



European
Commission

JRC TECHNICAL REPORT

Access to finance and labor market performance in the EU 28

Ferent-Pipas, M.

Pedraza, P. de

2019

This publication is a Technical report by the Joint Research Centre (JRC), the European Commission's science and knowledge service. It aims to provide evidence-based scientific support to the European policymaking process. The scientific output expressed does not imply a policy position of the European Commission. Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use that might be made of this publication. For information on the methodology and quality underlying the data used in this publication for which the source is neither Eurostat nor other Commission services, users should contact the referenced source. The designations employed and the presentation of material on the maps do not imply the expression of any opinion whatsoever on the part of the European Union concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Contact information

Name: Pablo de Pedraza
Address: European Commission, DG Joint Research Centre, Directorate I - Competences
Unit I.1 - Monitoring, Indicators and Impact Evaluation.
TP 361 – Via E. Fermi 2749 – I-21027 – Ispra (Va) - ITALY
Tel: +39 0332 78 3805
E-mail: pablo.depedraza@ec.europa.eu ; JRC-COIN@ec.europa.eu

EU Science Hub

<https://ec.europa.eu/jrc>

JRC118365

EUR 29926 EN

PDF	ISBN 978-92-76-12575-4	ISSN 1831-9424	doi:10.2760/97382
Print	ISBN 978-92-76-12576-1	ISSN 1018-5593	doi:10.2760/407449

Luxembourg: Publications Office of the European Union, 2019

© European Union, 2019



The reuse policy of the European Commission is implemented by the Commission Decision 2011/833/EU of 12 December 2011 on the reuse of Commission documents (OJ L 330, 14.12.2011, p. 39). Except otherwise noted, the reuse of this document is authorised under the Creative Commons Attribution 4.0 International (CC BY 4.0) licence (<https://creativecommons.org/licenses/by/4.0/>). This means that reuse is allowed provided appropriate credit is given and any changes are indicated. For any use or reproduction of photos or other material that is not owned by the EU, permission must be sought directly from the copyright holders.

All content © European Union, 2019

How to cite this report: Ferent-Pipas, M. and Pedraza, P.de , *Access to finance and labor market performance in the EU 28*, EUR 29926 EN, Publications Office of the European Union, Luxembourg, 2019. ISBN 978-92-76-12575-4, doi:10.2760/97382, JRC 118365

Contents

Acknowledgements.....	3
Abstract.....	4
1 Introduction.....	6
2 Literature review and institutional background.....	8
3 Data and methods.....	11
3.1 Estimation Strategy.....	11
3.2 Data.....	12
3.2.1 Access to finance.....	12
3.2.2 Control variables.....	16
4 Results.....	18
5 Conclusions.....	22
List of figures.....	26
List of tables.....	27

Acknowledgements

The authors would like to acknowledge comments and suggestions from Michaela Saisana and Claudia Guisetti and support from Anastasis Katsinis. The scientific output expressed does not imply a European Commission policy position. Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use that might be made of this publication.

Authors

Marina Ferrent-Pipas

Pablo de Pedraza

Abstract

This paper examines the relationship between access to finance and labor market performance in the EU28 for the period 2003-2017. For this purpose, we first construct a composite indicator to measure access to finance by equal-weighting information about days needed to be paid, rejected loans, the willingness of banks to provide a loan, interest rate for small loans, venture capital, private equity, business angels, and public funding. Secondly, using a Two-Stage Least Squares (2SLS), we estimate the relationship between the employment and unemployment growth rates on our access to finance indicator while controlling for main macro-economic variables. Our results suggest that improved access to finance is likely to stimulate labor market performance - increased access to finance generates increased employment growth rates, and decreased unemployment growth rates respectively. Findings contribute to empirical literature and have important policy implications. Improving business environment conditions for SMEs through access to finance could improve labor market outcomes.

Keywords: access to finance; labor market; small and medium-sized enterprises

1 Introduction

Unemployment rate, its evolution, and main drivers is an important concern for academicians and practitioners alike (see for example [Boeri & Burda](#), 1996; [Blanchard & Diamond](#), 1989; [Bonthuis, Jarvis, & Vanhala](#), 2013). This is mainly because of its further social and economic implications. On the one hand, the unemployment rate reduces the quality of life of those under unemployment by minimizing their spendable income and inducing feelings of depression, low self-esteem and anxiety (see for example [Darity & Goldsmith](#), 1996). On the other, an increase in the unemployment rate has a negative impact on the national budget both from the social benefits governmental expenditures perspective and from the fiscal incomes one.

Research has focused mainly on the impact of labor market institutions and policies on the unemployment rate. The main area of debate has been rigid versus flexible labor markets with a widespread idea that rigid labor markets are detrimental to employment rates (see for example [Blasco & Pertold-Gebicka](#), 2013; [Boeri, Conde-Ruiz, & Galasso](#), 2002; [Bova, Jalles, & Kolerus](#), 2016; [Fertig, M.Schmidt, & Schneider](#), 2006; [Kraft](#), 2010). However, in the last two decades, several researchers have questioned the interplay between the business environment conditions, including access to finance, and the labor market outputs. They argued that reforms in labor market institutions and policies were not enough to achieve better employment and lower unemployment desideratum. In this context, they bring about the idea of the positive impact of improved business environment conditions ([Acemoglu](#), 2001; [Belke, Fehn, & Foster](#), 2004; [Blanchard, Jaumotte, & Loungani](#), 2014) and access to finance ([Feldman](#) 2014) on the employment rate. With the recent financial recession, the deterioration in financing opportunities was succeeded by increases in unemployment rates and contractions in job creation and employment rates, respectively. As such, it has increased the interest in the study of the impact of the firm's access to finance on (un)employment and job creation ([Boeri, Garibaldi, & Moen](#), 2018). So far, most of the empirical studies focused on the impact of access to finance on job creation at the firm level. The macro-level contributions in the field are still scarce - [Borsi](#) (2018); [Belke et al.](#) (2003; 2004), [Cingano, Leonardi, Messina, & Pica](#) (2014); [Feldmann](#) (2010; 2013; 2014) and [Papapetrou & Tsalaporta](#) (2017) are notable exemptions.

Our paper contributes to the literature by exploring macro-evidences. We test the hypothesis that better access to finance opportunities for the SMEs have a positive impact on the labor market performance. In order to fulfill our goal, we employ data on the EU28 member states for the 2003-2017 period. Being access to finance a multidimensional concept, we proxy access to finance by constructing a composite indicator of Access to finance. We equal-weight eight indicators related to different types of financing (such as bank lending, venture capital or private equity) some of them specifically related to SMEs. We then study the relationship between our access to finance indicator and employment and unemployment growth rates while controlling for main macro-economic and labor market indicators and using a two-stage least squares (2SLS) estimation with country and time fixed effects.

As far as we know, this is the first macro-level study using a composite measure of access to finance and focusing on the European Union's member states. Previous macro-level studies used specific indicators that may not capture the several financial channels and opportunities,

to analyze either the OECD countries (Belke et al., 2003; 2004; [Papapetrou & Tsalaporta, 2017](#)) or developing economies ([Feldmann, 2015](#)).

From a policy action point of view, the European Commission's 'Small Business Act' (SBA) motivates the goal of this paper. It was enacted in 2008 as part of the Lisbon Strategy to place the needs of small and medium-sized enterprises (SMEs) at the heart of Europe's strategies to boost jobs, economic growth, and well-being and included access to finance as one of its ten pillars¹ (European Commission, 2008).

The remaining part of the paper is organized as follows. In Section 2, we review the theoretical and empirical literature in the field and discuss the institutional context. In section 3, we introduce the data and methodology. In Section 4, we present and discuss the estimated results. Finally, we draw conclusions and policy implications in Section 5.

¹ The 'Small Business Act' evaluates the performance and context of the SMEs across the EU28 member states based on a framework comprised of 77 indicators pertaining to 10 pillars - (1) Entrepreneurship, (2) Second chance, (3) Think small first, (4) Responsive administration, (5) State aid public procurement, (6) Access to finance, (7) Single market, (8) Skills and innovation, (9) Environment, and (10) Internationalization.

2 Literature review and institutional background

Linkages between financing opportunities of enterprises and the evolution of unemployment and employment rates have not received too much of attention in labor market literature. There are references tackling the issue from a theoretical point of view, some studies following an empirical approach at firm level and few attempts trying to explore how the theoretical models and micro evidences translate into macro-economic measures such as unemployment and employment levels and growth rates.

Regarding theoretical studies, Acemoglu (2001) shows that in markets with credit frictions, a technological shock limits the employment growth in highly credit dependent industries. His results suggest that an economy with credit market frictions may undergo high unemployment periods since potential entrepreneurs need time to acquire wealth for future job creation. Wasmer & Weil (2004) theorize the existence of a financial accelerator in an economy with credit and labor market imperfections. They suggest that further cross-sectional empirical research would help understand why changes in labor market reforms do not yield the expected changes in unemployment rates and whether financial conditions could explain better the evolution of unemployment. Petrosky-Nadeau & Wasmer (2013) extend the Wasmer & Weil (2004) allowing frictions to affect all firms in the economy. They find out a strong interaction between frictions in the financial and labor markets. Garín (2015) shows that higher credit constraints increase the cost of labor, which translates into a decrease in the net benefit of hiring an extra worker.

Empirical studies that focus on the impact of financing opportunities at firm level have found that there are at least three financial channels able to display a positive impact on employment at firm level: bank lending, venture capital, and public funding (Kersten, Harms, Liket, & Maas, 2017).

Firstly, banks and credit institutions play the dominant role in access to external finance of SMEs. According to the Survey of Access to Finance of Enterprises (SAFE), in 2018, bank loans represent a relevant source of external financing for 47% of the SMEs in the EU. Bank lending deterioration has a negative impact on employment rates inside firms. Berton, Mocetti, Presbitero, & Richiardi (2018) find evidences for the Veneto region of Italy, Bentolila, Jansen, & Jiménez (2017) find evidences for Spanish firms during the 2000-2010 period and Gerlach-Kristen, O'Connell, & O'Toole (2015) find evidences for Irish firms.

Secondly, venture capital stimulates job creation by lowering firms' financial constraints. Davila, Foster, & Gupta (2003) show it for 500 USA start-up companies (193 – venture-backed and 301 – non-venture-backed) during 1994-1999.

And thirdly, public financing programs are intended to overcome market failures, by providing the SMEs with the means to invest and improve their performance, which in turn stimulates job creation (Benavente, Crespi, & Maffioli, 2007; Kersten et al., 2017). On average, public financing programs have a positive effect on the employment rates inside SMEs. Depending on the type of public funding analyzed, the impact on employment can be observed during periods that range from 1 to 10 years (Arraiz, Melendez, & Stucchi, 2014; Negri, Maffioli, Rodriguez,

& Vázquez, 2011; Kersten et al., 2017). Brown & Earle (2017) observe an increased job creation in the first three years after the receipt of a loan. Arraiz, Melendez, & Stucchi (2014) find out that firms in Colombia that gain access to credit backed by the National guarantee Fund during 1997-2007 were able to grow in terms of both output and employment. Negri et al. (2011) shows that provision of credit through second-tier development banks in Brazil effectively improve firm's competitiveness in terms of employment growth.

Existing macro-level studies support that micro-level findings hold at macro-economic level: better financing opportunities generate improved labor market performance. Borsi (2018) analyze OECD countries over the 1980-2013 period and finds that after the start of a credit contraction there are typically increases in the total unemployment rate of about 1%. Increases are even more substantial in the case of youth in which case it amounts to about 2.5%. For the same country sample and for the 1970-2013 period, Papapetrou & Tsalaporta (2017) analyze the effect of credit constraints accounting for labor market institutions and fiscal imbalances on the unemployment rate. Feldmann (2014 and 2015) analyses the impact of bank concentration on labor market performance in industrial countries and in 42 developing countries over the 1987-2007 period. In both cases, his findings suggest a negative impact of bank credit availability on the unemployment rate.

Belke et al. (2003, 2004) estimate the direct impact of variables measuring venture capital on both employment and unemployment rates in 20 OECD countries for the 1987-1999 period. They find a positive significant dynamic effect of the venture capital investment on the employment rate. Using the same country sample over the 1992-2003 period, Feldmann (2010) concludes that greater and more readily available venture capital investments increase employment rates across the economy. Feldmann (2014) reconfirms those findings in a broader sample of 78 countries over the 1992-2007 period.

Micro-evidences show that access to finance operates by more than one financial channel which gives ground to the calculation of an access to finance composite indicator able to capture the multidimensionality of it. However, there is no available evidence of the macroeconomic effect of a measure including several financial channels and the several alternatives that companies may have at their disposal.

The 'Small Business Act' directly links SMEs' development with the generation of employment opportunities and local and regional well-being and makes access to finance to SMEs one of its ten pillars. The European Commission has continuously declared in its policy papers its commitment to foster an inclusive environment with more and better jobs and higher social cohesion (see for example Europe 2020, 2010; Jobs, Growth and Investment, 2014; European Pillar of Social Rights, 2017). The European Commission provides annually the Country Fact Sheets and a Scientific Report evaluating the state of the EU28 countries in several SBA dimensions, including access to finance. Yet, there is no study, as to our knowledge, testing the relationship between access to finance as defined by the SBA framework and the labor market performance inside the EU member.

Against the above background, this paper aims to explore additional evidences of the links between access to finance and labor market performance, testing the relationship of a composite measure of access to finance that includes several financial channels and focusing on European Union member states where policy efforts have been focusing on facilitating entrepreneurship to generate employment and reduce unemployment.

3 Data and methods

3.1 Estimation Strategy

In estimating the impact of access to finance on our labor market outcomes we firstly ran a Pooled Ordinary Least Squares (POLS)² model with country and time fixed effects³:

$$Y_{i,t} = \beta_1 AF_{i,t} + \beta_2 Z_{i,t} + \alpha_i + \lambda_t + \epsilon_{i,t}, (1)$$

where $Y_{i,t}$ is the labor market outcome of country i at the year t , $AF_{i,t}$ is an access to finance indicator and $Z_{i,t}$ is a vector of control variables. α_i and λ_t are country and time fixed effects, respectively. Finally, $\epsilon_{i,t}$ is the error term.

Regarding endogeneity problems, literature has documented that reverse causality between labor market outcomes and the access to finance indicators is likely to occur (see, for example, Feldmann, 2013, 2014, 2015; Belke et al., 2003, 2004). Taking that into account, we ran a Hausman test on the POLS regressions. Based on the results of Hausmann test, we conclude that our model suffers from endogeneity. To extract the exogenous effect of access to finance indicator, we re-estimated the model through Two-Stage Least Squares (2SLS). We instrumented our access to finance measure with lagged differences covering the last three years following same method as Feldmann (2014) and Feldmann (2015)⁴:

First stage:

$$AF_{i,t} = \sum_{s=1}^2 \beta_3 (AF_{i,t-s} - AF_{i,t-s-1}) + \beta_4 Z_{i,t} + \gamma_i + \kappa_t + \eta_{i,t} (2)$$

Second stage:

$$Y_{i,t} = \beta_1 AF_{i,t} + \beta_2 Z_{i,t} + \alpha_i + \lambda_t + \epsilon_{i,t} (3)$$

where $Y_{i,t}$ is the labour market outcome of country i at the year t , $AF_{i,t}$ is our access to finance indicator and $Z_{i,t}$ is our vector of control variables. We controlled for the impact of country specificity and cross-country common shocks by including country (γ_i and α_i) and time (κ_t and λ_t) fixed effects, respectively. Finally, $\eta_{i,t}$ and $\epsilon_{i,t}$ are the error terms.

² This model is unlikely to be adequate, but it provides a baseline for comparisons with more complex estimators.

³ We considered fixed effects due to the homogeneity of our sample. We included country effects to control for unobserved country-specific effects. Further on, we included time fixed effects to control for potential common shocks affecting the countries such as financial or technological shocks as theoretical literature emphasized the impact of access to finance in the presence of such shocks.

⁴ In additional estimations, we also controlled for simultaneous determination in case of main economic indicators (GDP growth and inflation rate). Estimation results did not change, thus in the spirit of Feldmann (2014) we instrumented only the 'Access to finance' indicator.

Based on the results of Wu-Hausman and Sargan tests, we conclude that our instruments are valid, providing support for the 2SLS estimation. Therefore, we have estimated Models through 2SLS with country and time fixed effects to overcome the endogeneity between access to finance and labor market outcomes. Our estimates are consistent and the chosen instruments are valid as they are strong enough to capture the endogeneity.

3.2 Data

We employ data on the EU28 member states for the 2003-2017 period. As endogenous variables, we use both the employment rate and the unemployment rate⁵ (Feldmann, 2010, 2013, 2014; Papapetrou and Tsalaporta, 2017). Following the work of Belke et al. (2004)⁶, we subsequently modeled the growth rates of these variables. For definitions, sources and descriptive statistics see Table 1.

Table 1. List of of endogenous variables – description and summary statistics

Variable	Description	Summary statistics			
		Min.	Median	Mean	Max.
Employment rate	Percentage of active population aged 15-64 [Source: Eurostat]	44.3	64.7	65.05	86.6
Unemployment rate	Percentage of active population aged 15-64 [Source: Eurostat]	2.3	7.7	8.679	27.5
Employment growth rate	Annual growth rate of employment rate [Source: Own computations based on Eurostat data on employment rate]	-11.58	0.78	0.59	6.70
Unemployment growth rate	Annual growth rate of unemployment rate [Source: Own computations based on Eurostat data on unemployment rate]	-30.93	-2.30	0.65	145.46

3.2.1 Access to finance

To measure the SMEs' degree of access to finance, we re-construct the 'Access to Finance' composite indicator of the European Commission (Ghisetti & Pedraza, 2017) taking into account Feldman (2014) (see Table 2 for detailed variable description, sources and main descriptive statistics)⁷. As such, we consider the following variables: total duration in days to

⁵ In countries in which there is lack of incentives to register as unemployed, the real unemployment rate might be higher than the reported one (Blanchard et al., 2015).

⁶ We tested for the presence of unit roots in the series of (un)employment rates, GDP, GDP per capita, and inflation rate. Since neither of the five series we tested has missing values, the most appropriate unit root test is the Levin, Lin, and Chu. Except for the employment rates, all the series reject the null of the presence of a unit root. We also tested the independent variables, concluding in stationary series for all applied tests. Given all the tests are asymptotic, and our data set contains a low number of time observations (15 years), we treat all the results with cautiousness. To avoid possible misspecifications, we further used GDP growth as well as (un)employment growth rates which are known in the literature to be stationary processes (see also Belke et al., 2004).

⁷ The initial indicator computed in Ghisetti & Pedraza (2017) used a larger list of ten indicators. They included 'Strength of legal rights' and 'Bad debt loss.' The two indicators suffered a change in computation methodology in 2015. In order to assure consistency of our indicator, we excluded them for the present analysis. However, when computing the indicator following Ghisetti & Pedraza (2017), it showcases a correlation

be paid, rejected loan applications, the willingness of banks to provide a loan, , venture capital, private equity, business angels and public funding (Ghisetti and Pedraza 2017) and annual average interest rate for small loans (Feldman, 2014).

Table 2. List of 'Access to Finance' components (not standardized) - description and summary statistics⁸

Variable	Description	Summary statistics			
		Min.	Median	Mean	Max.
Venture capital investments (+)	Percent of GDP [Source: Eurostat]	0	0.04	0.04176	0.32
Equity funding available for new and growing firms (+)	Likert scale 1-5: 1=worst; 5=best [Source: National Expert Survey (NES) of the Global Entrepreneurship Monitor (GEM)]	1.41	2.62	2.636	4.16
Professional Business Angels funding available for new and growing firms (+)	Likert scale 1-5: 1=worst; 5=best [Source: National Expert Survey (NES) of the Global Entrepreneurship Monitor (GEM)]	1	2.49	2.498	3.75
Access to public financial support including guarantees (-)	Share of companies that indicated a deterioration [Source: Survey on the Access to Finance of Enterprises (SAFE)]	2.04	17.49	19.15	69.27
Rejected loan applications and loan offers whose conditions were deemed unacceptable (-)	Percentage of loan applications by SMEs [Source: Survey on the Access to Finance of Enterprises (SAFE)]	0	12.42	13.18	42.98
Willingness of banks to provide a loan (-)	Percentage share of respondents who indicated a deterioration [Source: Survey on the Access to Finance of Enterprises (SAFE)]	1.94	21.01	22.14	68.07
Total duration in days to get paid (-)	Number of days it takes for a company to get its invoices paid by the customer (average of B-2-C, B-2-B, and Public authorities) [Source: European Payment Index, White paper, Intrum Justitia]	13	43	48.57	120.67
Annual average of interest rate for small loans (-)	[Source: European Central Bank except for the UK in which case the source is Bank of England]	0	4.18	4.246	18.21

of 99.42% with our indicator, and the results of the analysis do not change. Also, in plus from Ghisetti & Pedraza (2017) we add to this framework the 'annual average of interest rate for small loans'.

⁸ All indicators are SMEs related. Further details on this respect can be found at <http://sdw.ecb.europa.eu/browseExplanation.do?node=9689717> for SAFE indicators and <https://www.gemconsortium.org/data/sets> for GEM indicators.

In constructing the composite indicator, we followed Nardo et al. (2014) and Ghisetti & Pedraza (2017). We firstly checked for the presence of reporting errors and outliers in the data. We flagged indicators having skewness (absolute) greater than 2 and kurtosis greater than 3.5, which are thresholds widely adopted in the context of composite indicators to detect potential outliers. As they are only heuristic rules of thumb, each flagged case needs to be analyzed individually to determine whether any outlier treatment is needed. We found it necessary for the case of 'public funding,' in which case we treated outliers by winsorization⁹.

Secondly, we treated missing values through a multiple steps imputation algorithm that combines a data-driven bootstrap time-series cross-sectional expectation-maximization approach in the spirit of Honaker & King (2010). We re-scaled Likert scale data to a 0-5 scale after the imputation.

Thirdly, we normalized the variables to achieve a common scale. To this aim, we considered a min-max normalization in which all the indicators take a scale from 0 to 1. Re-scaling widens the range of an indicator. In the context of composite indicators, this provides an advantage for those indicators with a small range of values since it allows differentiation between countries with similar levels of SMEs' performance. However, min-max normalization is not appropriate in the presence of extreme values or outliers, which can distort the normalized indicator. To control for this, in step 1 above, we identified and treated extreme values.

At this stage, we also took into consideration the direction of the variable's effects. For example, higher values of 'venture capital investments' showcase higher degrees of access to finance since the variable is measured in percent of GDP. In this case, we re-scaled the variable by using the formula:

$$x_i - \max(x) / \max(x) - \min(x) \quad (1).$$

On the other hand, higher values of 'willingness of banks to provide a loan' showcase lower degrees of access to finance since the variable is measured in percent of respondents that indicated a deterioration in the variable. In this case we re-scaled the variable by using the formula:

$$\max(x) - x_i / \max(x) - \min(x) \quad (2).$$

⁹ Outliers can polarize the findings and bias the results. As such, we detect outliers based on skewness or kurtosis. Further on, we treat them by assigning them the next closest value, up to the level where its skewness and kurtosis become acceptable.

In Table 2 we marked with the '+' sign all of the variables in which case we rescaled based on (1) and with '-' all of those for which we rescaled based on (2).

Following these pre-processing stages, we aggregated the variables in a composite indicator through the arithmetic mean which imply we are assuming perfect substitutability among indicators, i.e., poor performance in one indicator can be fully compensated by good performance in another. This suits our case because of two reasons. On the one hand, our research hypothesis is that access to finance of SMEs has a positive impact on the employment rate, regardless of its source. On the other, we are evaluating the impact of one of the SBA's dimensions and follow its methodology (see Ghisetti & Pedraza, 2017) including interest rates as an additional indicator most commonly used by literature (Feldman 2015).

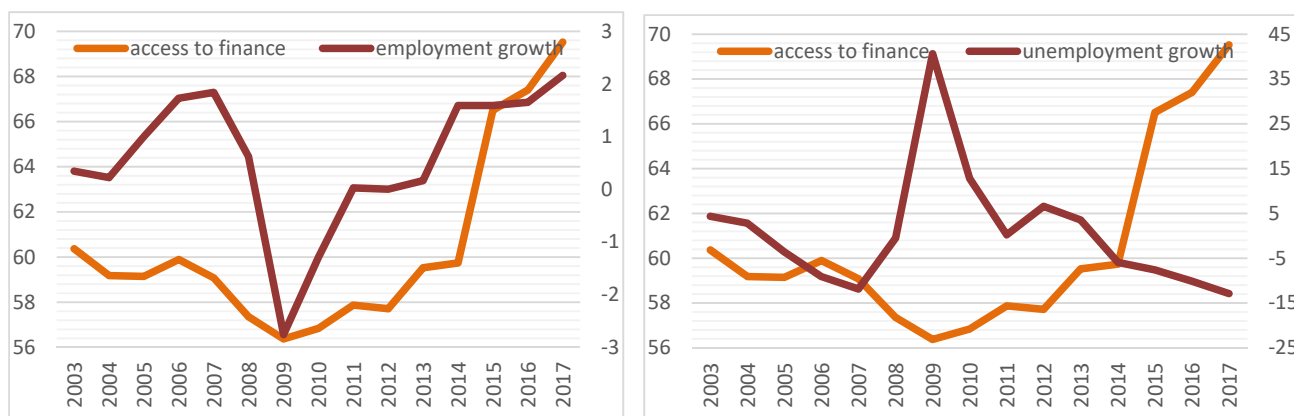
Lastly, we re-scaled the indicator on a 0-100 scale.

Based on the correlations in 2017 between each variable and 'access to finance' composite indicator, the contribution of the variables to the indicator range from 26% to 84%. The lowest contributions are those of 'venture capital availability' (26%) and 'rejected loans' (43%). The highest contributions are those of 'equity funding' (84%) and 'public finance' (68%).

Figure 1 shows the evolution of employment, and unemployment growth rates (right axis) and access to finance (left axis), the graphs show a perfectly reverse story. On the one hand, employment growth rate smoothly increased from 2003 to 2007 before decreasing and entering negative numbers reaching its minimum in 2009 (-2,76%). From 2009 to 2017 it recovered reaching rates higher than the pre-2009 ones (2.16% in 2017). On the other hand, unemployment growth rate shows a smooth decrease until 2007 (-11.86%), and afterwards and increasing trend until 2009 followed by a decreasing tendency, reaching rates lower than the pre-2009 ones (-12.89% in 2017). The two variables move in opposite directions. The scales of the two evolutions are very different: for employment growth rate (its values ranging from -2.79% to 2.16%) and for unemployment growth rate (its values ranging from -12.89% to 40.63%), respectively.

Increases in access to finance are accompanied by increases in employment growth rates and decreases in unemployment growth rates. Correlation between access to finance and the employment growth RATE is 69%. Correlation between access to finance and unemployment growth rate is of -58%. In the following section we further explore this relationship by controlling for several macro-economic and labor market indicators.

Figure 1. The evolution of access to finance against the evolution of employment growth rate (left pane) and of unemployment growth rate (right pane) – EU28 average



3.2.2 Control variables

We control for main macro-economic and labor market indicators following existing literature (Table 3). We test for the stability of results by estimating several specifications. In our baseline model (Model 1), we accounted for GDP (Gross Domestic Product) growth rate, trade openness, labor market regulation index, and top marginal tax rate index. Following Feldmann (2014), we control for trade openness and top marginal tax rate in order to ensure that access to finance estimated elasticity does not absorb business environment conditions as a whole. Following literature on the impact of labor market policies and institutions on the evolution of unemployment rates (Bentolila et al. 2012, Bova et al 2016) we account for the labor market institutional context using the labor market regulation index developed by the Fraser Institute (Feldmann 2014). Generally, the research agrees on the detrimental impact of rigid environments on the unemployment rate evolution. .

In a first robustness check (Model 2), we substitute the labor market regulation index with the more conventional measures: minimum wage, unemployment benefits, employment protection legislation (EPL), spending with active labor market policies (ALMP), trade union density and collective bargaining coverage rate. In line with previous literature, we expect more stringent EPL and higher unemployment benefits to have a negative impact on the employment growth rate (Bentolila et al., 2012; Bova et al., 2016). On the other hand, literature documents a generally positive impact of ALMPs on employment growth rates (Bova et al. 2016; Kraft, 1998).

In a second robustness check (Model 3), we replace the top marginal tax rate index with a more comprehensive business regulation index. Blanchard et al. (2014) suggest that lowering barriers to the entry of new firms increases competition and in turn, fosters employment in the respective sectors.

In a third robustness check (Model 4), we consider inflation rate as the labor economics literature suggests it as a good predictor of employment and unemployment rate (see for example Tobin, 1995)¹⁰. In a fourth robustness check (Model 5), we add the credit market regulation index. In the last check (Model 6), we add the freedom of trade index.

¹⁰ The inflation - unemployment rate relationship is widely known as an endogenous one. In the present estimations, we do not instrument for the inflation rate since, in our sample, the inflation rate is targeted by the Central Banks.

4 Results

Tables 4 and 5 present the results of the regressions explained in the previous section. The coefficient of the access to finance index is statistically significant in all the models, remaining significant at alternative specifications with different control variables. Also, its size is very similar to the baseline specifications presented in the first column of both tables.

Table 3. Regressions to explain the employment growth rate

Independent variables	Baseline specification (Model 1)	Alternative labor market regulation indicators (Model 2)	Top marginal tax rate substituted by business regulation index (Model 3)	Inflation rate added (Model 4)	Credit market regulation added (Model 5)	Freedom of trade added (Model 6)
Access to finance index	0.2105*** (0.0478)	0.2676*** (0.0527)	0.2103*** (0.0478)	0.2248*** (0.0514)	0.2124*** (0.0496)	0.2072*** (0.0480)
GDP growth rate	0.1206*** (0.0226)	0.1307*** (0.0238)	0.1203*** (0.0227)	0.1103*** (0.0244)	0.1206*** (0.0227)	0.1225*** (0.0227)
Trade openness	0.0212** (0.0091)	0.0134 (0.0102)	0.0206** (0.0092)	0.0224** (0.0092)	0.0211** (0.0092)	0.0217** (0.0091)
Labor market regulation index	-0.0013 (0.0238)		-0.0008 (0.0254)	-0.0023 (0.0241)	-0.0002 (0.0241)	-0.0018 (0.0238)
Top marginal tax rate index	-0.0124 (0.0146)	-0.0135 (0.0175)		-0.0113 (0.4425)	-0.0118 (0.0146)	-0.0134 (0.0145)
Employment protection legislation ^a		-0.4784 (0.6694)				
Minimum wage ^b		-0.0278 (0.0182)				
Unemployment benefits		-0.8852 (0.6252)				
Spending with active labor market polices ^c		3.5116*** (1.2276)				
Collective bargaining		-0.0405** (0.0199)				
Business regulation index			0.0051 (0.0397)			

Inflation rate				0.1271 (0.0858)		
Credit market regulation index					-0.009 (0.0210)	
Freedom of trade index						0.0805 (0.0783)
Number of observations	292	233	292	291	291	291
Number of countries	28	26	28	28	28	28
Weak instruments test	34.746*** (0.0000)	33.083*** (0.0000)	33.850*** (0.0000)	30.947*** (0.0000)	33.295*** (0.0000)	34.043*** (0.0000)
Wu-Hausman test	7.697*** (0.0059)	12.324*** (0.0005)	7.720*** (0.0058)	8.168*** (0.0047)	7.672*** (0.0060)	7.454*** (0.0067)
Sargan test	0.041 (0.8388)	0.398 (0.5282)	0.060 (0.8060)	0.043 (0.8363)	0.042 (0.8375)	0.076 (0.7832)

Notes: Results of Two Stage Least Squares with country-specific and year-specific fixed effects. 'Access to finance index' is instrumented through its lagged differences covering the previous three years. Robust standard errors, adjusted for clusters at the country level, are reported in parentheses. ***, **, * denotes statistically significant at the 1%,5% and 10% level.

^a In current specification we use the EPL index as computed by OECD. In alternative specifications we also used the EPL index computed by ILO. ^b In alternative specifications we used a dummy variable for the existence of a minimum wage. ^c In alternative specifications we use the participation in ALMP.

Table 4. Regressions to explain the unemployment growth rate

Independent variables	Baseline specification	Alternative labor market regulation indicators	Top marginal tax rate substituted by business regulation index	Inflation rate added	Credit market regulation added	Freedom of trade added
Access to finance index	-1.3605*** (0.4654)	-1.8763*** (0.4297)	-1.3581** (0.48198)	-1.2482** (0.5125)	-1.4136*** (0.4684)	-1.3190** (0.4693)
GDP growth rate	-1.2111***	-1.3398***	-1.2189***	-1.2915***	-1.2121***	-1.2357***

	(0.3764)	(0.3775)	(0.3687)	(0.4288)	(0.3926)	(0.3675)
Trade openness	-0.2539 (0.1403)	-0.2951 (0.1832)	-0.2463 (0.1409)	-0.2442 (0.1378)	-0.2516 (0.1363)	-0.2601 (0.1326)
Labor market regulation index	0.1487 (0.2330)		0.1127 (0.2606)	0.1407 (0.2067)	0.1198 (0.2557)	0.1546 (0.2079)
Top marginal tax rate index	0.1749 (0.1591)	0.3364 (0.1915)		0.1830 (0.1488)	0.1606 (0.1671)	0.1876 (0.1668)
Employment protection legislation ^a		6.7006 (10.6961)				
Minimum wage ^b		-0.0987 (0.1392)				
Unemployment benefits		1.6820 (6.5746)				
Spending with active labor market polices ^c		-32.8266** (11.2747)				
Collective bargaining		0.1280 (0.1920)				
Business regulation index			0.0752 (0.3601)			
Inflation rate				0.9954 (1.1200)		
Credit market regulation index					0.2462 (0.2307)	
Freedom of trade index						-1.0279 (0.7050)
Number of observations	292	233	292	291	291	291
Number of countries	28	26	28	28	28	28
Weak instruments test	41.7160*** (0.0000)	29.5270*** (0.0000)	45.0140*** (0.0000)	33.0690*** (0.0000)	30.2000*** (0.0000)	44.4110*** (0.0000)
Wu-Hausman test	5.4870** (0.0268)	6.7740** (0.0162)	5.3570** (0.0285)	3.6560* (0.0665)	5.8790** (0.0223)	5.2850** (0.0295)

Sargan test	0.0490 (0.8246)	0.3380 (0.5612)	0.0970 (0.7556)	0.0490 (0.8257)	0.0510 (0.8211)	0.129 (0.7199)
--------------------	--------------------	--------------------	--------------------	--------------------	--------------------	-------------------

Notes: Results of Two Stage Least Squares with country-specific and year-specific fixed effects. 'Access to finance index' is instrumented through its lagged differences covering the previous three years. Robust standard errors, adjusted for clusters at the country level, are reported in parentheses. ***, **, * denotes statistically significant at the 1%,5% and 10% level.

^a In current specification we use the EPL index as computed by OECD. In alternative specifications we also used the EPL index computed by ILO. ^b In alternative specifications we used a dummy variable for the existence of a minimum wage. ^c In alternative specifications we use the participation in ALMP.

The estimates suggest that increases in access to finance for SMEs has a positive impact on employment growth rate while a negative effect on unemployment growth rate. These results are in line with existing theoretical, firm level and previous macro level findings that use unidimensional indicators of access to finance. The results suggest that better access to finance improves overall labor market performance also after controlling for main macro-economic and labor market variables. Results also support using a Composite Indicators of access to finance index to capture different financing opportunities.

More specifically, a one standard deviation increase in access to finance is associated with an approximate of 2 to 2.5 percentage points increase in the employment growth rate and a decrease in the unemployment growth rate between 12.5 to 18 percentage points. These values are computed based on the smallest and largest coefficients from Tables 5 and 6, respectively.

It is worth to notice that the impact of the control variables on the labor market performance are also in line with what was expected. Higher economic growth is associated with higher employment growth and lower unemployment growth, respectively. In line with previous research (Feldmann, 2014), these results suggest that better economic environment enables an inclusive job market. Similarly, an increase in trade openness is associated with higher employment growth rates (Blanchard et al., 2014).

5 Conclusions

In this paper we have analyzed the impact of a multidimensional measure of access to finance on employment and unemployment growth rates for a panel of 28 countries (EU member states) over the 2003-2017 periods. For this purpose, we conduct a two-stage least squares estimation with country and year fixed effects in order to account for the possible endogeneity between our access to finance indicator and labor market performance variables. In order to capture access to finance in each country, we calculate a composite indicator following generally accepted Composite Indicators literature (Nardo et al., 2014). Our composite indicator incorporates information about days needed to be paid, rejected loans, the willingness of banks to provide a loan, interest rate for small loans, venture capital, private equity, business angels, and public funding.

Our results show that labor market performance, measured by employment and unemployment growth rates is related to access to finance, measure by an access to finance composite indicator where several access to finance channels are taken into account. These results suggest that the positive effects of improvements in access to finance on job creation and employment growth documented at firm's level are spread to magnitudes that refer to the whole economy. *Ceteris paribus*, better access to finance generates increases in employment growth rates and decreases in unemployment growth rates. Our results remain robust to various specifications and support previous findings from Belke, 2004 and Feldmann, 2014 showing access to finance as a determinant of labor market performance. Policies aiming at improving the business environment conditions for the SMEs are also able to improve labor market performance. Findings support the importance of the SBA framework in facilitating better and more inclusive labor markets in the EU28 area. Whether these policies should take the form of public financing schemes or subsidies, or they should provide benefits/tax exemptions to banks, venture capitalists or business angels should be the focus of future research.

References

- Acemoglu, D. (2001). Credit market imperfections and persistent unemployment. *European Economic Review*, 45 (4-6), 665-679.
- Arraiz, I., Melendez, M., Stucchi, R. (2014). Partial credit guarantees and firm performance: evidence from Colombia. *Small Business Economics*, 43 (3), 711-724.
- Belke, A., Fehn, R., Foster, N. (2003). Does venture capital investment spur employment growth? (Vienna Economics Papers). University of Vienna, Department of Economics.
- Belke, A., Fehn, R., Foster, N. (2004). Venture capital investment and labor market performance: a panel data analysis. In *Venture capital, entrepreneurship, and public policy* (p. 97–126). MIT Press.

- Benavente, J. M., Crespi, G., Maffoli, A. (2007, December). Public support to firm-level innovation: An evaluation of the fontec program (OVE Working Papers). Inter-American Development Bank, Office of Evaluation and Oversight (OVE).
- Bentolila, S., Jansen, M., Jiménez, G. (2017). When Credit Dries Up: Job Losses in the Great Recession. *Journal of the European Economic Association*, 16 (3), 650-695.
- Berton, F., Mocetti, S., Presbitero, A., Richiardi, M. (2018). Banks, firms and jobs. *World Development*, 31 (6), 2113-2156.
- Blanchard, O. J., Diamond, P. (1989). The beveridge curve. *Brookings Papers on Economic Activity*(1).
- Blanchard, O. J., Jaumotte, F., Loungani, P. (2014, Jan 31). Labor market policies and imf advice in advanced economies during the great recession. *IZA Journal of Labor Policy*, 3 (1), 2.
- Blasco, S., Pertold-Gebicka, B. (2013). Employment policies, hiring practices and firm performance. *Labour Economics*, 25 (C), 12-24.
- Boeri, T., Burda, M. C. (1996). Active labor market policies, job matching and the czech miracle. *European Economic Review*, 40 (3-5), 805-817.
- Boeri, T., Conde-Ruiz, J., Galasso, V. (2003). Protecting Against Labour Market Risk: Employment Protection or Unemployment Benefits? (Tech. Rep.).
- Boeri, T., Garibaldi, P., Moen, E. R. (2018). Financial constraints in search equilibrium: Mortensen Pissarides meet Holmstrom and Tirole. *Labour Economics*, 50, 144 - 155.
- Bonthuis, B., Jarvis, V., Vanhala, J. (2016). Shifts in euro area beveridge curves and their determinants. *IZA Journal of Labor Policy*.
- Borsi, M. T. (2018). Credit contractions and unemployment. *International Review of Economics Finance*, 58 , 573 - 593.
- Bouvet, F. (2012, September). The Beveridge curve in Europe: new evidence using national and regional data. *Applied Economics*, 44 (27), 3585-3604.
- Bova, E., Jalles, J. T., Kolerus, C. (2016, April). Shifting the Beveridge Curve; What Affects Labor Market Matching? (IMF Working Papers No. 16/93). International Monetary Fund.
- Brown, J. D., Earle, J. S. (2017). Finance and growth at the firm level:Evidence from SBA loans. *The Journal of Finance*, 72 (3), 1039-1080.
- Cingano, F., Leonardi, M., Messina, J., Pica, G. (2014, 08). The effects of employment protection legislation and financial market imperfections on investment: evidence from a firm-level panel of EU countries. *Economic Policy*, 25 (61), 117-163.

- Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - “Think Small First” - A “Small Business Act” for Europe {SEC(2008) 2101} {SEC(2008) 2102}.
- Darity, W. A., Goldsmith, A. H. (1996, March). Social psychology, unemployment and macroeco-nomics. *Journal of Economic Perspectives*, 10 (1), 121-140.
- Davila, A., Foster, G., Gupta, M. (2003, November). Venture capital financing and the growth of startup firms. *Journal of Business Venturing*, 18 (6), 689-708.
- European Commission, 2010. Europe 2020. A strategy for smart, sustainable and inclusive growth. [online]. Available at: <http://ec.europa.eu/archives/growthandjobs_2009/pdf/complet_en.pdf> [Accessed 14.Oct. 2019].
- European Commission, 2017. European Pillar of Social Rights. Publications Office of the European Union, Luxemburg.
- Feldmann, H. (2010, February). Venture Capital Availability and Labor Market Performance in Industrial Countries: Evidence Based on Survey Data. *Kyklos*, 63 (1), 23-54.
- Feldmann, H. (2013, October). Financial System Sophistication and Unemployment in Industrial Countries. *International Journal of Finance & Economics*, 18 (4), 319-338.
- Feldmann, H. (2014). Venture capital availability and labour market performance around the world. *Applied Economics*, 46 (1), 14-29.
- Fertig, M., M.Schmidt, C., Schneider, H. (2006). Active labor market policy in Germany—is there a successful policy strategy? *Regional Science and Urban Economics*, 36 (3), 399 - 430.
- Garín, J. (2015). Borrowing constraints, collateral fluctuations, and the labor market. *Journal of Economic Dynamics and Control*, 57 (C), 112-130.
- Gerlach-Kristen, P., O’Connell, B., O’Toole, C. (2015). Do Credit Constraints Affect SME Investment and Employment? *The Economic and Social Review*, 46 (1), 51-86.
- Ghisetti, C., de Pedraza Garcia, P. (2017, Jun). Monitoring SMEs’ performance in Europe: Methodological assessment of the sme scoreboard 2017 (Tech. Rep.).
- Honaker, J., King, G. (2010). What to do about missing values in time-series cross-section data. *American Journal of Political Science*, 54 (2), 561-581.
- Hujer, R., Maurer, K.-O., Wellner, M. (1997, April). Estimating the Effect of Training on Unemployment Duration in West Germany - A Discrete Hazard-Rate Model with Instrumental Variables (Econometrics). University Library of Munich, Germany.
- Kersten, R., Harms, J., Liket, K., Maas, K. (2017). Small Firms, large Impact? A systematic review of the SME Finance Literature. *World Development*, 97 (C), 330-348.

- Kraft, K. (1998). An evaluation of active and passive labour market policy. *Applied Economics*, 30 (6), 783-793.
- Nardo, M., Saisana, M., Saltelli, A., Tarantola, S., Hoffmann, A., Giovannini, E. (2008). Handbook on constructing composite indicators: Methodology and user guide. OECD publishing.
- Negri, J. A. D., Maffoli, A., Rodriguez, C. M., Vázquez, G. (2011, December). The Impact of Public Credit Programs on Brazilian Firms (SPD Working Papers No. 1103). Inter-American Development Bank, Office of Strategic Planning and Development Effectiveness (SPD).
- Papapetrou, E., Tsalaporta, P. (2017, July). Unemployment, Labour Market Institutions, Fiscal Imbalances and credit Constraints: New Evidence on an Active Debate. *Manchester School*, 85 (4), 466-490.
- Petrosky-Nadeau, N., Wasmer, E. (2013, January). The Cyclical Volatility of Labor Markets under Frictional Financial Markets. *American Economic Journal: Macroeconomics*, 5 (1), 193-221.
- Tobin J. (1995). Inflation and Unemployment. In: Estrin S., Marin A. (eds) *Essential Readings in Economics*. Palgrave, London
- Wasmer, E., Weil, P. (2004, September). The Macroeconomics of Labor and Credit Market Imperfections. *American Economic Review*, 94 (4), 944-963.

List of figures

Figure 1. The evolution of access to finance against the evolution of employment growth rate (left pane) and of unemployment growth rate (right pane) – EU28 average	16
---	----

List of tables

Table 1. List of of endogenous variables – description and summary statistics	12
Table 2. List of 'Access to Finance' components (not standardized) - description and summary statistics.....	13
Table 3. Regressions to explain the employment growth rate	18
Table 4. Regressions to explain the unemployment growth rate.....	19

GETTING IN TOUCH WITH THE EU

In person

All over the European Union there are hundreds of Europe Direct information centres. You can find the address of the centre nearest you at: https://europa.eu/european-union/contact_en

On the phone or by email

Europe Direct is a service that answers your questions about the European Union. You can contact this service:

- by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),
- at the following standard number: +32 22999696, or
- by electronic mail via: https://europa.eu/european-union/contact_en

FINDING INFORMATION ABOUT THE EU

Online

Information about the European Union in all the official languages of the EU is available on the Europa website at: https://europa.eu/european-union/index_en

EU publications

You can download or order free and priced EU publications from EU Bookshop at: <https://publications.europa.eu/en/publications>. Multiple copies of free publications may be obtained by contacting Europe Direct or your local information centre (see https://europa.eu/european-union/contact_en).

The European Commission's science and knowledge service

Joint Research Centre

JRC Mission

As the science and knowledge service of the European Commission, the Joint Research Centre's mission is to support EU policies with independent evidence throughout the whole policy cycle.



EU Science Hub
ec.europa.eu/jrc



@EU_ScienceHub



EU Science Hub - Joint Research Centre



EU Science, Research and Innovation



EU Science Hub



Publications Office
of the European Union

doi:10.2760/97382

ISBN 978-92-76-12575-4