Macroeconomic Dynamics (2025), **29**, e155, pp. 1–24
doi:10.1017/S136510052510028X

CAMBRIDGE UNIVERSITY PRESS

ARTICLE

Microfinance, competition, and growth

Réda Marakbi[1], Asma Boussetta[2], and El Moctar Laghlal[3]

[1]Univ, Artois, CNRS, IESEG School of Management Univ Lille UMR, Lille Economie Management (LEM), Arras, France
[2]Laboratoire d'Économie de Poitiers (LéP). Université de Poitiers, Poitiers, France
[3]Unité de Recherche en Macroéconomie, Croissance et Développement (URMCD), Université de Nouakchott, Nouakchott, Mauritania
Corresponding author: Reda Marakbi; Email: reda.marakbi@univ-lille.fr

Abstract

This paper analyzes the relationship between microfinance, competition, and growth in a sample of 119 countries over the period 1999–2018. Our results are fourfold. First, we show that microfinance increases economic growth. Second, we identify investment and consumption as the main channels explaining the positive effect of microfinance on growth. Third, our study highlights that the conventional financial sector and microfinance are substitutes and not complements in emerging and developing countries. Finally, we show that competitive microfinance markets allow increasing the positive effect of microfinance on growth.

Keywords: Microfinance; economic growth; competition; panel data

JEL classification: G21; D4; O4; C33

1. Introduction

In developing countries, microfinance[1] is one of the main drivers for financial inclusion (Labie and Montalieu, 2019) and has grown considerably since the beginning of the 21st century. Figure 1 shows that between 2010 and 2018, the size of credits granted each year by microfinance institutions (hereafter MFIs) has soared from 54 Mds in 2010 to 124 Mds in 2018 worldwide. Meanwhile, the number of borrowers has risen from 105 M in 2010 to 140 M in 2018.[2] This impressive expansion is mainly explained by the lack of access to conventional financial services in many developing countries. By facilitating access to credit, the microfinance sector allows the poorest households to invest in productive projects (Dalla Pellegrina (2011)) and to get access to a better education (Adjei et al. (2009)). Thus, microfinance contributes to the financial inclusion of populations that are excluded.

In response to the rapid growth of MFIs, an increasing number of studies have started examining the economic effects of microfinance. Since the initial objective of microfinance was to improve the well-being of poor people, these works are mainly concerned with the effects of microfinance on poverty, inequality, education, health, and, to a lesser extent, the empowerment of women. The large majority of these studies use survey data and provide analysis at the microeconomic level. Among the most interesting are the works of Karlan and Zinman (2010) on South Africa, Karlan and Zinman (2011) on the Philippines, Augsburg et al. (2015) on Bosnia and Herzegovina, Tarozzi et al. (2015) on Ethiopia, Angelucci et al. (2015) on Mexico, and Banerjee et al. (2015) on India. The conclusions of these studies are mixed. Some find that microfinance improves the socioeconomic status of poor people by reducing poverty and inequality, some find no effect, and some even find that microfinance increases poverty (Banerjee and Jackson, 2017).

© The Author(s), 2025. Published by Cambridge University Press.

https://doi.org/10.1017/S136510052510028X Published online by Cambridge University Press

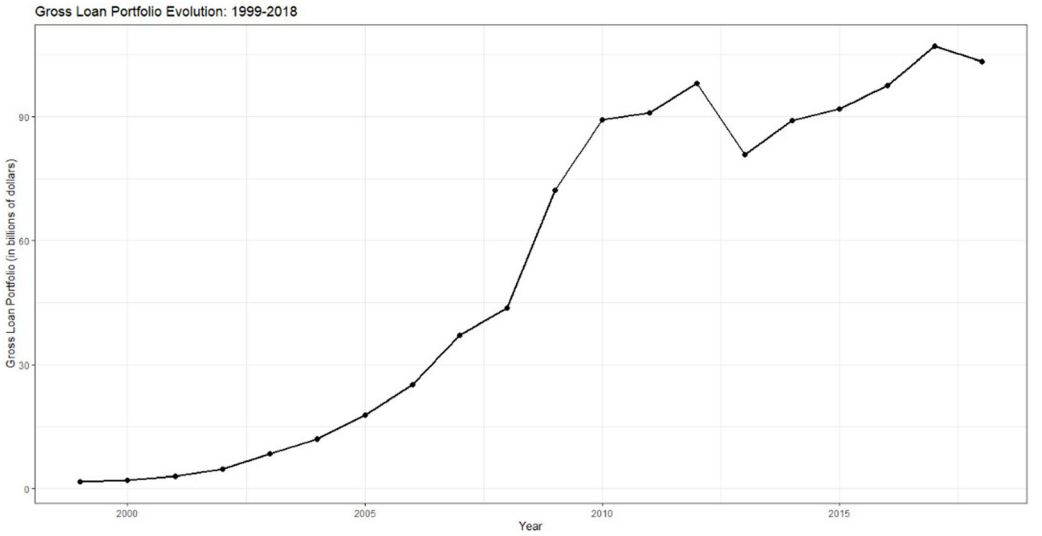


Figure 1. Evolution of the size of the microfinance sector over time.

Due to the lack of large databases on microfinance institutions until very recently, there has been much less work at the macroeconomic level. However, contrary to microeconomic studies, these works globally conclude that microfinance contributes to reducing inequality and poverty (Imai et al. (2012), Hermes (2014), and Bangoura et al. (2016)). Therefore, even if microfinance does not reduce inequality and poverty in all countries—given the specific constraints and structural framework within which each of these economies operates—it nevertheless reduces inequality and poverty at a global level. According to Bangoura et al. (2016), this could be explained by the fact that microfinance would stimulate growth, thus reducing poverty.

Existing literature presents contrasting perspectives on the link between microfinance and economic development. Cull and Morduch (2018) provide a comprehensive overview of the literature to analyze the heterogeneous effects of microfinance institutions (MFIs) on poverty reduction, highlighting persistent debates about their transformative efficacy. In particular, while Donou-Adonsou and Sylwester (2017) observe, using a panel of 85 developing countries, a positive correlation between microfinance loans and economic growth-attributed primarily to gains in total factor productivity rather than capital accumulation Smolo (2023) identifies an asymmetric and predominantly negative long-term relationship in the specific context of Bosnia and Herzegovina, limiting the generalizability of these findings. Moreover, Abrar et al. (2021) demonstrate that MFIs enhance financial development and the efficiency of commercial banks through competitive effects, acting as complements to the formal banking sector1. However, to date, no clear cross-country empirical evidence exists on the structural role of microfinance markets in promoting economic growth, particularly regarding its channels and optimal configuration.

The purpose of this paper is to fill this gap in the literature and to assess the relationship between microfinance, competition, and growth in developing countries. To this end, we use a large panel of 119 emerging and developing countries over the 1999–2018 period (Tables 1–19).

Our contribution to the literature is fourfold. First, our results show that microfinance strongly contributes to increase growth, in particular in low- and middle-income countries. Second, we study the channels through which microfinance positively affects growth. In particular, we show that microfinance boosts investment and consumption which are essential determinants of economic growth. Third, we also analyze the substitutability/complementary between the microfinance sector and the conventional financial sector. In this respect, we show that both sectors are substitutes and not complements. Fourth, compared to the paper of Lacalle-Calderón et al. (2015),

https://doi.org/10.1017/S136510052510028X Published online by Cambridge University Press

this study offers a reflection on the optimal structure of the microfinance market and highlight a negative relationship between the degree of concentration of the microfinance sector and growth. In other words, the more concentrated the microfinance sector is, the lower its impact on growth. From a policy perspective, encouraging the development of a competitive microfinance sector must therefore be a top priority in developing countries with low access to the conventional financial sector.

The remainder of the paper is organized as follows. The next section describes the data. Section 3 discusses the relation between microfinance and economic growth. Section 4 examines the optimal structure of the microfinance sector. Section 5 concludes.

2. Data

We conduct an empirical analysis on a large unbalanced panel of 119 emerging and developing countries over the period 1999-2018. The selection of countries is based on the availability of data. Specifically, all countries for which microfinance data were available have been included in our sample.[3]

Our data on microfinance stem from the Microfinance Information Exchange (MIX) database. MIX is a nonprofit organization whose purpose is to promote financial inclusion by providing easily accessible data and specialized information services. MIX contains the largest and the most accurate collection of microfinance data. It provides information on more than 3000 MFIs and 100 millions borrowers in more than 100 emerging markets worldwide. All in all, MIX is the most used dataset in the recent literature on microfinance (Ahlin et al. (2011), Hermes et al. (2011), Bauchet and Morduch (2013), Imai et al. (2012), Wagner and Winkler (2013), and D'Espallier et al. (2017)).

In order to measure the size of the microfinance sector in a given country, we use the logarithm of the Gross Loan Portfolio (GLP) per capita indicator. This variable includes all outstanding principals due for all outstanding client loans. This encompasses current, delinquent, and renegotiated loans, but not loans that have been written off. In other words, this index can be considered as a good proxy of the size of the microfinance sector. Moreover, MIX provides microfinance data at the country level but also at the institution level. In our study, country-level data are used to examine the relation between microfinance, investment, and economic growth and institution level data are used to study the growth-maximizing structure of the microfinance sector in terms of competition and concentration.

Other variables include the usual determinants of economic growth. All come from the World Development Indicators (WDI) and the World Governance Indicators (WGI) databases of the World Bank. We include investment (Khan and Reinhart (1990)), openness (Harrison (1996)), and inflation (De Gregorio (1993)), and we use the logarithm of the initial level of real GDP per capita (Barro (1991)) to control for conditional convergence. Moreover, for robustness purposes, we successively include domestic credit (King and Levine (1993)), foreign direct investment (Borensztein et al. (1998)), government effectiveness (Alam et al. (2017), Marakbi et al. (2021)), unemployment (Eriksson (1997)), education (Barro (1996)), and population growth (Solow (1956)) as additional control variables.[4] Table 1 displays some descriptive statistics of our sample, Table 16 (in Appendix) exposes the correlation matrix between regressors and Table 13 (in Appendix) summarizes the variables and sources of information used.

3. How does microfinance affect growth?

In this section, our analysis is organized around three major issues. First, we explore the relation between the size of the microfinance sector and economic growth. Second, we focus on the of the main channels that may explain the impact of microfinance on growth, namely investment and consumption. Third, we investigate if microfinance is a substitute or a complement to the

https://doi.org/10.1017/S136510052510028X Published online by Cambridge University Press

Table 1. Descriptive statistics

	Mean	Std. dev.	Min	Max
Log GLP per capita	1.41	2.50	−10.48	6.92
Concentration ratio	0.87	0.16	0.21	1
HHI	5507.47	3109.85	336.25	10,000
Economic growth	3.01	4.64	−27.23	59.89
Initial GDP per capita	7.61	1.04	5.25	9.74
Trade	74.24	31.41	0.16	277.13
Inflation	6.77	11.26	−10.06	359.93
Investment	22.36	7.15	2.00	69.67
Consumption	23.97	1.69	19.79	29.31
Domestic credit	33.54	27.87	0.49	161.13
Foreign direct investment	1.45	3.64	−7.44	48.78
Education	67.49	26.81	5.29	132.81
Unemployment	7.80	6.44	0.31	37.25
Population growth	1.61	1.23	−9.08	7.78
Government effectiveness	−0.48	0.56	−2.24	1.27

conventional financial sector. The general empirical strategy consists in estimating fixed-effects regressions and to address the endogeneity problem using instrumental variables.

3.1 Microfinance and Growth

As a preliminary step in our analysis, we first estimate the following regression model

$$Growth_{it} = \alpha_1 GLP_{it} + \alpha_2' X_{it} + \varepsilon_{it} \tag{1}$$

where $Growth_{it}$ corresponds to the GDP per capita growth rate in country i at time t, GLP_{it} is the logarithm of the gross loan portfolio per capita variable that measures the size of the microfinance sector, X_{it} is a vector of control variables and ε_{it} is the error term.

This first step allows us to study the direct impact of microfinance on growth before controlling for potential endogeneity. The results of this first regression are reported in Table 2. The coefficients associated with the logarithm of the GLP per capita are always positive and highly significant. Therefore, any increase in the size of the microfinance sector leads to an increase in the GDP per capita growth rate. This result is robust to the inclusion of a number of additional control variables. In addition, the other determinants of growth have the expected sign and are significant.

Further, as usual in growth regressions, we need to address the endogeneity of the explanatory variables. To this end, we re-estimate Equation 1 using a 2SLS approach. We regress the endogenous regressor on specific instrumental variables and we then regress the GDP per capita growth rate on control variables and the predicted values of the endogenous regressor derived from the first regression. The instruments we use to control endogeneity are of two types. We use internal instruments for all variables except the GLP and external instruments for the GLP. To address the endogeneity of the usual determinants of growth, we use their lagged values in the 2SLS model. For the GLP variable, we resort to two instrumental variables: the number of depositors and the operating expenses. The number of depositor represents the number of individuals who currently have funds on deposit within a microfinance institution. The operating expenses variable includes all expenses which are not related to financial and credit loss impairment, such as personnel expenses, depreciation, amortization, and administrative expenses. Both

https://doi.org/10.1017/S136510052510028X Published online by Cambridge University Press

https://doi.org/10.1017/S136510052510028X Published online by Cambridge University Press

Table 2. Fixed-effects regressions before endogeneity correction

	Dependent variable: GDP per capita growth rate								
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Log GLP per capita	0.439*** (0.069)	0.473*** (0.072)	0.232*** (0.078)	0.472*** (0.072)	0.381*** (0.065)	0.355*** (0.090)	0.465*** (0.069)	0.372*** (0.080)	0.436*** (0.069)
Trade	0.041*** (0.007)	0.039*** (0.007)	0.040*** (0.007)	0.042*** (0.007)	0.042*** (0.006)	0.039*** (0.009)	0.038*** (0.007)	0.039*** (0.007)	0.043*** (0.007)
Inflation	−0.021** (0.009)	−0.021** (0.009)	−0.022** (0.009)	−0.020** (0.009)	−0.021** (0.009)	−0.032* (0.019)	−0.023** (0.009)	−0.029 (0.018)	−0.022** (0.009)
Initial GDP per capita	−7.603*** (0.584)	−8.140*** (0.613)	−13.617*** (0.940)	−7.294*** (0.679)	−6.488*** (0.563)	−8.494*** (0.876)	−8.170*** (0.592)	−8.414*** (0.632)	−7.589*** (0.590)
Investment		0.032 (0.023)							
Consumption			6.063*** (0.795)						
Domestic credit				−0.014 (0.012)					
Foreign direct investment					0.122*** (0.032)				
Education						0.042** (0.017)			
Unemployment							−0.290*** (0.055)		
Government effectiveness								1.574** (0.658)	
Population growth									−0.470** (0.207)
Observations	1640	1582	1428	1614	1623	1172	1620	1529	1622
Number of countries	111	107	100	109	111	100	109	111	110

Standard errors are in parentheses. Significance Codes, ∗∗∗ : 0.01; ∗∗ : 0.05; ∗ : 0.1.

variables come from the MIX Market database and are expected to constitute good instruments for controlling the endogeneity of microfinance.

The number of depositors is a proxy for the resource base of a microfinance institution. A larger number of depositors typically means the institution has more funds available to lend, which should be closely correlated with the size of its loan portfolio. However, the number of depositors is determined by institutional features (such as outreach, reputation, network) rather than by short-term macroeconomic conditions. Thus, while it is correlated with GLP, it is unlikely to be directly influenced by economic growth, fulfilling the exclusion restriction.

Similarly, operating expenses reflect the scale and administrative capacity of microfinance institutions. Institutions with larger portfolios incur higher operational costs (for staff, infrastructure, risk management, etc.). So again, these expenses are strongly linked to GLP size. At the same time, these costs do not influence GDP growth directly; they are internal to the MFI and not part of macroeconomic policy or aggregate demand. Therefore, they constitute a good instrument for controlling the potential endogeneity of microfinance.

For robustness purposes, we also control the endogeneity of the GLP variable using its lag. Results are shown in Table 19 in Appendix. They show that the effects remain qualitatively unchanged.

Table 3 reports the results of the second stage estimation.[5] Overall, they are qualitatively similar to those of Table 2. The values of the GLP coefficients are even higher after correcting for endogeneity and their level of significance remains very high. In addition, Table 3 shows that our selected instruments are statistically valid.[6] The Anderson and Cragg-Donald tests lead to reject the null hypothesis of underidentification and weak identification. Moreover, regarding overidentification, we do not reject the null hypothesis of the Sargan test. This implies that all excluded instrumental variables are exogenous. Finally, the p-value of the Davidson-MacKinnon test indicates that we should reject the null hypothesis of exogeneity between microfinance and growth, thereby justifying the need for a 2SLS approach. From Table 3, we can then argue that microfinance robustly and significantly contributes to increase economic growth.

3.2 The Channels of the Microfinance-Growth Nexus

In this subsection, we explore the channels through which microfinance can influence economic growth, focusing specifically on two key variables: investment and consumption. According to Buera et al. (2021), who analyzed data from India and Thailand, approximately 51% of microloans are allocated to consumption, while the remaining 49% finance investments. Therefore, the aim of this subsection is to investigate whether microfinance contributes to economic growth via these two channels.

3.2.1 Microfinance and Investment

How does microfinance foster economic growth? In his famous book entitled *Creating a World Without Poverty*, Muhammad Yunus wrote: *"Microcredit is supposed to describe loans offered with no collateral to support income-generating businesses aimed at lifting the poor out of poverty."*[7] In these lines, the father of modern microfinance expressed his wish to see the poor investing in productive projects. Have microcredits really contributed to boosting investment? If so, it could be one of the main channels through which microfinance positively affects economic growth in addition to reducing to poverty (Imai et al. (2012)).

On this issue, a number of studies of limited scope have already analyzed the behavior of borrowers with regard to the money they have borrowed. Most conclude that microcredits are often used, at least partially, for productive purposes. For instance, Dalla Pellegrina (2011) has shown that microfinance loans are mainly channeled toward productive and non-agricultural activities.

https://doi.org/10.1017/S136510052510028X Published online by Cambridge University Press

https://doi.org/10.1017/S136510052510028X Published online by Cambridge University Press

Table 3. Fixed effects regressions with endogeneity correction

	Dependent variable: GDP per capita growth rate								
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Log GLP per capita	1.297*** (0.272)	1.464*** (0.295)	1.164*** (0.375)	1.313*** (0.287)	1.200*** (0.268)	1.775*** (0.446)	1.295*** (0.272)	1.194*** (0.300)	1.310*** (0.280)
Trade	0.014 (0.009)	0.010 (0.010)	0.007 (0.011)	0.013 (0.010)	0.011 (0.009)	0.010 (0.013)	0.014 (0.009)	0.018* (0.010)	0.014 (0.009)
Inflation	−0.004 (0.010)	−0.002 (0.010)	−0.002 (0.009)	−0.003 (0.010)	−0.003 (0.010)	−0.044* (0.023)	−0.005 (0.010)	−0.058** (0.022)	−0.004 (0.010)
Initial GDP per capita	−11.456*** (1.149)	−13.086*** (1.296)	−16.538*** (1.218)	−12.351*** (1.170)	−10.299*** (1.161)	−14.832*** (1.486)	−11.664*** (1.149)	−12.133*** (1.178)	−11.527*** (1.180)
Investment		0.053* (0.028)							
Consumption			4.568*** (1.647)						
Domestic credit				0.020 (0.016)					
Foreign direct investment					0.233*** (0.040)				
Education						−0.005 (0.032)			
Unemployment							−0.134* (0.075)		
Government effectiveness								2.259*** (0.835)	
Population growth									0.067 (0.282)
Davidson-MacKinon test	8.224 [0.0041]	9.675 [0.0019]	7.534 [0.0061]	7.810 [0.0052]	7.199 [0.0073]	8.936 [0.0028]	8.218 [0.0041]	7.332 [0.0068]	8.032 [0.0046]
Anderson test	155.532 [0.0000]	137.967 [0.0000]	91.446 [0.0000]	144.852 [0.0000]	150.428 [0.0000]	77.315 [0.0000]	154.579 [0.0000]	145.804 [0.0000]	148.967 [0.0000]
Cragg-Donald test	91.107 [0.0000]	79.606 [0.0000]	50.665 [0.0000]	83.957 [0.0000]	87.707 [0.0000]	42.818 [0.0000]	90.422 [0.0000]	85.313 [0.0000]	86.612 [0.0000]
Sargan test	0.032 [0.8590]	0.030 [0.8636]	0.092 [0.7610]	0.069 [0.7927]	0.023 [0.8791]	0.009 [0.9232]	0.103 [0.7488]	0.001 [0.9760]	0.031 [0.8601]
Observations	1126	1086	961	1109	1112	820	1121	1059	1119
Number of countries	93	91	79	92	92	80	92	92	92

Standard errors are in parentheses. Significance Codes, ∗∗∗ : 0.01; ∗∗ : 0.05; ∗ : 0.1. p-value are in brackets.

Table 4. Fixed effects regressions with endogeneity correction for investment

	Dependent variable: investment						
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Log GLP per capita	0.498*** (0.088)	0.512*** (0.090)	0.495*** (0.088)	0.351*** (0.098)	0.501*** (0.088)	0.584*** (0.099)	0.496*** (0.089)
Trade	0.050*** (0.008)	0.051*** (0.008)	0.045*** (0.008)	0.056*** (0.010)	0.048*** (0.008)	0.057*** (0.009)	0.049*** (0.008)
Inflation	−0.034*** (0.010)	−0.034*** (0.010)	−0.034*** (0.010)	−0.044** (0.019)	−0.037*** (0.010)	−0.069*** (0.021)	−0.035*** (0.010)
Initial GDP per capita	0.285 (0.676)	0.496 (0.810)	0.494 (0.688)	1.828** (0.871)	−0.314 (0.683)	−0.798 (0.744)	0.189 (0.686)
Domestic credit		−0.007 (0.013)					
Foreign direct investment			0.203*** (0.039)				
Education				0.018 (0.018)			
Unemployment					−0.371*** (0.064)		
Government effectiveness						0.878 (0.758)	
Population growth							−0.028 (0.229)
Observations	1473	1455	1457	1078	1458	1365	1456
Number of countries	106	104	106	96	105	106	105

Standard errors are in parentheses. Significance Codes, ∗∗∗ : 0.01; ∗∗ : 0.05; ∗ : 0.1.

Similar results are found by Imai et al. (2010) in India, Imai and Azam. (2012) in Bangladesh or Schicks (2014) in Ghana.

The objective of this subsection is to investigate if microfinance programs have contributed on a global scale to increasing investment in productive projects, thus explaining the positive effect of microfinance on growth highlighted in the previous subsection. To do this, we estimate the following model

$$INV_{it} = \beta_1 GLP_{it} + \beta_2' Z_{it} + \varepsilon_{it} \tag{2}$$

where Z_{it} is a vector that contains the same control variables as X_{it} except investment. To adress the endogeneity issue, we use the lagged values of the regressors.

Table 4 generalizes the results of micro studies at the macro level and shows that microfinance programs globally promote investment. The logarithm of the GLP per capita is always positive and significant at the 1% level, regardless of the additional variables introduced into the model. This means that microloans are used in investment projects and not only for consumption purposes. Moreover, all the tests carried out confirm the validity of our instruments. Therefore, since investment is positively related to growth (see Table 3), this variable can be considered as a channel through which microfinance positively affects growth.

3.2.2 Microfinance and Consumption

We have shown that microfinance positively affects growth through the investment channel. Let us now look at whether another channel, namely consumption, can also explain the beneficial effect of the development of the microfinance sector on economic growth.

To do this, we use exactly the same method as above. We regress consumption on GLP and on a set of control variables.

$$CONS_{it} = \beta_1 GLP_{it} + \beta_2' Z_{it} + \varepsilon_{it} \tag{3}$$

https://doi.org/10.1017/S136510052510028X Published online by Cambridge University Press

Table 5. Fixed effects regressions with endogeneity correction for consumption

	Dependent variable: consumption						
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Log GLP per capita	0.041*** (0.002)	0.039*** (0.002)	0.039*** (0.002)	0.030*** (0.002)	0.042*** (0.002)	0.036*** (0.002)	0.042*** (0.002)
Trade	−0.0008*** (0.0002)	−0.001*** (0.0002)	−0.0006** (0.0002)	−0.0007** (0.0003)	−0.0009*** (0.0002)	−0.0008*** (0.0002)	−0.0009*** (0.0002)
Inflation	−0.0009*** (0.0003)	−0.0009*** (0.0003)	−0.001*** (0.0003)	−0.001* (0.0005)	−0.0009*** (0.0003)	−0.002*** (0.0006)	−0.0008*** (0.0003)
Initial GDP per capita	0.912*** (0.021)	0.789*** (0.025)	0.942*** (0.021)	0.707*** (0.026)	0.900*** (0.022)	0.914*** (0.022)	0.912*** (0.022)
Domestic credit		0.003*** (0.0004)					
Foreign direct investment			0.003** (0.001)				
Education				0.007*** (0.0005)			
Unemployment					−0.005*** (0.001)		
Government effectiveness						−0.033 (0.023)	
Population growth							0.020** (0.009)
Observations	1348	1331	1335	996	1337	1252	1331
Number of countries	100	98	100	89	99	100	99

Standard errors are in parentheses. Significance Codes, ∗∗∗ : 0.01; ∗∗ : 0.05; ∗ : 0.1.

As with investment, we can observe that consumption has a positive and significant effect on microfinance. Therefore, we can argue that consumption is a second channel through which microfinance positively affects economic growth. Nevertheless, when comparing the coefficients of the consumption regression with those of the investment regression, we can see that the effect of consumption on microfinance is much smaller than the effect of microfinance on investment. Thus, investment remains the main channel through which microfinance affects growth and consumption, certainly through a mechanism of household wealth generation following the growth of wealth generated by microfinance, also makes it possible to boost economic activity.

3.3 Are the Microfinance and the Conventional Financial Sectors Substitutes or Complements?

For a long time, the development of the conventional financial sector has been considered beneficial for growth (see e.g., King and Levine (1993) ; Levine and Zervos (1998), Beck et al. (2000)). However, several studies have recently nuanced this opinion. Arcand et al. (2015) have shown a negative effect of financial development when credit to the private sector reaches 100% of the GDP. In the same vein, Benczúr et al. (2019) have found a threshold effect in the finance-growth nexus. According to Summer (2013) and Piketty (2013), the increase of the size of the financial sector can lead to real negative returns to capital and inequality which, in turn, slow down economic growth. Another explanation is that the majority of credit allocation is no longer directed towards productive investment projects but towards the investment in financial assets (Bezemer et al. (2014)). Thus, we want to explore if microfinance is a complement or substitute to the conventional financial system.

This question deserves to be explored because the development of the conventional financial sector, in both developed and developing countries ((Arcand et al. 2015), Ibrahim and Alagidede (2018)), has shown its limits in limiting growth if the capital is not invested in productive activities. We have shown that microfinance stimulates growth through investment. Therefore, it is quite possible that the microfinance sector should be used as a substitute for the conventional financial sector in developing countries in order to maximize its effects on growth.

https://doi.org/10.1017/S136510052510028X Published online by Cambridge University Press

Table 6. Panel data estimation (IV): substituability of the microfinance and the conventional financial sectors

	Dependent variable: GDP per capita growth rate					
	[1]	[2]	[3]	[4]	[5]	[6]
Log GLP per capita	1.850*** (0.464)	1.799*** (0.465)	2.465*** (0.736)	1.856*** (0.465)	1.734*** (0.502)	1.885*** (0.478)
Trade	0.007 (0.010)	0.003 (0.010)	0.004 (0.014)	0.007 (0.010)	0.013 (0.011)	0.008 (0.010)
Inflation	0.003 (0.011)	0.005 (0.012)	−0.045* (0.024)	0.002 (0.011)	−0.052** (0.024)	0.003 (0.011)
Initial GDP per capita	−14.730*** (1.385)	−13.504*** (1.437)	−16.733*** (1.594)	−14.844*** (1.388)	−15.423*** (1.428)	−14.917*** (1.427)
Investment	0.042 (0.029)	0.003 (0.030)	0.035 (0.039)	0.040 (0.029)	0.031 (0.031)	0.042 (0.029)
Domestic credit	0.074*** (0.021)	0.069*** (0.022)	0.115*** (0.030)	0.072*** (0.022)	0.068*** (0.022)	0.075*** (0.021)
Log GLP per capita × domestic credit	−0.009** (0.004)	−0.009** (0.004)	−0.015** (0.007)	−0.009** (0.004)	−0.008* (0.004)	−0.009** (0.004)
Foreign direct investment		0.236*** (0.044)				
Education			−0.039 (0.040)			
Unemployment				−0.061 (0.083)		
Government effectiveness					2.641*** (0.964)	
Population growth						0.169 (0.295)
Davidson-MacKinon test	8.901 [0.002]	8.294 [0.004]	8.736 [0.003]	9.002 [0.002]	7.831 [0.005]	8.815 [0.003]
Anderson test	78.725 [0.000]	74.562 [0.000]	41.353 [0.000]	78.119 [0.000]	76.486 [0.000]	74.943 [0.000]
Cragg-Donald test	42.455 [0.000]	40.023 [0.000]	21.671 [0.000]	42.070 [0.000]	41.324 [0.000]	40.223 [0.000]
Sargan test	0.030 [0.861]	0.007 [0.932]	0.025 [0.874]	0.054 [0.815]	0.000 [0.994]	0.031 [0.860]
Observations	1069	1055	792	1064	1003	1062
Number of countries	90	89	78	89	89	89

Standard errors are in parentheses. Significance Codes, ∗∗∗ : 0.01; ∗∗ : 0.05; ∗ : 0.1. *p*-value are in brackets.

To address this issue, we introduce an interaction term in Eq. (1) between the logarithm of the GLP per capita and the domestic credit variable

$$Growth_{it} = \gamma_1 GLP_{it} + \gamma_2 DC_{it} + \gamma_3 DC_{it} \times GLP_{it} + \gamma_4' X_{it} + \varepsilon_{it}, \tag{4}$$

where DC_{it} represents the domestic credit used as a proxy of the size of the conventional financial sector.[8] Note that we control endogeneity using the same instruments as in the previous subsection.

Hence, we can respectively obtain, *ceteris paribus*, the marginal effects of GLP and domestic credit on growth

$$\frac{\partial Growth_{it}}{\partial GLP_{it}} = \gamma_1 + \gamma_3 DC_{it} \quad \text{and} \quad \frac{\partial Growth_{it}}{\partial DC_{it}} = \gamma_2 + \gamma_3 GLP_{it}. \tag{5}$$

As shown in Eq. (5), this specification with an interaction term implies that the impact of microfinance on growth depends on the depth of the conventional financial sector and that the impact of domestic credit on growth depends on the depth of the microfinance sector.

Table 6 reports the results of parameter estimation in regression (4). The coefficient associated with the log of GLP per capita and domestic credit are positive and significant, which is consistent

https://doi.org/10.1017/S136510052510028X Published online by Cambridge University Press

with both the previous subsection and the literature on financial development. However, the interaction term between the two variables is significantly negative. Therefore, when the depth of the conventional financial sector increases, the effect of microfinance on growth becomes less and less beneficial. Similarly, a deeper microfinance sector mitigates the impact of a more developed conventional financial sector. Consequently, the conventional financial sector and the microfinance sector can be viewed as substitutes from a growth-maximizing strategy perspective.

4. The optimal market structure of the microfinance sector

In this section, we study the optimal structure of the microfinance sector. To this end, we construct two indicators to measure the degree of concentration of the microfinance sector, namely the concentration ratio (CR-3) and the Herfindahl-Hirschman Index (HHI).

The concentration ratio corresponds to the sum of market shares measured in total outstanding loans of the three largest microfinance institutions (CR-3).[9] In addition, the HHI is determined by summing the squared market shares of all active microfinance institutions in the market

$$HHI = \sum_{i=1}^{n} s_i^2 \tag{6}$$

where s_i is the market share of the microfinance institution i and n is the number of MFIs. We should note that contrary to the previous section where the data used were national, we resort in this section to institution data. As for national data, they stem for the MIX market database.

4.1 Direct and Indirect Effects of Microfinance Concentration: Preliminary Results

To examine the direct and indirect effects of microfinance concentration on economic growth, we estimate the following regression

$$Growth_{it} = \beta GLP_{it} + \lambda MC_{it} + \gamma X_{it} + \theta GLP_{it} \times MC_{it} + \varepsilon_{it}, \tag{7}$$

where MC_{it} corresponds to the microfinance indicator (CR-3 or HHI), X_{it} is a vector of control variables and the interaction term captures the indirect effect of concentration.

The preliminary estimations are reported in Table 7 (columns 1 to 4). Before correcting for endogeneity, this table provides evidence that microfinance competition is beneficial for growth. Since the signs associated with the concentration ratios are negative, the higher the concentration of the microfinance sector, the lower economic growth.

In columns 5 to 8, we control for endogeneity. The instruments are the same as those used in the previous section, i.e., operating expense and the number of depositors in MFIs for the GLP and the one-year lags for the other determinants of economic growth. The results of the first-stage regression show that the selected instruments are statistically valid. First, the coefficients of our instruments are statistically significantly different from 0. Second, the Anderson and Cragg-Donald tests lead to reject the null hypothesis of underidentification and weak identification. Moreover, regarding overidentification, we do not reject the null hypothesis of the Sargan test. This implies that all excluded instrumental variables are exogenous. Finally, the p-value of the Davidson-MacKinnon test indicates that we should reject the null hypothesis of exogeneity between microfinance and growth, thereby justifying the need for a two-stages least squares approach.

The results of the second stage estimation displayed in Table 7 (columns 5 to 8) show no direct effect of the concentration degree of the microfinance sector for CR-3 but a significant and negative effect for HHI. Therefore, the conclusions regarding the direct effect of concentration on growth are mixed. However, the impact of the GLP per capita on growth depends

https://doi.org/10.1017/S136510052510028X Published online by Cambridge University Press

Table 7. Panel data estimations

	Fixed effect				Instrumental variables			
Explanatory Variables	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Log GLP per capita	0.433*** (0.076)	1.172*** (0.386)	0.421*** (0.074)	0.681*** (0.148)	1.491*** (0.344)	1.740*** (0.471)	1.428*** (0.300)	1.440*** (0.308)
Trade	0.039*** (0.007)	0.039*** (0.007)	0.039*** (0.007)	0.039*** (0.007)	0.010 (0.010)	0.014 (0.010)	0.010 (0.010)	0.013 (0.010)
Inflation	−0.021** (0.009)	−0.021** (0.009)	−0.020** (0.009)	−0.019** (0.009)	−0.002 (0.010)	−0.006 (0.010)	−0.001 (0.010)	−0.003 (0.010)
Initial GDP per capita	−8.125*** (0.612)	−8.327*** (0.621)	−8.099*** (0.612)	−8.332*** (0.622)	−13.116*** (1.342)	−11.312*** (0.860)	−13.173*** (1.278)	−12.054*** (0.948)
Investment	0.032 (0.023)	0.031 (0.023)	0.029 (0.023)	0.029 (0.023)	0.052* (0.028)	0.066** (0.027)	0.051* (0.028)	0.062** (0.027)
CR-3	−1.773 (1.095)	−0.142 (1.377)			0.541 (1.657)	0.527 (1.674)		
Log GLP per capita × CR-3		−0.775* (0.397)				−0.663** (0.336)		
HHI			−0.0001*** (0.00005)	−0.0001** (0.00006)			−0.0001** (0.00007)	−0.0001* (0.00008)
Log GLP per capita × HHI				−0.00003** (0.00001)				−0.00004* (0.00002)
Davidson-MacKino test					8.457 [0.003]	10.169 [0.001]	9.905 [0.001]	12.301 [0.000]
Anderson test					110.482 [0.000]	122.726 [0.000]	135.451 [0.000]	190.308 [0.000]
Cragg-Donald test					61.704 [0.000]	69.434 [0.000]	77.846 [0.000]	116.712 [0.000]
Sargan test					0.031 [0.859]	0.296 [0.586]	0.033 [0.855]	0.203 [0.652]
Observations	1582	1582	1582	1582	1086	1086	1086	1086
Number of countries	107	107	107	107	91	91	91	91

Standard errors are in parentheses. Significance Codes, ∗∗∗ : 0.01; ∗∗ : 0.05; ∗ : 0.1. *p*-value are in brackets.

on the market structure of the microfinance industry. Indeed, we can see that the interaction between the GLP per capita and the concentration index is always negative and significant, regardless of the index used (CR-3 or HHI). This means that the positive impact of microfinance on growth is mitigated as the sector becomes less competitive. As a result, a growth-maximizing government should promote competitive microfinance markets in order to enhance economic growth.

4.2 Robustness Checks

In this subsection, we carry out four types of robustness checks. First, we examine the sensitivity of our results to additional explanatory variables. Second, we analyze the microfinance sector competition-growth nexus using alternative instruments. Third, since our results may hide some disparities between countries, we split our sample and focus on the low- and middle-income economies. Fourth, we run the regressions using five-year growth periods to control for potential fluctuations.

The first set of robustness extends the results of Table 7 using other determinants of growth. The additional variables are domestic credit, foreign direct investment, education, government effectiveness, unemployment, and population growth. The results are reported in Table 8 when we use the concentration ratio CR-3 and Table 9 when we use the HHI index. Note that we only report the results after correcting for endogeneity. Overall, the results are similar to those reported

https://doi.org/10.1017/S136510052510028X Published online by Cambridge University Press

Table 8. Results of fixed effects estimations with additional explanatory variables (Concentration index: CR-3)

	Dependent variable: GDP per capita growth rate					
	[1]	[2]	[3]	[4]	[5]	[6]
Log GLP per capita	1.735*** (0.480)	1.660*** (0.464)	2.081*** (0.613)	1.732*** (0.472)	1.826*** (0.529)	1.774*** (0.484)
Trade	0.009 (0.010)	0.011 (0.010)	0.014 (0.013)	0.014 (0.010)	0.019* (0.011)	0.014 (0.010)
Inflation	−0.007 (0.010)	−0.005 (0.010)	−0.049** (0.023)	−0.007 (0.010)	−0.068*** (0.023)	−0.006 (0.010)
Initial GDP per capita	−13.178*** (1.014)	−10.201*** (0.868)	−13.016*** (1.171)	−11.476*** (0.862)	−12.066*** (0.931)	−11.412*** (0.873)
Investment	0.059** (0.027)	0.027 (0.028)	0.042 (0.037)	0.061** (0.027)	0.056* (0.028)	0.066** (0.027)
CR-3	0.255 (1.701)	0.755 (1.636)	1.715 (2.085)	0.472 (1.677)	1.740 (1.837)	0.606 (1.685)
Log GLP per capita × CR-3	−0.715** (0.347)	−0.629* (0.330)	−0.915** (0.419)	−0.656* (0.336)	−0.854** (0.386)	−0.675** (0.343)
Domestic credit	0.054*** (0.016)					
Foreign direct investment		0.232*** (0.043)				
Education			0.019 (0.026)			
Unemployment				−0.107 (0.080)		
Government effectiveness					2.222** (0.880)	
Population growth						0.162 (0.289)
Davidson-MacKinon test	8.776 [0.003]	9.262 [0.002]	9.512 [0.002]	10.124 [0.001]	9.208 [0.002]	10.131 [0.001]
Anderson test	121.754 [0.000]	119.260 [0.000]	87.054 [0.000]	121.727 [0.000]	104.462 [0.000]	117.533 [0.000]
Cragg-Donald test	68.884 [0.000]	67.251 [0.000]	48.852 [0.000]	68.756 [0.000]	58.271 [0.000]	66.085 [0.000]
Sargan test	0.538 [0.463]	0.224 [0.636]	0.203 [0.652]	0.422 [0.515]	0.091 [0.763]	0.306 [0.580]
Observations	1069	1072	804	1081	1020	1079
Number of countries	90	90	79	90	90	90

Standard errors are in parentheses. Significance Codes, ∗∗∗ : 0.01; ∗∗ : 0.05; ∗ : 0.1. *p*-value are in brackets.

in Table 7. Nevertheless, we can observe that when we add other control variables, we can sometimes obtain a significant and negative direct effect of microfinance concentration. Therefore, under some conditions, a concentrated microfinance market can directly and indirectly lead to a reduction of growth. Moreover, Tables 8 and 9 highlight that all additional explanatory variables are on the whole, statistically significant and their signs are consistent with theory.

Second, we consider another instrumental variable. In addition to the use of the number of depositors and operating expense in MFIs, we add an institutional variable, namely voice and accountability, as a third instrumental variable. Table 10 exhibits similar results as those presented before and the use of three instrumental variables instead of two does not have any impact on the validity of our instruments, as shown by the endogeneity, Davidson-Mackinon, Cragg-Donald, and Sargan tests.

In Table 11, we remove high-income countries from our sample[10] to make sure that our results remain robust in low- and middle-income countries which are the most concerned countries by microfinance. This removing does not lead to any qualitative change in the results.

Finally, the literature that analyzes the relationship between financial development and growth in panel sometimes uses five-year (or ten-year) periods. In the other regressions in our study, we

https://doi.org/10.1017/S136510052510028X Published online by Cambridge University Press

Table 9. Results of fixed effects estimations with additional explanatory variables (Concentration index: HHI)

	Dependent variable: GDP per capita growth rate					
	[1]	[2]	[3]	[4]	[5]	[6]
Log GLP per capita	1.440*** (0.313)	1.369*** (0.306)	1.690*** (0.410)	1.436*** (0.309)	1.422*** (0.347)	1.465*** (0.317)
Trade	0.009 (0.010)	0.010 (0.010)	0.011 (0.013)	0.013 (0.010)	0.016 (0.010)	0.013 (0.010)
Inflation	−0.003 (0.010)	−0.001 (0.010)	−0.043* (0.023)	−0.003 (0.010)	−0.059** (0.023)	−0.002 (0.010)
Initial GDP per capita	−13.841*** (1.088)	−10.931*** (0.962)	−13.641*** (1.213)	−12.229*** (0.949)	−12.796*** (1.014)	−12.155*** (0.967)
Investment	0.055** (0.027)	0.024 (0.027)	0.042 (0.037)	0.056** (0.027)	0.055** (0.028)	0.062** (0.027)
HHI	−0.0001* (0.00008)	−0.0001* (0.00007)	−0.00005 (0.0001)	−0.0001* (0.00008)	−0.00006 (0.00009)	−0.0001* (0.00008)
Log GLP per capita × HHI	−0.00005** (0.00002)	−0.00004* (0.00002)	−0.00006** (0.00002)	−0.00004* (0.00002)	−0.00006** (0.00003)	−0.00004* (0.00002)
Domestic credit	0.049*** (0.016)					
Foreign direct investment		0.229*** (0.042)				
Education			0.006 (0.027)			
Unemployment				−0.119 (0.079)		
Government effectiveness					2.120** (0.874)	
Population growth						0.154 (0.283)
Davidson-MacKinon test	10.970 [0.000]	10.972 [0.000]	11.371 [0.000]	12.303 [0.000]	10.459 [0.001]	12.275 [0.000]
Anderson test	187.589 [0.000]	183.525 [0.000]	129.302 [0.000]	188.937 [0.000]	167.724 [0.000]	182.804 [0.000]
Cragg-Donald test	114.960 [0.000]	111.820 [0.000]	77.707 [0.000]	115.662 [0.000]	101.324 [0.000]	111.107 [0.000]
Sargan test	0.399 [0.527]	0.145 [0.703]	0.109 [0.740]	0.329 [0.566]	0.044 [0.834]	0.207 [0.649]
Observations	1069	1072	804	1081	1020	1079
Number of countries	90	90	79	90	90	90

Standard errors are in parentheses. Significance Codes, ∗∗∗ : 0.01; ∗∗ : 0.05; ∗ : 0.1. *p*-value are in brackets.

decided not to focus on five-year (or ten-year) periods because of the limited time span of our sample. However, for the sake of robustness, we present in Table 12 some results showing that our results remain significant when we use five-year forward-moving average variables.

In sum, all these robustness checks enable us to state with confidence that there is a strong relationship between microfinance and growth and that competition between MFIs reinforces this beneficial effect.

5. Conclusion

This study contributes to the empirical literature that analyzes the macroeconomic effects of microfinance at a global level. Using a sample of 119 countries over the period 1999-2018, we have examined the impact of microfinance on growth and the role of investment in this relation. We also proposed a discussion on the substitutability between the microfinance sector and the conventional financial sector. Finally, we have investigated the growth-maximizing structure of the

https://doi.org/10.1017/S136510052510028X Published online by Cambridge University Press

Table 10. Results of fixed effects estimations with an additional instrument

	Dependent variable: GDP per capita growth rate			
	[1]	[2]	[3]	[4]
Log GLP per capita	1.553*** (0.355)	1.832*** (0.509)	1.466*** (0.320)	1.458*** (0.340)
Trade	0.012 (0.010)	0.015 (0.010)	0.011 (0.010)	0.013 (0.010)
Inflation	−0.003 (0.011)	−0.008 (0.010)	−0.002 (0.010)	−0.004 (0.010)
Initial GDP per capita	−13.512 (1.327)	−11.558*** (0.881)	−13.502*** (1.287)	−12.326*** (0.977)
Investment	0.051* (0.029)	0.065** (0.028)	0.050* (0.028)	0.062** (0.027)
CR-3	0.604 (1.645)	0.704 (1.726)		
Log GLP per capita × CR-3		−0.753** (0.360)		
HHI			−0.0001** (0.00007)	−0.0001** (0.00008)
Log GLP per capita × HHI				−0.0005* (0.00002)
Davidson-MacKinon test	10.581 [0.001]	11.153 [0.000]	11.013 [0.000]	12.117 [0.000]
Anderson test	112.181 [0.000]	111.766 [0.000]	128.935 [0.000]	167.769 [0.000]
Cragg-Donald test	41.951 [0.000]	41.732 [0.000]	49.180 [0.000]	67.032 [0.000]
Sargan test	0.842 [0.656]	1.782 [0.410]	1.153 [0.561]	2.027 [0.362]
Observations	1058	1058	1058	1058
Number of countries	91	91	91	91

Additional instrument = voice and accountability Standard errors are in parentheses. Significance Codes, ∗∗∗ : 0.01; ∗∗ : 0.05; ∗ : 0.1. *p*-value are in brackets.

microfinance sector by looking at the relation between competition/concentration and economic growth.

Our results are fourthfold. First, we have shown that microfinance is strongly correlated with increased growth. This result is robust to the inclusion of additional explanatory variables and additional instrumental variables. Second, we have identified investment and consumption as fundamental variables through which the effect of microfinance on growth is channeled. Third, we have highlighted the substitutability of the microfinance sector with the conventional financial sector. Fourth, our analysis provides policy recommendations for countries in which microfinance constitutes a relatively large part of the financial sector. In order to maximize growth, governments should promote systems where the microfinance sector is highly competitive rather than systems where the microfinance sector is concentrated among only a few institutions.

This study calls for further research on the macroeconomic effects of microfinance. In particular, it would be interesting in the future to refine the analysis of the transmission channels of the effects of microfinance by using more disaggregated national data. In addition, further analysis of the structure of financial systems in which microfinance plays a prominent role should be undertaken. A final aspect that will need to be closely investigated is the risks related to microfinance. As it is well documented, microfinance can generate chaotic dynamics of indebtedness which could lead in the long run, if the phenomenon is not controlled, to effects antagonistic to those we observe today on economic growth and development. Therefore, an analysis of public policies that could sustain the virtuous circle of microfinance and growth must be investigated.

https://doi.org/10.1017/S136510052510028X Published online by Cambridge University Press

Table 11. Results of fixed effects estimations - low and middle income countries

	Dependent variable: GDP per capita growth rate			
	[1]	[2]	[3]	[4]
Log GLP per capita	1.651*** (0.394)	1.923*** (0.556)	1.612*** (0.334)	1.621*** (0.344)
Trade	0.020 (0.013)	0.021 (0.013)	0.020 (0.013)	0.021 (0.013)
Inflation	−0.052** (0.023)	−0.053** (0.023)	−0.046** (0.023)	−0.045** (0.023)
Initial GDP per capita	−14.571*** (1.599)	−12.587*** (1.000)	−14.763*** (1.501)	−13.461*** (1.097)
Investment	0.0003 (0.040)	0.017 (0.038)	0.0003 (0.038)	0.014 (0.037)
CR-3	0.014 (2.034)	0.228 (2.158)		
Log GLP per capita × CR-3		−0.725* (0.413)		
HHI			−0.0002** (0.00009)	−0.0001* (0.0001)
Log GLP per capita × HHI				−0.00005* (0.00003)
Davidson-MacKinon test	7.179 [0.007]	8.825 [0.003]	9.055 [0.002]	11.560 [0.000]
Anderson test	82.461 [0.000]	92.714 [0.000]	104.988 [0.000]	155.636 [0.000]
Cragg-Donald test	46.058 [0.000]	52.548 [0.000]	60.763 [0.000]	97.926 [0.000]
Sargan test	0.057 [0.810]	0.394 [0.530]	0.072 [0.788]	0.322 [0.570]
Observations	790	790	790	790
Number of countries	63	63	63	63

Table 12. Results of fixed effects estimations (with five-year forward moving average of growth)

	Dependent variable: GDP per capita growth rate			
	[1]	[2]	[3]	[4]
Log GLP per capita	0.912*** (0.184)	0.971*** (0.251)	0.897*** (0.162)	0.860*** (0.166)
Trade	−0.006 (0.006)	−0.003 (0.005)	−0.005 (0.006)	−0.003 (0.005)
Inflation	0.007 (0.005)	0.004 (0.004)	0.007 (0.005)	0.006 (0.004)
Initial GDP Per Capita	−11.636*** (0.775)	−10.280*** (0.507)	−11.687*** (0.754)	−10.766*** (0.567)
Investment	0.031** (0.015)	0.044*** (0.014)	0.031** (0.015)	0.039*** (0.014)
CR-3	0.127 (0.936)	−0.376 (0.880)		
Log GLP per capita × CR-3		−0.361** (0.173)		
HHI			−0.00004 (0.00004)	−0.00006 (0.00004)
Log GLP per capita × HHI				−0.00002** (0.00001)
Davidson-MacKinon test	13.806 [0.000]	11.646 [0.000]	16.728 [0.000]	16.187 [0.000]
Anderson test	89.335 [0.000]	89.971 [0.000]	108.905 [0.000]	140.614 [0.000]
Cragg-Donald test	49.954 [0.000]	50.291 [0.000]	62.660 [0.000]	84.776 [0.000]
Sargan test	11.462 [0.000]	14.599 [0.000]	11.685 [0.000]	14.235 [0.000]
Observations	874	874	874	874
Number of countries	89	89	89	89

https://doi.org/10.1017/S136510052510028X Published online by Cambridge University Press

Notes

1 Microfinance typically refers to the financial services provided to low-income individuals who are usually excluded from conventional banks. In this paper, we focus specifically on one aspect of microfinance, namely microcredit. More about how we understand microfinance in this study are provided in the data section.
2 Source: Microfinance Information Exchange (MIX) database
3 Table 14 in Appendix provides a list of all the countries included in the sample, classified by income.
4 We do not include all control variables at once to avoid problems of multicollinearity.
5 For convenience and to make the article easier to read, we do not report the results of the first-stage estimation. However, these results are available on request from the authors.
6 The Anderson underidentification test allows us to make sure that the excluded instruments are correlated with the endogenous regressor. The rejection of the null hypothesis indicates that the model is well identified. The Cragg-Donald test allows testing the null hypothesis of weak instruments, i.e., testing if the excluded instruments are weakly correlated with the endogenous regressor. The Sargan overidentifying test examines the null hypothesis of valid instruments. It is meant by valid instruments that the instruments are uncorrelated with the error term and that the excluded instruments are correctly excluded from the estimated equation. Finally, the goal of the endogeneity test is to check the specified endogenous regressors can actually be treated as exogenous.
7 Yunus, M. (2009). *Creating a World Without Poverty: Social Business and the Future of Capitalism*. Public Affairs, p. 68.
8 The informations provided by the World Bank indicate that microcredits are not included in the domestic credit variables.
9 This indicator is very usual in the banking competition literature. For more details, see for instance Bourke (1989).
10 We remove nine countries: Chile, Croatia, Hungary, Panama, Poland, Romania, Slovak Republic, Trinidad and Tobago and Uruguay

References

Abrar, A., I. Hasan and R. Kabir. (2021) Finance-growth nexus and banking efficiency: the impact of microfinance institutions. *Journal of Economics and Business* 114, 105975.
Adjei, J. K., T. Arun and F. Hossain. (2009) *The role of microfinance in asset-building and poverty reduction: The case of Sinapi Aba Trust of Ghana*, Brooks World Poverty Institute, University of Manchester.
Ahlin, C., J. Lin and M. Maio. (2011) Where does microfinance flourish? Microfinance institution performance in macroeconomic context. *Journal of Development economics* 95, 105–120.
Alam, M. R., E. Kiterage and B. Bizuayehu. (2017) Government effectiveness and economic growth. *Economic Bulletin* 37, 222–227.
Angelucci, M., D. Karlan and J. Zinman. (2015) Microcredit impacts: evidence from a randomized microcredit program placement experiment by compartamos banco. *American Economic Journal: Applied Economics* 7, 151–182.
Arcand, J. L., E. Berkes and U. Panizza. (2015). Too much finance or statistical illusion: a comment, Technical report. Graduate Institute of International and Development Studies Working Paper.
Augsburg, B., R. De Haas, H. Harmgart and C. Meghir. (2015) The impacts of microcredit: evidence from bosnia and herzegovina. *American Economic Journal: Applied Economics* 7, 183–203.
Banerjee, A., E. Duflo, R. Glennerster and C. Kinnan. (2015) The miracle of microfinance? Evidence from a randomized evaluation. *American Economic Journal: Applied Economics* 7, 22–53.
Banerjee, S. B. and L. Jackson. (2017) Microfinance and the business of poverty reduction: critical perspectives from rural Bangladesh. *Human relations* 70, 63–91.
Bangoura, L., M. K. Mbow, A. Lessoua and D. Diaw. (2016) Impact of microfinance on poverty and inequality a heterogeneous panel causality analysis. *Revue d'économie politique* 126, 789–818.
Barro, R. J. (1991) Economic growth in a cross section of countries. *The quarterly journal of economics* 106, 407–443.
Barro, R. J. (1996). Determinants of economic growth: a cross-country empirical study, Technical report. National Bureau of Economic Research.
Bauchet, J. and J. Morduch. (2013) Is micro too small? Microcredit vs. sme finance. *World Development* 43, 288–297.
Beck, T., R. Levine and N. Loayza. (2000) Finance and the sources of growth. *Journal of financial economics* 58, 261–300.
Benczúr, P., S. Karagiannis and V. Kvedaras. (2019) Finance and economic growth: financing structure and non-linear impact. *Journal of Macroeconomics* 62, 103048.
Bezemer, D. J., M. Grydaki and L. Zhang. (2014) *Is financial development bad for growth?*, University of Groningen, Faculty of Economics and Business.
Borensztein, E., J. De Gregorio and J.W. Lee. (1998) How does foreign direct investment affect economic growth? *Journal of international Economics* 45, 115–135.
Bourke, P. (1989) Concentration and other determinants of bank profitability in europe, north america and australia. *Journal of Banking & Finance* 13, 65–79.
Buera, F. J., J. P. Kaboski and Y. Shin. (2021) The macroeconomics of microfinance. *The Review of Economic Studies* 88, 126–161.

https://doi.org/10.1017/S136510052510028X Published online by Cambridge University Press

Cull, R. and J. Morduch. (2018) Microfinance and economic development, In *Handbook of finance and development*, Edward Elgar Publishing.
D'Espallier, B., J. Goedecke, M. Hudon and R. Mersland. (2017) From ngos to banks: does institutional transformation alter the business model of microfinance institutions? *World Development* 89, 19–33.
Dalla Pellegrina, L. (2011) Microfinance and investment: a comparison with bank and informal lending. *World development* 39, 882–897.
De Gregorio, J. (1993) Inflation, taxation, and long-run growth. *Journal of monetary economics* 31, 271–298.
Donou-Adonsou, F. and K. Sylwester. (2017) Growth effect of banks and microfinance: evidence from developing countries. *The Quarterly Review of Economics and Finance* 64, 44–56.
Eriksson, C. (1997) Is there a trade-off between employment and growth? *Oxford Economic Papers* 49, 77–88.
Harrison, A. (1996) Openness and growth: a time-series, cross-country analysis for developing countries. *Journal of Development Economics* 2, 419–447.
Hermes, N. (2014) Does microfinance affect income inequality? *Applied Economics* 46, 1021–1034.
Hermes, N., R. Lensink and A. Meesters. (2011) Outreach and efficiency of microfinance institutions. *World development* 39, 938–948.
Ibrahim, M. and P. Alagidede. (2018) Effect of financial development on economic growth in sub-saharan africa. *Journal of Policy Modeling* 40, 1104–1125.
Imai, K. S. and M. S. Azam. (2012) Does microfinance reduce poverty in bangladesh? New evidence from household panel data. *Journal of Development studies* 48, 633–653.
Imai, K. S., R. Gaiha, G. Thapa and S. K. Annim. (2012) Microfinance and poverty: a macro perspective. *World development* 40, 1675–1689.
Imai, K. S., T. Arun and S. K. Annim. (2010) Microfinance and household poverty reduction: new evidence from india. *World Development* 38, 1760–1774.
Karlan, D. and J. Zinman. (2010) Expanding credit access: using randomized supply decisions to estimate the impacts. *The Review of Financial Studies* 23, 433–464.
Karlan, D. and J. Zinman. (2011) Microcredit in theory and practice: using randomized credit scoring for impact evaluation. *Science* 332, 1278–1284.
Khan, M. S. and C. M. Reinhart. (1990) Private investment and economic growth in developing countries. *World development* 18, 19–27.
King, R. G. and R. Levine. (1993) Finance and growth: Schumpeter might be right. *The quarterly journal of economics* 108, 717–737.
Labie, M. and T. Montalieu. (2019) Introduction. de la microfinance à l'inclusion financière. *Mondes en developpement* 1, 7–12.
Lacalle-Calderón, M., C. Chasco, J. Alfonso-Gil and I. Neira. (2015) A comparative analysis of the effect of aid and microfinance on growth. *Canadian Journal of Development Studies/Revue canadienne d'études du développement* 36, 72–88.
Levine, R. and S. Zervos. (1998) Stock markets, banks, and economic growth. *American economic review*, 537–558.
Marakbi, R., C. Turcu and P. Villieu. (2021) Institutions'impact on the corruption-growth nexus: nonlinearities and transmission channels. *Macroeconomic Dynamics* 25, 257–279.
Piketty, T. (2013) *Capital in the 21st century*. President and Fellows, Harvard College:Cambridge, MA.
Schicks, J. (2014) Over-indebtedness in microfinance–an empirical analysis of related factors on the borrower level. *World development* 54, 301–324.
Smolo, E. (2023) Asymmetric impact of microfinance on economic growth: evidence from Bosnia and Herzegovina. *Heliyon* 9, 12.
Solow, R. M. (1956) A contribution to the theory of economic growth. *The quarterly journal of economics* 70, 65–94.
Summer, M. (2013) Financial contagion and network analysis. *Annual Review of Financial Economics* 5, 277–297.
Tarozzi, A., J. Desai and K. Johnson. (2015) The impacts of microcredit: evidence from Ethiopia. *American Economic Journal: Applied Economics* 7, 54–89.
Wagner, C. and A. Winkler. (2013) The vulnerability of microfinance to financial turmoil–evidence from the global financial crisis. *World Development* 51, 71–90.

https://doi.org/10.1017/S136510052510028X Published online by Cambridge University Press

Appendix A: Varibale definitions and sources

Table 13. Variable definitions and sources

Variable	Variable definion	Source
GDP per capita growth (annual %)	Annual percentage growth rate of GDP per capita based on constant local currency. Aggregates are based on constant 2010 U.S. dollars.	WDI
Trade (% of GDP)	Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product.	WDI
Inflation, consumer prices (annual %)	Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly.	WDI
Investment: gross fixed capital formation (% of GDP)	Includes land improvements, plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings.	WDI
Domestic credit to private sector (% of GDP)	It refers to financial resources provided to the private sector by financial corporations, such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment.	WDI
Foreign direct investment, net outflows (% of GDP)	It refers to direct investment equity flows in an economy. It is the sum of equity capital, reinvestment of earnings, and other capital.	WDI
Education: school enrollment, secondary (% gross)	Gross enrollment ratio is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown. Secondary education completes the provision of basic education that began at the primary level, and aims at laying the foundations for lifelong learning and human development, by offering more subject- or skill-oriented instruction using more specialized teachers.	WDI
Unemployment, total (% of total labor force)	Unemployment refers to the share of the labor force that is without work but available for and seeking employment.	WDI
Population growth (annual %)	Annual population growth rate for year t is the exponential rate of growth of midyear population from year t-1 to t, expressed as a percentage. Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship.	WDI
Population growth (annual %)	Annual population growth rate for year t is the exponential rate of growth of midyear population from year t-1 to t, expressed as a percentage. Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship.	WDI
Government effectiveness	Government Effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.	WGI
Voice and accountability	Voice and Accountability captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.	WGI
Gross loan portfolio	All outstanding principals due for all outstanding client loans. This includes current, delinquent and renegotiated loans, but not loans that have been written off. It does not include interest receivable.	MIX Market
Number of depositors	The number of individuals who currently have funds on deposit with the financial institution (MFI)	MIX Market
Operating expense	Includes expenses not related to financial and credit loss impairment, such as personnel expenses, depreciation, amortization and administrative expenses.	MIX Market

https://doi.org/10.1017/S136510052510028X Published online by Cambridge University Press

Appendix B: List of Countries

Table 14. List of countries by income classification

No.	Low income	No.	Lower middle income	No.	Upper middle income	No.	High income
1	Afghanistan	26	Angola	68	Albania	111	Chile
2	Burkina Faso	27	Bangladesh	69	Argentina	112	Croatia
3	Burundi	28	Benin	70	Armenia	113	Hungary
4	Central African Rep	29	Bhutan	71	Azerbaijan	114	Panama
5	Chad	30	Bolivia	72	Belize	115	Poland
6	Dem Rep Congo	31	Cambodia	73	Bosnia and Herzegovina	116	Romania
7	Ethiopia	32	Cameroon	74	Brazil	117	Slovak Republic
8	Gambia	33	Comoros	75	Bulgaria	118	Trinidad and Tobago
9	Guinea	34	Congo Rep	76	China	119	Uruguay
10	Guinea-Bissau	35	Cote d'Ivoire	77	Colombia		
11	Haiti	36	Egypt Arab Rep	78	Costa Rica		
12	Liberia	37	El Salvador	79	Dominican Republic		
13	Madagascar	38	Eswatini	80	Ecuador		
14	Malawi	39	Ghana	81	Fiji		
15	Mali	40	Honduras	82	Gabon		
16	Mozambique	41	India	83	Georgia		
17	Niger	42	Kenya	84	Grenada		
18	Rwanda	43	Kyrgyz Republic	85	Guatemala		
19	Sierra Leone	44	Lao PDR	86	Guyana		
20	Sudan	45	Moldova	87	Indonesia		
21	Syrian Arab Rep	46	Mongolia	88	Iraq		
22	Tajikistan	47	Morocco	89	Jamaica		
23	Togo	48	Myanmar	90	Jordan		
24	Uganda	49	Nepal	91	Kazakhstan		
25	Yemen	50	Nicaragua	92	Kosovo		
		51	Nigeria	93	Lebanon		
		52	Pakistan	94	Malaysia		
		53	Papua New Guinea	95	Mexico		
		54	Philippines	96	Montenegro		
		55	Senegal	97	Namibia		
		56	Solomon Islands	98	North Macedonia		
		57	Sri Lanka	99	Paraguay		
		58	Tanzania	100	Peru		
		59	Timor-Leste	101	Russian Federation		
		60	Tunisia	102	Samoa		
		61	Ukraine	103	Serbia		
		62	Uzbekistan	104	South Africa		
		63	Vanuatu	105	St Lucia		
		64	Vietnam	106	Suriname		
		65	West Bank and Gaza	107	Thailand		
		66	Zambia	108	Tonga		
		67	Zambia	109	Turkey		
				110	Venezuela		

https://doi.org/10.1017/S136510052510028X Published online by Cambridge University Press

Appendix C: Unit root test

Table 15. Panel unit root test

	Phillips-Perron test statistic	
Variables	Statistic	*p*-value
Log GLP per capita	1451.4037	0.0000
Economic growth	1132.9241	0.0000
Concentration ratio	279.5958	0.0220
HHI	726.8975	0.0000
Initial GDP per capita	56.0476	1.0000
Trade	492.5074	0.0000
Inflation	1044.4489	0.0000
Investment	286.2949	0.0010
Consumption	277.0356	0.0001
Domestic credit	234.7298	0.4013
Foreign direct investment	1072.7527	0.0000
Education	303.4980	0.0000
Unemployment	475.6144	0.0000
Population growth	826.6007	0.0000
Government effectiveness	494.7020	0.0000

https://doi.org/10.1017/S136510052510028X Published online by Cambridge University Press

https://doi.org/10.1017/S136510052510028X Published online by Cambridge University Press

Appendix D: Correlation matrix

Table 16. Correlation matrix

Variables	Growth	Initial	TRADE	INF	INVT	GLP	CR-3	HHI	DEP	EXP	DC	FDI	EDU	UNMP	POP	GOVT	VOIC	CONS
Growth	1.000																	
Initial	−0.019	1.000																
TRADE	0.112*	0.119*	1.000															
INF	−0.043	−0.083*	−0.051*	1.000														
INVT	0.173*	0.082*	0.144*	−0.096*	1.000													
GLP	0.033	0.205*	0.146*	−0.176*	0.153*	1.000												
CR-3	−0.025	0.096*	0.178*	0.032	−0.001	−0.274*	1.000											
HHI	−0.027	0.184*	0.208*	0.026	−0.016	−0.262*	0.783*	1.000										
DEP	0.028	−0.036	−0.177*	−0.021	0.038	0.200*	−0.207*	−0.182*	1.000									
EXP	0.006	0.151*	−0.148*	−0.051*	0.055*	0.352*	−0.379*	−0.265*	0.440*	1.000								
DC	−0.021	0.470*	0.197*	−0.138*	0.241*	0.184*	0.053*	0.145*	0.117*	0.123*	1.000							
FDI	0.138*	−0.047*	0.166*	0.009	0.165*	−0.045	0.044	0.070*	−0.073*	−0.050*	−0.028	1.000						
EDU	0.021	0.781*	0.175*	−0.052	0.074*	0.328*	0.008	0.101*	0.018	0.202*	0.460*	0.019	1.000					
UNMP	−0.049*	0.369*	0.162*	−0.035	−0.072*	0.078*	0.167*	0.150*	−0.122*	−0.114*	0.177*	−0.042	0.388*	1.000				
POP	−0.157*	−0.536*	−0.110*	0.047	−0.090*	−0.194*	−0.047*	−0.156*	−0.029	−0.063*	−0.297*	0.023	−0.660*	−0.343*	1.000			
GOVT	0.064*	0.615*	0.066*	−0.194*	0.210*	0.162*	0.046	0.144*	0.037	0.136*	0.597*	−0.033	0.544*	0.191*	−0.429*	1.000		
VOIC	−0.045	0.470*	0.027	−0.134*	−0.006*	0.209*	0.017	0.072*	0.016	0.097*	0.244*	−0.048*	0.410*	0.135*	−0.316*	0.600*	1.000	
CONS	0.048	0.467*	−0.323*	0.028	0.119*	−0.157*	−0.197*	−0.130*	0.261*	0.330*	0.394*	−0.025	0.383*	−0.070*	−0.235*	0.407*	0.123*	1.00

Notes: Growth = Economic growth; Initial = Initial real GDP per capita; TRADE = Trade; INF = Inflation; INVT = Investment; GLP = Log GLP per capita; DEP = Number of depositors; EXP = Operating expense; DC = Domestic Credit; FDI = Foreign direct investment; EDU = Education; UNMP = Unemployment; POP = Population growth, GOVT = Government effectiveness; VOIC = Voice & accountability; CONS = Consumption ∗ Significant at 5%.

Appendix E: Some robustness checks on the transmission channels

In order to establish the robustness of our results, we have examined whether the impact of microfinance on growth through the investment and consumption channels remains when investment and consumption are decomposed into two parts: a part that affects growth directly through the investment and consumption channels and a part that affects growth via other factors.

To this end, we have followed a two-step estimation procedure. First, we estimate the impact of the development of the microfinance sector on the transmission channels (investment and consumption).

The estimation results are reported in Tables 17 and 18. After recovering the residuals from the estimation of the positive relationship between microfinance and the two transmission channels, we find that microfinance still has a positive effect on growth. We also show that the share of investment (Table 17) and consumption (Table 18) that is not explained by microfinance also has a positive and significant effect on economic growth. In sum, we have been able to robustly demonstrate the existence of two channels in the microfinance-growth nexus, namely private investment and consumption.

Table 17. Microfinance and growth through the investment channel

	Dependent variable: GDP per capita growth rate						
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Log GLP per capita	0.526*** (0.079)	0.539*** (0.081)	0.504*** (0.079)	0.482*** (0.098)	0.543*** (0.080)	0.439*** (0.089)	0.519*** (0.080)
Trade	0.016** (0.007)	0.016** (0.007)	0.014* (0.007)	0.011 (0.010)	0.015** (0.007)	0.016** (0.008)	0.018** (0.007)
Inflation	−0.018* (0.009)	−0.017* (0.009)	−0.017* (0.009)	−0.055*** (0.019)	−0.018* (0.009)	−0.071*** (0.019)	−0.018* (0.009)
Initial GDP per capita	−8.935*** (0.610)	−9.176*** (0.731)	−8.251*** (0.614)	−11.361*** (0.871)	−9.072*** (0.624)	−9.923*** (0.670)	−8.884*** (0.618)
Investment resid	0.067*** (0.024)	0.067*** (0.024)	0.050** (0.024)	0.062** (0.031)	0.067*** (0.024)	0.051** (0.025)	0.067*** (0.024)
Domestic credit		0.002 (0.012)					
Foreign direct investment			0.207*** (0.035)				
Education				0.057*** (0.017)			
Unemployment					0.007 (0.059)		
Government effectiveness						1.515** (0.683)	
Population growth							−0.367* (0.207)
Observations	1473	1455	1457	1078	1458	1365	1456

Standard errors are in parentheses. Significance Codes, ∗∗∗ : 0.01; ∗∗ : 0.05; ∗ : 0.1.

https://doi.org/10.1017/S136510052510028X Published online by Cambridge University Press

Table 18. Microfinance and growth through the consumption channel

	Dependent variable: GDP per capita growth rate						
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Log GLP per capita	0.518*** (0.079)	0.540*** (0.080)	0.496*** (0.079)	0.582*** (0.096)	0.529*** (0.080)	0.466*** (0.088)	0.492*** (0.079)
Trade	0.010 (0.008)	0.012 (0.008)	0.010 (0.008)	0.006 (0.010)	0.010 (0.008)	0.013 (0.008)	0.013* (0.008)
Inflation	−0.018** (0.008)	−0.017** (0.008)	−0.017* (0.009)	−0.054*** (0.018)	−0.018** (0.008)	−0.065*** (0.018)	−0.019** (0.008)
Initial GDP Per Capita	−8.881*** (0.624)	−8.316*** (0.761)	−8.479*** (0.635)	−10.008*** (0.899)	−8.915*** (0.636)	−9.804*** (0.636)	−8.819*** (0.631)
Consumption Resid	6.982*** (0.817)	7.366*** (0.848)	6.287*** (0.833)	9.352*** (1.085)	7.001*** (0.823)	6.251*** (0.879)	7.199*** (0.817)
Domestic credit		−0.020 (0.012)					
Foreign direct investment			0.115** (0.052)				
Education				−0.006 (0.018)			
Unemployment					0.035 (0.056)		
Government effectiveness						1.975*** (0.697)	
Population growth							−0.857*** (0.266)
Observations	1348	1331	1335	996	1337	1252	1331

Standard errors are in parentheses. Significance Codes, ∗∗∗ : 0.01; ∗∗ : 0.05; ∗ : 0.1.

https://doi.org/10.1017/S136510052510028X Published online by Cambridge University Press

https://doi.org/10.1017/S136510052510028X Published online by Cambridge University Press

Appendix F:

Table 19. Fixed effects regressions with endogeneity correction (2SLS: insturment=LagGLP)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log GLP per capita	0.544***	0.591***	0.423***	0.566***	0.523***	0.528***	0.572***	0.417***	0.544***
	(0.097)	(0.102)	(0.115)	(0.100)	(0.097)	(0.121)	(0.099)	(0.112)	(0.098)
Trade	0.018**	0.015*	0.013	0.020**	0.017**	0.012	0.017**	0.019**	0.020***
	(0.007)	(0.008)	(0.008)	(0.008)	(0.007)	(0.010)	(0.008)	(0.008)	(0.008)
Inflation	−0.018*	−0.017*	−0.016*	−0.017*	−0.018*	−0.054***	−0.018*	−0.073***	−0.018*
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.019)	(0.009)	(0.019)	(0.009)
Initial GDP	−8.594***	−9.305***	−12.119***	−8.469***	−7.897***	−11.304***	−8.801***	−9.345***	−8.572***
	(0.621)	(0.655)	(1.007)	(0.708)	(0.624)	(0.886)	(0.637)	(0.672)	(0.629)
Investment		0.042*							
		(0.023)							
Consumption			3.232***						
			(0.856)						
Domestic credit				−0.010					
				(0.012)					
Foreign direct inv.					0.210***				
					(0.034)				
Education						0.053***			
						(0.018)			

Table 19. Continued

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Unemployment							−0.018		
							(0.057)		
Gov. effectiveness								1.535**	
								(0.659)	
Population growth									−0.370*
									(0.206)
Observations	1528	1478	1331	1508	1512	1109	1510	1417	1511
Number of countries	107	103	91	105	107	98	105	106	106
Underidentification test	908.701	855.905	709.694	897.940	892.892	641.946	894.094	789.953	898.197
p-value (Underident.)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Weak identification test	2513.431	2258.915	1652.767	2485.484	2440.990	1749.872	2450.027	1980.012	2481.195
p-value (Weak ident.)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Standard errors are in parentheses. Significance Codes, ***: 0.01; **: 0.05; *: 0.1.

Cite this article: Marakbi R, Boussetta A and Laghlal EM (2025). "Microfinance, competition, and growth." *Macroeconomic Dynamics* **29**(e155), 1–24. https://doi.org/10.1017/S136510052510028X

https://doi.org/10.1017/S136510052510028X Published online by Cambridge University Press