



Conventional or alternative financing to promote entrepreneurship? An analysis of female and male entrepreneurship in developed and developing countries

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Abstract

One of the main concerns of entrepreneurs is obtaining finance to launch their projects. In this sense, this study aims to analyse the relationship between entrepreneurship and different sources of finance, considering the type of entrepreneurship, gender, and the country. To achieve this purpose, entrepreneurship has been distinguished by gender and type of entrepreneurship (necessity and opportunity entrepreneurship), using data from the Global Entrepreneurship Monitor (GEM) as a reference. Sources of finance were divided into conventional (bank) financing and alternative financing (microfinance and cooperatives). Countries were divided into developed and developing countries according to the classification proposed by the International Monetary Fund (IMF). We worked with 66 countries (17 developed and 49 developing) for which information was obtained for 2007–2019. Using fixed effect panel data models, the results show how microfinance and cooperativism have a positive impact, especially on female entrepreneurship by opportunity in developing countries. In the case of cooperativism, there is a direct and clear relationship between female entrepreneurship, regardless of whether driven by necessity or opportunity, and region. Conventional financing is generally unfavourable to female entrepreneurship but favours male opportunity entrepreneurship. This paper makes recommendations to authorities to create an appropriate framework to encourage these sources of finance for entrepreneurship, given their particular positive impact and benefit in developing regions.

Keywords Entrepreneurship · Alternative financing · Gender · Necessity/opportunity entrepreneurship · Country development

Introduction

Entrepreneurship is one of the main topics of analysis from the economic approach, as its contribution to economic growth (Hirsch & Walz, 2018) and unemployment reduction (Svotwa et al., 2022) in countries or regions is widely recognised. Research

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shows that the main concern for entrepreneurship is access to finance and the acquisition of economic resources (Cumming et al., 2019). Cumming and Groh (2018) highlight the evolution of different sources of finance, finding that non-bank sources, such as Initial Public Offerings (IPOs) and venture capital, have been the most studied from 2000 to 2016. Subsequently, the literature also pays attention to collaborative sources of finance (Cumming et al., 2019; Manigart & Khosravi, 2023). However, Cumming et al. (2019) point out that the forms and sources of entrepreneurial finance need to be differentiated on a firm-by-firm basis, as they are a subset of conventional corporate finance.

Cumming et al. (2019) indicate that the financing problem is constantly being addressed through the creation and implementation of different sources of finance. Therefore, research is needed to comprehend the contribution and complexity of financing. For Abdullahi (2018), academia should seek to address the financial constraints of early-stage entrepreneurs or future entrepreneurs. Manigart and Khosravi (2023) highlight that although the literature on entrepreneurial finance has grown exponentially, several knowledge gaps remain. Fraser et al. (2015) suggest that the literature should aim to answer questions such as the extent to which microfinance fills a financing gap created by rejection from other sources. Cumming et al. (2019) also ask whether these new sources can overcome the challenges of conventional forms of finance.

Mamaro and Sibindi (2022) point out that global crises increase the level of financial shortfalls, forcing entrepreneurs to seek new financing alternatives. This situation was most evident in the last global crisis caused by the COVID-19 pandemic, where conventional banks were unable to mobilise sufficient resources, leading to a shortage of credit (Song et al., 2020). To address this problem, Manigart and Khosravi (2023) highlight that one of the new trends in the literature on financing for entrepreneurs is collaborative financing, such as microfinance and cooperativism. They are presented as an alternative to address the problem of access to conventional banking. Microfinance is emerging as an alternative to eradicate poverty in the world, and its main contribution to the field of entrepreneurship is to support start-ups in their early stages (Chao et al., 2020; Doering & Wry, 2022; Mamaro & Sibindi, 2022). Some studies (Santos & Neumeyer, 2021; Shkodra et al., 2021; Swapana, 2017) highlight the contribution of microfinance to female entrepreneurship. However, no literature has been found that compares this contribution with that of male entrepreneurship, or that precisely identifies the differences between entrepreneurship motivated by opportunity and that motivated by necessity. A similar situation arises in the case of cooperativism. Some studies (Bastida et al., 2020; Galindo-Reyes et al., 2016) analyse its impact on female entrepreneurship in poor areas, but do not compare it with male entrepreneurship, nor assess whether it is motivated by necessity or opportunity. This study tries to fill this gap and to contribute to science giving a response to the most recent literature that demands more research in this area, both on the influence of different entrepreneurship alternatives, as well as differentiation by gender and by necessity or opportunity, and by the level of development of the country (Franzke et al., 2022; Lingappa & Rodrigues, 2023).

In this sense, the objective of this paper is to analyse the impact of two alternative sources of finance, microfinance, and cooperatives, compared to bank finance

on entrepreneurship. To study this effect, three fundamental aspects are also considered: gender of the entrepreneur, motivation for entrepreneurship (necessity or opportunity) and level of development of the country in which the entrepreneur is located. To this end, a fixed-effects panel data model is used, analysing data from 66 countries over a period from 2007 to 2019. The main results show a clear positive relationship between cooperativism and female entrepreneurship. In addition, microfinance has a greater effect on female entrepreneurship in developing economies. Male entrepreneurship by opportunity is directly related to bank finance, regardless of country type. This paper makes the following contributions to the previous literature: (1) it analyses the impact of different sources of finance (conventional and alternative) on entrepreneurship rates; (2) it explores the relationship of different sources of finance to necessity/opportunity entrepreneurship and male/female entrepreneurship; and (3), again building on previous contributions, it considers whether entrepreneurship takes place in developing or developed countries.

In the second section the study makes a literature review highlighting the main contributions on access to finance, microfinance, cooperativism and other factors affecting access to finance. The third section presents the methodology, including the data sample and the method. The fourth section presents the results and discussion. Finally, the last section shows the conclusions, limitations, and future lines of research.

Literature review

Entrepreneurship research is complex and heterogeneous (Audretsch, 2012). Multiple factors influence its development and evolution, with the environment and the level of economic development playing a key role. Environmental changes could trigger business model innovation (Ahamat & Sin, 2022). The entrepreneurial ecosystem in a transition economy is still especially complex in developed countries. Progress towards mature and productive entrepreneurship is slow, non-linear, subject to setbacks and seriously threatened by corruption, lack of skills, political interference, and regional differences (Belitski et al., 2021). Gender is another factor considered by researchers. Today, there is a positive relationship between the sentiment of the content generated on empowerment and the positioning of businesswomen and female entrepreneurs and leaders (Blanco-González-Tejero & Cano-Marin, 2022). Dixit et al. (2022) defend that the comparison of female and male entrepreneurs is completely unjustified, but most of the literature shows that the contribution of female entrepreneurs lags behind that of male entrepreneurs. Recent research continues to show that women face additional barriers to entrepreneurship in terms of training, access to some networks or cultural barriers, with access to sufficient capital being one of the main limitations (Shmailan, 2016).

Access to finance

Access to finance is considered a crucial element of entrepreneurship (Frimanslund et al., 2023). The right choice of financial resources can be a differentiating strategy for the sustainability and growth of ventures (López García et al., 2021). However, their growth

is limited by their difficult access, which is one of their main problems (Carpenter & Petersen, 2002; Kolaković et al., 2019; Stefani et al., 2019). For Cumming et al. (2019), another problem with financing entrepreneurs is the asymmetry of information between them and the resource providers, as well as the lack of guarantees to secure the requested resources. The characteristics and structure of ventures, as well as the level of uncertainty, make it difficult to obtain resources, mainly due to the rejection of conventional sources of finance (Cosh et al., 2009).

When analysing the difficulties in accessing entrepreneurial finance, it is important to note that there are some studies that measure the level of entrepreneurship in terms of the rate of self-employment (Svotwa et al., 2022). However, Henrekson and Sanandaji (2014) conclude that using the self-employment variable distorts the concept of entrepreneurship, which is likely to result in entrepreneurs having less access to conventional finance. In addition, they find that when entrepreneurship is assessed alone, countries with higher incomes, more confidence, lower taxes, more venture capital investment, and lower regulatory burdens have higher rates of entrepreneurship and lower rates of self-employment. This emphasises the lack of a relationship between these two variables.

For example, Deloof and Vanacker (2018) highlight that start-ups generally turn to banks in their early stages. However, they do not always achieve the expected results, leading to a high probability of failure. Approximately 20% of companies in the European region abandon their innovation projects due to difficulties in accessing bank finance (Stefani et al., 2019). In this regard, Frimanslund et al. (2023) mention that banks and conventional sources of finance are isolated environments that are not suitable for understanding the evolutionary dynamics of ventures, especially when there are economic and social problems and crises (Mamaro & Sibindi, 2022). Eberhart and Eesley (2018) also show that financial intermediaries (conventional banks) often hinder the creation and growth of ventures, even though they were created to encourage and strengthen them. However, it should not be forgotten that start-ups are generally too risky for conventional financing structures (Brown et al., 2020). Moreover, financial institutions tend to make mistakes in the valuation of ventures (Stefani et al., 2019). As a result, they often turn to other non-conventional sources to finance their operations, including a number of informal sources (Brown et al., 2020).

Fraser et al. (2015), in their analysis of supply and demand, do not discuss the limitations of access to finance but focus on the lack of finance to meet the needs of ventures, mainly at the development stage. They conclude that high rejection rates of finance applicants are not a market failure per se, but a strategy to mitigate potential credit risk. Thus, it can be argued that the lack of access to financial resources is not exclusively due to a financing gap, but to the inability of ventures to be attractive to conventional resource providers (Eberhart & Eesley, 2018). Prtenjača Mažer et al. (2019) highlight that the financing gap arises because entrepreneurs mostly rely on bank financing alone, even though the market is increasingly presenting new alternatives for raising resources.

As highlighted by Cumming et al. (2019), most work on entrepreneurial finance looks at formal and corporate sources, such as venture capital, business angels, IPOs or similar sources (Hirsch & Walz, 2018). In regions marked by high levels of poverty, inequality, lack of access to financial and technological products and other problems (Hakizimfura et al., 2020) the relationship between investors and ventures is hampered,

so entrepreneurs often turn to crowdfunding. The main collaborative sources are micro-finance and cooperatives.

Microfinance

Given the limitations of bank finance, entrepreneurs have sought other alternatives. Berger and Udell (1998) associated each stage of enterprise with some sources of finance. In the case of start-ups, they suggest informal sources such as family, friends, and equity. However, for Cumming et al. (2019) and Reza-Gharehbagh et al. (2020), one of the new trends and main sources of entrepreneurial finance is that developed by peers, i.e., collaborative, or peer-to-peer finance, especially microfinance and crowdfunding. Since 2010, most of these studies have been applied in specific regions, mainly in Africa (Mamaro & Sibindi, 2022; Sivotwa et al., 2022) and Asia (Saeed et al., 2018; Félix & Belo, 2019). Global crises, such as the one caused by the COVID-19 pandemic, accelerated the shift from financing to new collaborative alternatives, mainly towards crowdfunding and microfinance (Mamaro & Sibindi, 2022).

This type of financing has democratized the access to and sources of finance for entrepreneurs, providing alternatives that are accessible to all (Ackermann et al., 2020), especially those excluded from the financial system (Gama et al., 2023). Crowdfunding is one of the main trends and challenges for entrepreneurial finance in the future. However, conditions in developing countries, such as lack of internet access and low financial literacy are the main problems, so the initial use of microfinance alternatives is suggested (Chao et al., 2020). Similarly, Igra et al. (2021) mention that crowdfunding is mainly beneficial in regions with higher levels of wealth and education. For those who do not yet have these conditions, alternatives such as microfinance are recommended. According to Doering and Wry (2022), microfinance institutions encourage the creation of mainly necessity-based ventures, especially in regions where financial access is not guaranteed, and the banking sector is weak (Cobb et al., 2016).

Cooperativism

Another alternative source of financing for entrepreneurship is cooperativism (Abdullahi, 2018). According to Otto and Ukpere (2011), a cooperative is an association of people who pool their resources on a mutual basis to solve socio-economic problems. It is a model that mainly contributes to the economic development of communities (Kelly, 2012) and promotes small businesses by providing finance and entrepreneurship (Duguma & Han, 2021). In addition, most cooperative institutions are aligned with, at least, one of the Sustainable Development Goals (SDGs) (Sepúlveda-Molina et al., 2022). The entrepreneurial activities undertaken by members of these communities foster both individual and collective economic goals (Mabula et al., 2020). Most studies on cooperatives have focused mainly on agricultural development and the like, neglecting their contribution to business and entrepreneurial development (Abdullahi, 2018; Wale et al., 2021). For Mabula et al. (2020), cooperativism is one of the answers to the problem of entrepreneurial

failure. Meanwhile, Oladejo (2011) points out that it is the best alternative for financing businesses due to its real impact, especially in low-income areas.

When analysing ventures, the impact of cooperativism as a driver of entrepreneurship is found mainly among vulnerable groups such as young people, women, and older adults (Abdullahi, 2018). Evidence of the contribution of cooperativism has been found mainly in the development of female entrepreneurship and female-led ventures (Bastida et al., 2020; Fieve & Chrysostome, 2022). Its impact on improving living conditions in general (Cornée et al., 2020), creating jobs that are better adapted to needs (Minetti et al., 2021), improving self-esteem, and increasing a sense of empowerment (Bastida et al., 2020; Galindo-Reyes et al., 2016) has also been highlighted. Finally, its contribution to reducing inequality is better explained in terms of income distribution (Minetti et al., 2021). Financially, cooperatives contribute to ventures through interest-free or very low-interest, long-term loans (Cornée et al., 2020; Fieve & Chrysostome, 2022). All of this favours the conditions for entrepreneurs and improves their sustainability in meeting their commitments (Beishenaly & Dufays, 2023; Fieve & Chrysostome, 2022).

Other factors affecting access to finance

Cumming et al. (2019) suggest that the analysis of financing should consider aspects such as the type of entrepreneurship, the organisation providing the resources, i.e., the source of finance, and the region or country. Meanwhile, Frimanslund et al. (2023) stress that the analysis of entrepreneurial financing should take into account macroeconomic and even geographical variables.

Several studies (Galindo-Reyes et al., 2016; Stošić Panić, 2017; Bastida et al., 2020) point out that there are strong differences between female and male entrepreneurship, both in terms of opportunities and challenges (Outsios & Farooqi, 2017; Nguyen et al., 2021). In general, female entrepreneurs face more barriers than men in terms of access to finance (Galindo-Reyes et al., 2016) and business support networks (Wale et al., 2021). On the other hand, women often face more challenges than men in terms of work-life balance (Outsios & Farooqi, 2017; Özsungur, 2019). Female entrepreneurs have been shown to be more risk averse than men, which may influence their entrepreneurial decisions (Abdieva et al., 2019). It is also often assumed that women have fewer leadership skills than men, which may hinder their ability to raise finance and expand their businesses (Outsios & Farooqi, 2017). However, there is also evidence that, on average, female-led businesses perform better financially than male-led businesses (Janovac et al., 2021). While this situation strengthens female entrepreneurship, it does not solve the problem of accessing sources of finance (Kwong et al., 2012; Özsungur, 2019). Despite these obstacles, female entrepreneurs are finding innovative ways to overcome them, such as microcredit and crowdfunding (Babajide et al., 2022).

Moreover, the literature in recent years has focused on distinguishing between individuals who are forced into entrepreneurship by negative factors, such as unemployment or poverty (necessity) and those who are motivated by entrepreneurial intent (opportunity) (Dencker et al., 2021). Necessity-driven entrepreneurship can

be one of the solutions to poverty, and alternatives such as collaborative finance often provide important financial support for such ventures (Doering & Wry, 2022). Sendra-Pons et al. (2022) indicate that the rate of necessity-driven entrepreneurship is likely to be underestimated in some reports, as this type of entrepreneurship tends to be informal. Opportunity-driven entrepreneurship, on the other hand, tends to show a more realistic rate in most reports.

In the case of opportunity-driven entrepreneurship, funding may be required for research and prototyping, production and marketing of the product or service (Distefano, 2023). Entrepreneurs who focus on this type of entrepreneurship tend to be more attractive to investors (Khanin et al., 2022), as their projects are based on identified market opportunities and are therefore more likely to succeed (López-Muñoz et al., 2023). As a consequence, this type of entrepreneurship tends to have access to a wide range of financing options, such as venture capital, bank loans and business angels, i.e., most of the financing alternatives. On the other hand, necessity-driven entrepreneurs tend to have fewer financing options (Neymotin, 2021), as their projects may be considered riskier due to a lack of experience, education, and planning (López-Muñoz et al., 2023). In either case, financing can be a critical factor in the long-term success of ventures driven by both opportunity and necessity and can make a significant difference (Khanin et al., 2022).

Necessity-driven entrepreneurship is common, especially in developing countries, as an alternative to fighting poverty and improving people's living conditions (Doering & Wry, 2022). Moreover, the positive impact of necessity-driven entrepreneurship increases when entrepreneurs have access to financial resources. Emerging economies, especially those in developing countries, should promote and strengthen entrepreneurship as one of the main alternatives to address the problems of poverty and unemployment (Svotwa et al., 2022). This requires the creation of conditions for the development of entrepreneurship, in particular adequate sources of finance. Developing countries have not yet developed proper financing systems for entrepreneurship. However, the various alternatives that are available should be utilised (Prtenjača Mažer et al., 2019). Sources of crowdfunding (microfinance and collaborative finance) are more effective in countries with higher levels of poverty (Bros et al., 2022). According to Oladejo (2011), the real impact of crowdfunding is felt in areas with the lowest income levels.

Based on the literature reviewed, the following hypotheses were proposed for testing in this study:

- H.1. Alternative financing has a higher incidence than conventional financing in female entrepreneurship than in male entrepreneurship.
- H.2. Alternative financing has a higher incidence than conventional financing in necessity-driven entrepreneurship than in opportunity-driven entrepreneurship.
- H.3. Alternative financing is more prevalent than conventional financing in developing country entrepreneurship than in developed country entrepreneurship.

In all cases, it is necessary to highlight that "alternative" financing refers specifically to the two types of finance analysed, i.e., microfinance and cooperativism.

Methodology

Data sample

For this analysis, annual data were collected from the Global Entrepreneurship Monitor (GEM), the World Bank (WB), and the International Monetary Fund (IMF) for 66 countries worldwide for the period from 2007 to 2019. This time period was considered due to the limited observations after 2019 for most of the countries in the sample, particularly in the GEM database. Similarly, only countries with complete information for the period indicated were included. We used the Total early-stage Entrepreneurial Activity (TEA) rate, extracted from GEM reports, to measure entrepreneurial activity. In order to test the corresponding hypotheses, the TEA was considered as a dependent variable differentiated by gender, i.e., MTEA to refer to male entrepreneurship and FTEA to assess female entrepreneurship. We also differentiated between opportunity entrepreneurship MOTEA and FOTEA for male and female entrepreneurship, respectively, and necessity entrepreneurship MNTEA (male necessity-driven entrepreneurship) and FNTEA (female necessity-driven entrepreneurship). The variables were selected on the basis of the literature and official information sources. The IMF indicates that financing can be explained by the variables used, number of institutions per inhabitant, kilometres, and loans, while GEM takes as its main explanatory variables TEA in general and differentiated by gender, i.e., male, or female TEA (Landry Ngono, 2020).

Three sources of finance were considered in order to assess their impact on entrepreneurship: bank finance, microfinance and cooperativism, each of these measured through three variables (Table 1).

Barron et al. (2022) suggest the use of other variables to explain entrepreneurship, which were included in this analysis as control variables: Gross Domestic Product (GDP) growth, unemployment rate (UNP) and interest rates (INT). For this paper, a distinction was made between developed and developing countries in order to detect whether there are differences depending on the level of development of the country, in line with hypothesis 3. To differentiate between developed and developing countries, the IMF classification was taken into account.

The dependent and independent variables are presented with their corresponding descriptive results in Table 2.

From the descriptive results, it is noteworthy that the rate of male entrepreneurship exceeds that of female entrepreneurship both when it is driven by necessity and opportunity (the difference is greater in the latter case). This is in line with the literature which argues that women face more barriers to entrepreneurship than men (Kwong et al., 2012; Özsungur, 2019; Shmailan, 2016).

Table 3 shows the bivariate correlations of the study variables. It can be seen that there is no problem with the multicollinearity of the proposed variables (Alin, 2010) and that most of the correlations are significant. In the case of the male entrepreneurship variables, both by opportunity and necessity, there is a positive relationship with all the explanatory variables, all of which are positive. With the exception of

Table 1 Variables to measure the different types of financing

Bank finance	NBH: Number of banking institutions per 100,000 habitants NBK: Number of banking institutions per 1,000 km ² NBL: Number of loans from banking institutions
Microfinance	NMIH: Number of microfinance institutions per 100,000 habitants NMIK: Number of microfinance institutions per 1,000 km ² NML: Number of loans from microfinance institutions
Cooperativism	NCIH: Number of cooperative institutions per 100,000 habitants NCIK: Number of cooperative institutions per 1,000 km ² NCL: Number of loans from cooperative institutions

Data for the variables mentioned were obtained from the Financial Access Survey (FAS, 2020)

the NMIH variable, all other variables are significant with at least 90% confidence. On the other hand, the female entrepreneurship variables show a positive relationship with the microfinance and cooperativism variables. However, the relationship with bank finance is negative. All these relationships are significant with at least 90% confidence.

Method

In order to test the proposed hypotheses, a panel data analysis was chosen, taking into account the cross-sectional and temporal nature of the variables under study (Wooldridge, 2011). This methodology makes it possible to control for the effects of unobserved heterogeneity (Campbell & Mínguez-Vera, 2008) and to obtain valid inferences about the structural parameters (Hsiao, 2007). The choice of this method is appropriate for this study, since we are working with a large sample (more than 30 countries), also because there are enough observations over time to be able to apply the model and for it to provide robust results, that is, a high statistical power is achieved (Wooldridge, 2011). In addition, this method has made it possible to control for the individual effects, eliminating the noise caused by fixed differences between countries, thus achieving a high level of statistical efficiency, as well as the endogeneity that could be present in the variables, which increases the precision of the estimates made. These advantages have made this methodology of the most widely used in entrepreneurship research (Jafari-Sadeghi, 2020; Martínez-Rodríguez et al., 2022; Wu et al., 2017).

In order to validate the use of this method, the Breitung test was applied, which allows us to check the stationarity of the variables by determining the absence of unit roots. The panel data model applied is the fixed effects model according to the Hausman test (Hausman, 1978). Four models have been proposed to test the hypotheses proposed below:

Table 2 Description of the dependent and independent variables

Type of variable	Variable name	Description	Mean	S.D.	Min	Max	Source
Dependent	MOTEA	Male Opportunity-Driven TEA Ratio %	11.8511	7.8894	1.4429	53.1747	GEM
Dependent	FOTEA	Female Opportunity-Driven TEA Ratio %	7.7549	5.8867	0.3510	43.6224	GEM
Dependent	MNTEA	Male Necessity-Driven TEA Ratio %	4.0125	3.2164	0.1113	23.2090	GEM
Dependent	FNTEA	Female Necessity-Driven TEA Ratio %	3.4037	3.0589	0.0097	18.3580	GEM
Independent	NBH	Number of banking institutions per 100,000 inhabitants	19.3398	20.4313	0.4173	94.5747	Financial Access Survey (2020)
Independent	NBK	Number of banking institutions per 1,000 km ²	21.4836	14.0400	2.7898	74.5956	Financial Access Survey (2020)
Independent	NBL	Number of loans from banking institutions per 100,000 inhabitants	61.5486	98.7802	12.7871	1350.7173	Financial Access Survey (2020)
Independent	NMIH	Number of microfinance institutions per 100,000 adults	3.9487	12.4536	0.0041	76.6797	Financial Access Survey (2020)
Independent	NMIK	Number of all microfinance institution branches per 1,000 km ²	2.8739	3.3004	0.0085	17.0609	Financial Access Survey (2020)
Independent	NML	Number of loans from microfinance institutions per 100,000 inhabitants	26.1904	30.1342	0.0220	192.7728	Financial Access Survey (2020)
Independent	NCIH	Number of cooperative institutions per 100,000 inhabitants	12.2027	19.0009	0.0049	80.6950	Financial Access Survey (2020)
Independent	NCIK	Number of cooperative institutions per 1,000 km ²	10.8671	10.9145	0.0110	49.0676	Financial Access Survey (2020)
Independent	NCL	Number of loans from cooperative institutions per 100,000 inhabitants	7.5758	13.0976	0.0000	126.6832	Financial Access Survey (2020)
Independent	GDP	Gross Domestic Product growth	2.7052	4.6960	-32.550	55.6000	World Bank
Independent	UF	Unemployment rate %	8.4255	5.2044	1.2050	26.8650	World Economic Forum
Independent	INT	Lending interest rate %	9.2695	5.7253	1.9334	34.4542	World Bank

Table 3 Bivariate correlations of the analysed variables

	MOTEA	FOTEA	MNETA	FNTEA	NMIH	NMIK	NML	NCIH
MOTEA	1							
FOTEA	0.438 ^a (0.000)	1						
MNTEA	0.170 ^a (0.000)	0.190 ^a (0.000)	1					
FNTEA	0.139 ^a (0.000)	0.169 ^a (0.000)	0.162 ^a (0.000)	1				
NMIH	0.025 -0.176	0.176 ^b (0.026)	0.062 -0.121	0.184 ^a (0.000)	1			
NMIK	0.235 ^b -0.014	0.196 ^a (0.000)	0.336 ^a (0.001)	0.118 ^c -0.089	0.195 ^a (0.000)	1		
NML	0.175 ^a (0.001)	0.275 ^a (0.000)	0.287 ^a (0.000)	0.101 -0.325	0.396 ^a (0.001)	0.253 ^a (0.000)	1	
NCIH	0.184 ^a (0.000)	0.461 ^a (0.001)	0.295 ^a (0.000)	0.315 ^a (0.000)	0.435 ^a (0.000)	0.411 ^a (0.000)	0.385 ^a (0.000)	1
NCIK	0.195 ^a (0.007)	0.173 ^b (0.031)	0.256 ^a (0.000)	0.344 ^a (0.001)	0.357 ^a (0.000)	0.344 ^a (0.000)	0.507 ^a (0.002)	0.513 ^a (0.001)
NCL	0.197 ^a (0.003)	0.183 ^c (0.002)	0.228 ^a (0.000)	0.129 ^b (0.025)	0.045 -0.664	0.299 ^a (0.001)	0.023 -0.472	0.077 -0.326
NBH	0.129 ^a (0.000)	-0.282 ^b (0.012)	0.189 ^c -0.077	-0.294 ^c (0.085)	0.078 ^c -0.074	0.024 ^c -0.082	0.151 ^a (0.000)	0.076 -0.118
NBK	0.121 ^c -0.075	-0.039 ^c (0.084)	0.169 ^a (0.001)	-0.016 ^b (0.022)	0.042 -0.341	0.086 -0.271	0.056 ^c -0.082	0.065 -0.109
NBL	0.330 ^a -0.004	0.396 ^a (0.000)	0.443 ^a (0.000)	-0.278 ^b (0.035)	0.074 -0.164	0.083 ^c -0.088	0.179 ^c -0.074	0.07 -0.428
UF	-0.178 ^a (0.000)	-0.036 ^c (0.088)	-0.019 ^c -0.086	-0.297 ^a (0.000)	0.276 ^a (0.000)	0.203 ^a (0.000)	0.319 ^a (0.001)	0.149 ^b (0.015)
GDP	0.086 ^c -0.084	0.015 -0.532	-0.005 -0.159	-0.159 ^b (0.021)	0.205 ^c -0.056	0.001 -0.176	0.076 ^c -0.059	0.077 -0.436
INT	-0.099 -0.265	-0.194 ^c (0.065)	0.002 -0.216	0.075 -0.438	0.213 ^c -0.061	0.387 ^a (0.001)	0 -0.976	0.136 ^c -0.087
	NCIK	NCL	NBH	NBK	NBL	UF	GDP	INT
NCIK	1							
NCL	0.509 ^a (0.000)	1						
NBH	0.196 ^a (0.000)	0.023 -0.186	1					
NBK	0.003 ^a (0.000)	0.198 ^a (0.001)	0.05 -0.276	1				
NBL	0.190 ^a (0.001)	0.126 ^c -0.075	0.264 ^a (0.000)	0.601 ^a (0.000)	1			
UF	0.174 ^a (0.002)	0.105 -0.523	0.437 ^a (0.000)	0.336 ^a (0.002)	0.127 ^c (0.075)	1		

Table 3 (continued)

	NCIK	NCL	NBH	NBK	NBL	UF	GDP	INT
GDP	0.081 -0.265	0.123 ^c -0.067	0.212 ^a (0.002)	0.189 ^a (0.000)	0.098 ^c (0.084)	0.328 ^c (0.061)	1	
INT	0.292 ^b (0.042) -0.265	0.064 -0.259	0.114 -0.173	0.278 ^b (0.043)	0.049 -0.127	-0.273 ^b (0.032)	0.259 ^c (0.081)	1

^asignificance at 1%^bsignificance at 5%^csignificance at 10%

$$\begin{aligned}
 FOTE A_{it} = & \alpha + \beta_1 NBH_{it} + \beta_2 NBK_{it} + \beta_3 NBL_{it} + \beta_3 NBL_{it} \\
 & + \beta_4 NMIH_{it} + \beta_5 NMIK_{it} + \beta_6 NML_{it} + \beta_7 NCIH_{it} \\
 & + \beta_8 NCIK_{it} + \beta_9 NCL_{it} + \beta_{10} BUSANG_{it} + \beta_{11} UF_{it} \\
 & + \beta_{12} GDP_{it} + \beta_{13} INT_{it} + \omega_i + \varepsilon_{it}
 \end{aligned} \quad (1)$$

$$\begin{aligned}
 MOTE A_{it} = & \alpha + \beta_1 NBH_{it} + \beta_2 NBK_{it} + \beta_3 NBL_{it} + \beta_3 NBL_{it} \\
 & + \beta_4 NMIH_{it} + \beta_5 NMIK_{it} + \beta_6 NML_{it} + \beta_7 NCIH_{it} \\
 & + \beta_8 NCIK_{it} + \beta_9 NCL_{it} + \beta_{10} BUSANG_{it} + \beta_{11} UF_{it} \\
 & + \beta_{12} GDP_{it} + \beta_{13} INT_{it} + \omega_i + \varepsilon_{it}
 \end{aligned} \quad (2)$$

$$\begin{aligned}
 FNTE A_{it} = & \alpha + \beta_1 NBH_{it} + \beta_2 NBK_{it} + \beta_3 NBL_{it} + \beta_3 NBL_{it} \\
 & + \beta_4 NMIH_{it} + \beta_5 NMIK_{it} + \beta_6 NML_{it} + \beta_7 NCIH_{it} \\
 & + \beta_8 NCIK_{it} + \beta_9 NCL_{it} + \beta_{10} BUSANG_{it} + \beta_{11} UF_{it} \\
 & + \beta_{12} GDP_{it} + \beta_{13} INT_{it} + \omega_i + \varepsilon_{it}
 \end{aligned} \quad (3)$$

$$\begin{aligned}
 MNTE A_{it} = & \alpha + \beta_1 NBH_{it} + \beta_2 NBK_{it} + \beta_3 NBL_{it} + \beta_3 NBL_{it} \\
 & + \beta_4 NMIH_{it} + \beta_5 NMIK_{it} + \beta_6 NML_{it} + \beta_7 NCIH_{it} \\
 & + \beta_8 NCIK_{it} + \beta_9 NCL_{it} + \beta_{10} BUSANG_{it} + \beta_{11} UF_{it} \\
 & + \beta_{12} GDP_{it} + \beta_{13} INT_{it} + \omega_i + \varepsilon_{it}
 \end{aligned} \quad (4)$$

In each case, the variables MOTE A, FOTE A, MNTE A and FNTE A are the dependent variables, α is the constant, β_x is the regression coefficient corresponding to each explanatory variable x , ω_i is a random variable of the individual effects and ε_{it} is the error term.

The four equations presented allow us to test H.1, H.2, and H.3, by applying each one to both developed and developing countries.

Results and discussion

Table 4 presents the results of the different equations for both developed and developing countries.

First, the impact of the financing variables on both male and female opportunity entrepreneurship in developed countries is analysed in order to test H.1. Analysing alternative finance in developed countries and microfinance, the NMIH variable is negative for both male opportunity and necessity-driven entrepreneurship. In the case of female entrepreneurship, the relationship is also negative for necessity-driven entrepreneurship and positive for opportunity-driven entrepreneurship. For NMIK, it is negative for both female and male necessity and opportunity-driven entrepreneurship in developed countries. However, the variable NML is positive for male opportunity-driven entrepreneurship and negative for male necessity-driven entrepreneurship. For female entrepreneurship, it is positive for both types of venture. Thus, the number of institutions in a country, especially per square kilometre, reduces the impact of microfinance on entrepreneurship. However, the number of loans granted by these institutions favours and encourages mainly female entrepreneurship and favours male opportunity-driven entrepreneurship.

When analysing entrepreneurship in developing countries, only the NMIH variable has an inverse relationship with male entrepreneurship, both driven by opportunity and necessity, while the rest of the variables strengthen male entrepreneurship. In the case of female entrepreneurship, all the microfinance variables have a positive relationship, i.e., both the number of institutions and the number of loans granted favour to female entrepreneurship driven by both opportunity and necessity in developing countries. When analysing the coefficients of the positive variables in both male and female entrepreneurship, NMIK and NML have a higher incidence in female entrepreneurship.

Regarding the microfinance variables, the density of institutions in a country, especially per square kilometre, reduces the impact of microfinance on entrepreneurship. However, the amount of loans granted by these institutions supports mainly female entrepreneurship and also male opportunity-driven entrepreneurship. Cao et al. (2022) explain this situation by indicating that, in developed countries, technological progress prevents the creation of new financial institutions and makes it easier to access existing ones from anywhere. When analysing the coefficient, the impact is greater for male entrepreneurship. It should be noted that, to the best of our knowledge, no previous literature has been found that evaluates the impact of this type of financing on entrepreneurship in developed countries and distinguishes by gender and type of entrepreneurship. Doering and Wry (2022) suggests that microfinance promotes more entrepreneurship in less developed regions. In this regard, Lwesya and Mwakalobo (2023) mention that the presence and creation of microfinance institutions favour female entrepreneurship, especially when women-only microfinance networks are created. Additionally, Asongu and Odhiambo (2023) highlight that new policies and incentives in developing countries seek to create microfinance institutions to support and accompany the entrepreneurship of vulnerable people, especially women. Unlike in developed countries, where the number

Table 4 Results of the models to relate male and female entrepreneurship by opportunity and necessity in developed and developing countries with different financing alternatives

Variable	(1)			(2)			(3)			(4)			(4)		
	DEVELOPED			DEVELOPING			DEVELOPED			DEVELOPING			DEVELOPING		
	MOTEa	FOTEa	MOTEa	FOTEa	MOTEa	FOTEa	MNTEa	FNTEa	MNTEa	FNTEa	MNTEa	FNTEa	MNTEa	FNTEa	
Coef	Robust Standard Error	Coef	Robust Standard Error	Coef	Robust Standard Error	Coef	Robust Standard Error	Coef	Robust Standard Error	Coef	Robust Standard Error	Coef	Robust Standard Error	Coef	Robust Standard Error
NMII	-0.0400 (0.1182)	1.5293 (0.005)	4.8912 ^a (0.005)	0.188 (0.005)	-2.6750 ^a (0.000)	0.8716 (0.000)	3.5927 ^a (0.001)	0.8625 (0.001)	-0.0677 ^b (0.037)	0.0255 (0.037)	0.1833 (0.167)	-0.3523 (0.167)	0.0189 (0.190)	0.3718 ^c (0.057)	0.1377 (0.057)
NMIK	-7.9633 ^a (0.003)	2.089 (0.000)	-7.4029 ^a (0.000)	2.3867 (0.000)	1.1133 ^a (0.000)	0.3428 (0.000)	1.0626 ^a (0.000)	0.2305 (0.000)	-3.2463 ^a (0.002)	0.8748 (0.002)	0.5438 (0.025)	-1.5248 ^c (0.025)	0.034 (0.048)	0.1141 ^b (0.018)	0.0399 (0.018)
NML	3.0484 ^a (0.007)	1.0039 (0.007)	0.9277 ^b (0.017)	0.2865 (0.007)	0.023 (0.174)	0.114 (0.039)	0.0160 ^b (0.039)	0.0056 (0.000)	-1.1264 ^a (0.005)	0.2974 (0.005)	0.1579 (0.118)	0.4133 (0.118)	0.0046 ^c (0.051)	0.0015 (0.190)	0.0005 (0.190)
NCIK	0.0666 ^b (0.027)	0.0039 (0.007)	0.4691 ^c (0.060)	0.1866 (0.060)	-2.2315 ^a (0.000)	0.6256 (0.000)	1.8772 ^a (0.000)	0.4902 (0.000)	0.1548 ^a (0.000)	0.0428 (0.000)	0.0157 (0.044)	0.0369 ^b (0.044)	-0.3372 ^c (0.077)	0.7573 ^b (0.020)	0.2535 (0.020)
NCIH	0.4009 ^a (0.000)	0.1185 (0.000)	0.1863 ^b (0.025)	0.0678 (0.025)	4.2471 ^a (0.000)	0.8675 (0.000)	4.2170 ^a (0.000)	0.0731 (0.000)	0.0784 ^a (0.009)	0.0243 (0.009)	0.2656 (0.000)	0.0882 ^a (0.000)	0.6000 ^b (0.015)	1.4852 ^b (0.035)	0.5002 (0.035)
NCL	-0.0890 ^b (0.044)	0.0252 (0.000)	0.1790 ^a (0.000)	0.053 (0.000)	0.0158 ^b (0.045)	0.0063 (0.045)	0.0141 ^c (0.054)	0.0053 (0.000)	-0.0681 ^a (0.000)	0.0225 (0.000)	0.0044 (0.009)	0.0304 ^a (0.009)	-0.0020 (0.182)	0.0009 ^c (0.095)	0.0004 (0.095)
NBK	0.0498 ^b (0.026)	0.0152 (0.026)	-0.0823 ^c (0.063)	0.0347 (0.063)	2.2675 ^a (0.000)	0.6431 (0.000)	-1.3467 ^a (0.000)	0.3772 (0.000)	0.0877 ^a (0.000)	0.0199 (0.000)	0.0098 (0.072)	-0.0232 ^c (0.072)	0.0946 (0.068)	-0.4717 ^c (0.052)	0.1699 (0.052)
NBH	0.0666 ^b (0.020)	0.0276 (0.020)	-0.1185 ^a (0.005)	0.0043 (0.005)	0.5919 ^a (0.000)	0.1578 (0.000)	-0.4924 ^a (0.001)	0.0974 (0.001)	0.1033 ^a (0.000)	0.0244 (0.000)	0.0688 (0.020)	-0.0175 ^b (0.020)	0.0843 (0.000)	-0.4958 ^a (0.000)	0.1457 (0.000)
NBL	0.0134 ^b (0.019)	0.0048 (0.000)	-0.0327 ^a (0.000)	0.0875 (0.000)	0.0025 ^b (0.046)	0.0004 (0.046)	-0.0043 ^a (0.001)	0.0013 (0.001)	0.0084 ^c (0.070)	0.0030 (0.070)	0.0019 (0.012)	-0.0048 ^b (0.012)	0.0003 (0.026)	-0.0341 ^a (0.000)	0.0111 (0.000)
GDP	0.054 (0.000)	0.0194 (0.000)	-0.0201 ^c (0.000)	0.0054 (0.000)	-0.0423 ^c (0.0095)	0.0095 (0.0095)	-0.0080 ^c (0.0029)	0.0029 (0.0029)	-0.0281 (0.0281)	0.0154 (0.0154)	-0.0190 (0.0190)	0.0053 (0.0053)	-0.0897 (0.0897)	0.0255 (0.0255)	0.0770 (0.0770)

Table 4 (continued)

Variable	(1)			(2)			(3)			(4)			(5)		
	DEVELOPED			DEVELOPING			DEVELOPED			DEVELOPING			DEVELOPED		
	MOTEA	FOTEA	MOTEA	FOTEA	MOTEA	FOTEA	MNTEA	FNTEA	MNTEA	FNTEA	MNTEA	FNTEA	MNTEA	FNTEA	
Coef	Robust Standard Error	Coef	Robust Standard Error	Coef	Robust Standard Error	Coef	Robust Standard Error	Coef	Robust Standard Error	Coef	Robust Standard Error	Coef	Robust Standard Error		
UNP	(0.144) 0.697	(0.053) 0.2868	(0.080) 0.4810 ^b	(0.097) 0.3678 ^b	(0.172) 0.2410 ^b	(0.171) 0.1734 ^c	(0.150) 0.2815 ^c	(0.150) 0.0954	(0.150) 0.0954	(0.150) 0.0954	(0.150) 0.0954	(0.150) 0.0954	(0.150) 0.0954	(0.150) 0.0954	
INT	(0.135) 0.0672 ^c	(0.004) 0.0296	(0.019) -0.0578 ^b	(0.050) -0.0349 ^a	(0.029) -0.0758 ^b	(0.066) -0.0046 ^b	(0.073) -0.0184 ^a	(0.073) 0.0056	(0.073) 0.0056	(0.073) 0.0056	(0.073) 0.0056	(0.135) -0.0088 ^b	(0.135) 0.0030	(0.135) 0.0030	
cons	(0.080) 1.4886 ^b	(0.154) 0.5329	(0.018) 2.7845 ^b	(0.002) -1.0313 ^c	(0.035) 1.2298	(0.027) 1.3718 ^b	(0.002) 7.7850 ^a	(0.035) 2.4505	(0.035) 2.4505	(0.035) 2.4505	(0.035) 2.4505	(0.011) 8.1497 ^a	(0.011) 2.4383	(0.011) 2.4383	
R ² -within	(0.045) 0.5294	(0.008) 0.5832	(0.039) 0.5048	(0.078) 0.4593	(0.150) 0.6915	(0.013) 0.5618	(0.000) 0.2065	(0.000) 0.2065	(0.000) 0.2065	(0.000) 0.2065	(0.000) 0.2065	(0.000) 0.3261	(0.000) 0.3261	(0.000) 0.3261	
R ² -between	0.6386	0.4894	0.9948	0.996	0.3399	0.686	0.8769	0.8769	0.8769	0.8769	0.8769	0.7605	0.7605	0.7605	
R ² -overall	0.5697	0.4855	0.9484	0.9302	0.4	0.6304	0.7432	0.7432	0.7432	0.7432	0.7432	0.6693	0.6693	0.6693	
Hausman test	0.8347 ^a	0.5537 ^a	0.8724 ^a	0.5444 ^a	0.7648 ^a	0.6569 ^a	0.6483 ^a	0.6483 ^a	0.6483 ^a	0.6483 ^a	0.6483 ^a	0.5278 ^a	0.5278 ^a	0.5278 ^a	
(p-value)	(0.006)	(0.000)	(0.003)	(0.000)	(0.001)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	

^asignificance at 1%

^bsignificance at 5%

^csignificance at 10%

of institutions does not favour entrepreneurship, in developing countries, according to Demirgüç-Kunt et al. (2020), the lack of access to technological resources forces people to resort to physical institutions.

The number of loans granted has a greater impact on male entrepreneurship than on female entrepreneurship. Thus, the number of institutions favours female entrepreneurship, especially in developing countries, while the number of loans has a greater impact on male entrepreneurship. The efforts made in different countries have allowed the creation and consolidation of more microfinance institutions (Moya-Dávila & Rajagopal, 2020; Gama et al., 2023). However, when these are exclusively female, the financial resources they have and the loans they grant are smaller, so the impact of the number of loans on female entrepreneurship is lower (Yousfani et al., 2019).

The situation is different when analysing cooperativism compared to microfinance. Cooperativism variables, which measure both the number of institutions and the number of loans, have a positive impact on female entrepreneurship regardless of whether the entrepreneurship is driven by opportunity or necessity and whether it takes place in a developed or developing country. This result would be in line with Fernandez-Guadaño et al. (2020), who mention that cooperativism is one of the main sources of finance for all types of ventures. Also, Bastida et al. (2020) highlight that one of the main alternatives for communities and groups of women who decide to become entrepreneurs is the creation of savings and credit cooperatives that finance the entrepreneurship of their members. In terms of male entrepreneurship, the number of institutions favours male entrepreneurship in developed countries. However, the number of loans has an inverse relationship with male entrepreneurship. For entrepreneurship in developing countries, they show that NCIK has an inverse relationship with male entrepreneurship, while the other variables are positive.

With regard to conventional banking, the negative impact on female entrepreneurship can be seen irrespective of the analysis by country and by opportunity or necessity. In other words, both the number of institutions and the number of loans do not promote female entrepreneurship. According to Frimanslund et al. (2023), the inability of conventional banking to respond to the financing problems of female entrepreneurship has forced women to create financing alternatives that allow them to continue their activities. Factors such as the lack of collateral to guarantee the loan, lack of financial education or high failure rates, among others, are the main reasons why conventional financing does not fund female entrepreneurship (De Andrés et al., 2021). For men, the situation is different, especially in developed countries, where bank finance encourages this type of entrepreneurship, as previous literature has shown (Frimanslund et al., 2023). In developing countries, the impact depends on the type of venture, with opportunity entrepreneurship showing the highest incidence of this type of finance. Naiki and Ogame (2022) emphasise that banks are committed to projects with high growth potential and that they target emerging economies where they can develop.

In terms of the control variables, economic growth only favours the development of male entrepreneurship driven by opportunity in developed countries. As mentioned by Mamaro and Sibindi (2022), although female entrepreneurship boosts the economy, it should be noted that many of these new ventures are

created in the midst of economic crises, so the relationship between economic growth and female entrepreneurship may be negative. Thus, H.1. can be partially accepted, as a clear and strong difference in the impact of cooperativism in favour of female entrepreneurship over male entrepreneurship has been demonstrated. In the case of microfinance, the results show that only in developing countries is the incidence of female entrepreneurship higher than that of male entrepreneurship. In developed countries, only the number of loans has a positive impact on female entrepreneurship.

In contrast to H.2., when analysing the sign and coefficient of microfinance, the incidence of opportunity-driven entrepreneurship is higher than that of necessity-driven entrepreneurship. Considering developed countries, microfinance has a negative effect on male entrepreneurship across all its variables and only NML has a positive relationship with female necessity-driven entrepreneurship. However, for opportunity-driven entrepreneurship, MLN has a positive relationship that is stronger for both male and female entrepreneurship than for FNTEA. As regards developing countries, both opportunity-driven and necessity-driven female entrepreneurship are favoured by microfinance. However, the impact is greater for opportunity-driven entrepreneurship across all variables. The situation is similar for male entrepreneurship. For cooperativism, the relationship is the same as for microfinance. Although the coefficients have similar signs between opportunity-driven and necessity-driven entrepreneurship, the degree of influence of these variables is greater for opportunity-driven entrepreneurship in both developed and developing countries.

For bank finance, the incidence of bank finance has a greater impact in male necessity-driven entrepreneurship in developed countries than on opportunity-driven entrepreneurship when analysing the number of institutions. Khanin et al. (2022) indicate that opportunity-driven entrepreneurship is more likely to have financing offers from other types of investors. Therefore, they do not often turn to banking, especially when these ventures take place in developed entrepreneurial environments, located in countries with favourable conditions (Neymotin, 2021). However, in the case of developing countries, a different behaviour can be observed, i.e., opportunity-driven entrepreneurship receives a greater impact from bank finance than necessity-driven entrepreneurship. This situation is explained by Bárcena-Martín et al. (2021), who mention that, in some developing regions, financial institutions are the main source of finance for projects with growth potential. These are generally those driven by opportunity, as financing from other types of sources has not been developed (Naiki & Ogane., 2022). The control variables show no significant differences between necessity-driven and opportunity-driven entrepreneurship. In this sense, crowdfunding alternatives mainly strengthen opportunity-driven entrepreneurship. Therefore, H.2. could not be corroborated.

Finally, regarding H.3., when analysing microfinance, it can be seen that it has a positive and larger effect on female opportunity-driven entrepreneurship in developing countries than in developed countries. In the case of male entrepreneurship, with the exception of NMIH, the other variables also have a positive relationship in developing countries. For necessity entrepreneurship, the relationship is best seen in female entrepreneurship, where in developing countries there is a higher incidence of microfinance and a positive relationship with this type of entrepreneurship.

For cooperativism, there is also a positive relationship and higher coefficients for entrepreneurship in developing countries in most cases, mainly due to the variables assessing institutions. In the case of the number of loans, especially for female entrepreneurship, the incidence is higher in developed countries.

The results show that the greatest impact of collaborative finance is in developing countries. In this sense, microfinance and cooperativism are interesting because they are types or alternatives of finance that exist mainly in regions with high levels of poverty and low access to technology and education, especially financial education (Chao et al., 2020; Hakizimfura et al., 2020). With the support of technology and financial education, developed countries have introduced other financing alternatives, such as crowdfunding or crowdfunding, among others (Hornuf & Schwienbacher, 2018). This situation probably shows that, in developed economies, the number of crowdfunding institutions does not have a strong impact. However, in developing economies, their impact can be seen mainly in female entrepreneurship.

In short, in developing countries, microfinance has a positive relationship with female entrepreneurship driven by both opportunity and necessity. In the case of male entrepreneurship, as in developed countries, the relationship depends on the variable. In developed countries specifically, the number of loans rather than the number of institutions was found to have a positive impact. For cooperativism, both the number of institutions and loans have a positive impact on female entrepreneurship, regardless of whether the entrepreneurship is driven by opportunity or necessity and the level of development of the country. For conventional banking, it has a negative impact on female entrepreneurship in all cases, while favouring male entrepreneurship, mainly in developed countries.

Conclusions

The results of this research show different levels of impact of financing alternatives on entrepreneurship. These differences are mainly marked by the gender of the entrepreneur, the type of entrepreneurship (necessity or opportunity) or the region in which it is developed. This study has partially confirmed the hypotheses raised in relation to these factors. A positive relationship was found between female entrepreneurship and cooperativism, measured by all its variables, and a negative relationship with bank financing, regardless of the type of enterprise or the region in which it is located. With regard to microfinance, the relationship depends on the type of enterprise, gender, and the country in which it is developed.

The incidence of alternative or conventional finance by gender varies by type of venture and region. In developed countries, microfinance has a positive impact on both male and female entrepreneurship, particularly in terms of the number of loans granted. In developing countries, microfinance has an even greater impact on female entrepreneurship alone, both in terms of opportunity and necessity. The importance of women-only microfinance institutions in promoting female entrepreneurship is also highlighted, especially when women-only microfinance networks are created. Both microfinance and cooperatives are highlighted as having a positive effect on women's entrepreneurship, particularly in developing countries. However, it is

recognised that greater access to technological resources, financial education and consolidated projects are needed to promote female entrepreneurship.

On the other hand, conventional banking has a negative impact on women's entrepreneurship, regardless of region or type of entrepreneurship. Women are forced to seek alternative finance because conventional banks are unable to meet their needs. In contrast, bank financing encourages male entrepreneurship driven by opportunity and necessity, especially in developed countries, where male entrepreneurship is seen as an influential factor.

Overall, it can be concluded that microfinance and cooperativism are financing alternatives that have a positive impact on entrepreneurship, especially on female entrepreneurship in developing countries. The main implications include the importance of analysing alternative sources of finance for entrepreneurs, finance providers and policymakers. It is important for entrepreneurs to be aware of the different financing alternatives and their impact on their ventures. This helps them to choose the alternative that best suits their activities. For providers of finance, it helps them to better identify the target group for their products. Finally, public policymakers should create conditions and scenarios that favour the creation of these types of sources of finance to strengthen entrepreneurship in different economic and social contexts.

As presented in the literature review, some previous studies only discuss the impact of alternative finance on entrepreneurship, without detailing which types of entrepreneurship benefit most. Therefore, one of the main contributions of this paper is to identify the importance of microfinance and cooperative policies and programmes and their impact in the regions where they are located. In addition, it is necessary to address the limitations of conventional banking in effectively supporting entrepreneurship, especially female entrepreneurship.

Limitations and future lines of research

This paper has several limitations. Two of them are the small sample (66 countries) and the study period (ending in 2019). These limitations are due to the lack of information for other countries and years in official sources (mainly GEM and IMF). This situation could omit important and relevant information that would improve the results of this study. On the other hand, we did not find variables that would allow us to measure combined financing alternatives, so it is suggested that future work should analyse this possibility. Finally, another limitation is the period considered, which ends in 2019, although again this is due to the availability of data.

In view of the limitations presented, new research could be carried out by increasing the number of countries, extending the period of study (when the data becomes available) and considering new variables (e.g., COVID-19). A comparative study between developing economies could be of interest. As a future, more innovative line of work, the level of education and financial inclusion can be evaluated in this type of research, as these factors may contribute to improving entrepreneurship and reducing barriers to access to finance. Moreover, given the limited access to sufficient capital, it is necessary to analyse other sources of finance and to look for

alternatives to include them in developing markets, mainly those related to venture capital and financing through financial markets. In this respect, little information has been found on these sources of finance in areas with a low level of development. However, much of the literature analyses the impact of financial markets, venture capital and angel investors on ventures in developed regions.

Data availability The data used in this study are available upon request to the corresponding author of this article.

Declarations

Conflicts of interest The authors declare that they have no known competing financial interests or personal relationships that might appear to influence the work reported in this paper.

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