigerian small and micro firms are more resilient in the face of household-specific income shocks compared to price shocks, so there is little or no need for social insurance for crises of this form. The second, and in our view more likely, is that the family is able to help in such cases, regardless of the cousin marriage tradition. Third, and related, a main consequence of the dense kinship networks associated with the cousin marriage practice tradition may be its capacity for collective action required when facing common shocks, and mutual support including finance. This may be particularly effective to ensure ingroup and community resilience in the face of challenges that are economy- or region wide, but actually making less difference in face of individual household specific suffering. Thus, our findings suggest that the social insurance offered by informal institutions does exist but may be specialised. It is an important topic for future research to explore this possibility in more depth.

In particular, we offer no clear explanation why community-wide shocks have insignificant effects. On closer inspection, we may see that these contain subcategories related to recurring local natural disasters for which patterns of collective response are likely to be established in most places. In contrast, the economy wide price shocks are more difficult to address; they may be less standard, and this is where the closer-knit communities based on cousin marriage tradition may have a particular role. Taken together, the results suggest that stronger kinship structures play a role in alleviating the business effects of economy-wide shocks. However, we propose the causal linkages run between community level characteristics and family firm level

outcomes, that is *meso*-to-micro effects. It would be fascinating to explore the micro linkages. Is cousin marriage a factor at micro-to-micro linkages? To answer this question, one would need a rich dataset, which would combine economic micro-outcomes with details on consanguinity.<sup>4</sup>

We focus on the largest African economy, Nigeria. This is an important developing market context in which there are data concerning the mainly informal business sector. Moreover, Nigeria displays considerable heterogeneity in terms of informal institutions, including marriage systems, and collects systematic data on its businesses. Thus, one is able to explore the impact of informal institutions on the relationship between shocks and profitability intra-country, but in a country environment where all firms face the same formal institutions, that is to say within a single national jurisdiction. This is an important advantage of our research method, and one which we commend to future researchers. Despite the strengths of our research approach, we also faced important limitations. Perhaps most importantly, our data is not longitudinal, which restricts our ability to explore the dynamics behind the relationships we identify.

Finally, we consider the implications of our results for small and micro businesses in developing economies, and for policy makers. Our work has confirmed that family businesses in a major developing economy are indeed highly subject to shocks, both external and internal, and these significantly affect their financial performance and the earnings of family members. This suggests that such business owners should pay considerable attention to the issue of social insurance and continuing access to finance, building community relationships and accumulating buffer stocks of resources either to help other community members or for their own use when difficult times come.

From the policy perspective, our analysis suggests two areas where governments, local or national, may be able to increase the resilience of small and micro firms in the face of crises. The first is to help owner-managers in the accumulation and safe storage of financial assets that can be used in difficult times, which involves helping to increase access to financial institutions appropriate for this type of business (Demirgüç-Kunt, and Klapper, 2012). The second is to learn from the insights of Banerjee and Duflo (2011) about the damaging effects in developing economies caused by deficiencies in the supply of social insurance. We have argued that in areas which have the cousin marriage tradition, the negative effects of crises can to some extent be offset by local community cohesion. However, welfare would be greatly increased if this could be augmented by government provision of social insurance in the case of major shocks.

#### CRedit authorship contribution statement

**Saul Estrin:** Writing – review & editing, Writing – original draft, Methodology, Conceptualization. **Tomasz Mickiewicz:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization. **Tolu Olarewaju:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization.

#### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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#### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.worlddev.2024.106910>.

#### Data availability

Data will be made available on request.

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