

What Drives Small Business Crowdfunding? Impact of Macroeconomic and Financial Factors

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Abstract

This paper responds to the growing popularity of micro-finance platforms and the associated increasing volume of funding flowing through these platforms. This development also increases scientific attention to reward-based crowdfunding financing, an alternative to traditional bank loans and debt-based microloans. We choose a macroeconomic approach to look at the factors influencing the demand for crowdfunding funds in a particular country each year. Using a unique dataset extracted from the Crowdsurfer web service, we show that the volume of requested funds through reward-based crowdfunding projects in 27 OECD countries from 2009 to 2016 depends on the availability, effectiveness, and depth of the traditional banking sector institutions and financial markets. Our analysis also shows that macroeconomic variables such as GDP growth affect the demand for reward-based CF financing in the same way they influence demand for traditional bank loans. Finally, we suggest that the demand for reward-based CF loans is driven by similar motives as the demand for shadow banking loans in general.

1. Introduction

Crowdfunding (CF) is a relatively new practice of funding businesses by raising small amounts of money from a large number of contributors. During the last ten years, crowdfunding has become a popular form of financing business projects. It is worth mentioning that various CF platforms have raised more than 419 billion USD globally in 2017 (Ziegler et al., 2020). This suggests that entrepreneurs now have another opportunity and a place to raise funds for their business goals and projects. Not long ago, there were still individuals and companies that depended on traditional loans and traditional banks. However, in the modern era, great acceleration in technological development and revolutionary upheavals in social life have brought about change. With the development of crowdfunding and with the development of Fintech in general, entrepreneurs, innovators, and various

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enthusiasts no longer have to rely on their own financial resources, traditional banks, and other traditional forms of financing.

The rapid expansion of the Internet has enabled potential borrowers to meet their lenders and cooperate in various personal crowdfunding initiatives. With modern personal computers as intermediaries, the entire process of community funding has accelerated. Nowadays, more than 56% of the world's population has access to the Internet, while in Europe, it is more than 86%, and in North America, more than 89% (IWS, 2019). In principle, crowdfunding has become potentially available to almost everyone. Even if access to the Internet does not necessarily mean benefits from crowdfunding funding, the technologies used by Fintech are probably a promise of higher levels of financial inclusion in the future. There are reasons to expect that the volume of CF funding will grow. However, in the coming years, it will not replace the value of external financing conducted by banks in the form of loans and other forms of financing offered by banks. For comparison, we have already stated that globally CF platforms brokered transactions worth 419 billion USD in 2017, but the US banking sector alone provided a bank credit to the private non-financial sector of 10,072 billion USD in the same year (BIS, 2021). On the other hand, CCAF (2020) claims that excluding the Chinese market, the global alternative finance market volume grew by 48 % year-on-year in 2018 (47 % in the case of online alternative business funding for start-ups and SMEs).

The area of crowdfunding financing is rapidly evolving, and the development is like the development of other non-bank financial intermediaries. We can expect, as experience and professionalism of crowdfunding financing increase, crowdfunding platforms will evolve into more sophisticated intermediaries, which may offer other services beyond the facilitation of funding, such as due diligence, consulting, search for co-investors, or management of a co-investment fund (Helmer, 2011). This development is also associated with increasing scientific attention to crowdfunding financing, an alternative to traditional bank loans. Research in this area was particularly accentuated after the financial crisis of 2007-2008, when the traditional banking sector strongly reassessed its lending standards. A great deal of work has been devoted to the problem of raising money through crowdfunding platforms. Particularly, some papers deal with factors influencing the success of projects (e.g., Koch and Siering, 2015; Cordova et al., 2015; Lukkarinen et al., 2016; Janků and Kučerová, 2018; Petruzzelli et al., 2019), the behavior of investors (e.g., Harms, 2007; Bretschneider et al., 2014; or Shahab et al., 2019), funders' motivations (Herrero et al., 2020), legal regulation (e.g., Burkett, 2011; Cumming and Johan, 2013; or Hornuf and Schwienbacher, 2017), the geography of CF (e.g., Agrawal et al., 2011; or Mollick, 2014), or even gender differences in CF (Marom et al., 2016; Kleinert and Mochkabadi, 2021).

The research mentioned above is fundamental because crowdfunding financing gains a larger share of GDP in developed countries every year. Research devoted to determinants of successful crowdfunding campaigns or investors' behavior can save considerable economic resources for potential investors and CF creators. As far as we know, however, there is no empirical literature on the factors that lead creators to start new reward-based crowdfunding projects. What are the main factors of demand for reward-based crowdfunding financing? This important question remains unresolved.

Frydrych et al. (2014) mention that lending-based models of crowdfunding rely on a relatively traditional investment mechanism. Such a mechanism links founders and supporters in a debtor (borrower) and lender relationship. The lending mechanism of CF is essentially simple micro-financed loans built on the relationship between individual lenders and borrowers. Others, Bruton et al. (2015) or Duarte et al. (2012), mention that these new alternative forms of financing, including micro-lending, crowdfunding, or peer-to-peer financing, can bridge the gap between supply and demand for entrepreneurial finance. We, however, investigate reward-based crowdfunding projects. This type of financing is focused also on start-ups that do not qualify for traditional small business loans but have interesting and vital projects or are testing a market. Founders of the businesses post their projects on a crowdfunding portal, targeting a certain amount of capital to be raised. In return for donations from contributors, businesses provide rewards (tangible items or services) or other types of incentives for participating. The crucial question is whether the demand for reward-based financing differs from traditional demand for bank financing and whether the reward-based CF (with all its specifics) responds to the real economy and the development of the banking sector similarly to other non-bank financial intermediaries. Thanks to previous research, we already know that other non-bank financial intermediaries react to the development of the banking sector (Acharya et al. 2013b), and often, for example, substantial regulatory arbitrage occurs (Gorton and Metrick, 2011; Buchak, 2018).

In this paper, we calculate the amount of funds required by reward-based CF project creators through crowdfunding platforms as the sum of all projects launched in a particular country in a given period (year), multiplied by their respective goal amounts. We use a unique dataset on CF campaigns extracted from the Crowdsurfer web service. Data covers the period from 2009 to 2016 for developed (OECD) countries. Based on the above-mentioned data and current CF literature, we build an empirical model to explain the factors involved in the decision to apply for a given amount of money through CF platforms. We choose a principally macroeconomic approach to look at the factors influencing the demand for funds in a particular country in a given year.

Our preferred method of estimation is an Ordinary Least Squares (OLS) regression with Fixed Effects (FE) and a Within-Group estimator. Following similar empirical studies on panel data, we use FE regressions to control for further country-specific heterogeneity. Moreover, we use robust standard errors (White period robust covariance) in all our regressions, since residuals of most of the estimated models seem to be auto-correlated.

Our paper borrows analytical tools from the literature that studies macroeconomic factors influencing credit demand (such as real GDP or interest rates); see Altavilla et al. (2021), Calza et al. (2003), Bassett et al. (2014), or Del Giovane et al. (2011). Our paper is related to a rapidly growing literature on the factors determining the behavior of investors and creators of CF projects. This literature investigates non-macroeconomic factors that can affect money demand through CF platforms (such as personal characteristics of project founders or availability of classical banking financing) and focuses especially on lending-based crowdfunding (see Herzenstein et al., 2011; Duarte et al., 2012; or Martínez-Climent et al., 2018). We also refer to the literature examining other non-bank financial

intermediaries and shadow banking (Pozsar et al., 2010; Adrian and Ashcraft, 2012 or Irani et al. 2021).

We add some new insights to the existing literature on reward-based crowdfunding. We show that even reward-based crowdfunding behaves similarly to other non-bank financial intermediaries. This type of CF reacts to the real economy as the demand for reward-based crowdfunding acts pro-cyclically and it is growing with the higher growth rate of GDP per capita. It also responds with a decline to the growing capital of banks (which have been growing in recent years in line with higher capital requirements), responds positively to the growth of household credit and significantly decreases with the growth of the financial development of the given market (availability and efficiency of traditional banks and financial markets). We then illustrate that crowdfunding projects can also create a competitive environment for the banking sector. Higher interest rates and shortage of bank branches increase the amount of newly created CF projects and the demand for funds through crowdfunding platforms. Finally, we also show that the volume of required CF funds responds counter-cyclically to changes in the unemployment rate. Although reward-based CF currently still "employs" only a small part of the population, it may become an important sector that will help smooth out the cyclical changes of the economy and unemployment.

Let us also point out here that due to the limited sample, our analysis does not allow us to investigate in more detail or to extend the analysis to other years when there is much more data on both the non-banks (or shadow banks) side and the crowdfunding side in particular. Thus, we consider the relationships we find more as associations between variables and do not always attribute a causal relationship to them, nor do we assess them quantitatively.

The outline of the paper is as follows: In section 2, we describe the general theoretical framework and provide broad literature review. Section 3 presents our empirical model, methods, and data. Section 4 illustrates and discusses results of estimation, and contains further extensions of our model and robustness analysis. Section 5 concludes.

2. Theoretical Background of Crowdfunding Investment

Crowdfunding draws inspiration from microfinance but represents its unique category of fundraising. There are four basic types of crowdfunding platforms or models: (1) the donation model (a donor contract without material reward), (2) the reward model (a purchase contract for some type of product or service), (3) the debt-based model (a credit contract, where the credit is being repaid), (4) the equity model (a shareholding contract, where equity-like instruments are shared in the project).

The lack of access to traditional capital sources after the recent financial crisis of 2008-2009 has driven the demand for alternative sources of financing for small businesses and start-ups. Since then, crowdfunding has become an increasingly important source of external financing. Concerning funding, firms usually prefer the least expensive ways of financing their business. Myers (1984) describes the pecking order framework, in which firms prefer internal financing to external, and debt to equity when issuing securities. Vanacker and Manigart (2010)

claim the pecking order theory predicts the existence of a financing hierarchy, and firms avoid the higher cost of external financing if possible. Cosh et al. (2009) provide evidence of strong support for this traditional theory that predicts that firms prefer to finance new projects internally prior to seeking external capital. Bruton et al. (2015) also claim that entrepreneurs prefer those sources of finance that involve giving up less control and require lower servicing costs. Therefore, entrepreneurs prefer personal financial resources, followed by soft funding sources from family and friends, and often pursue external sources last.

Fraser et al. (2015) state that borrowers may be skewed towards other than classical external financing, not because it is harder to obtain the financing, but because it is perceived to be harder. They point out that perceptions that the supply of financing is poor may discourage and reliance on internal financing. Bruton et al. (2015) add that when entrepreneurs perceive that the supply of some types of financing is poor, they may become discouraged from seeking external financing altogether. As a result, entrepreneurs may perceive those new alternative forms of financing offer them greater access than the traditional ones. This should also generate demand for reward-based CF funding.

In the financial markets, the demand side consists of individual borrowers trying to find funding sources. Calza et al. (2003) show that real loans are positively related to real GDP and negatively related to real short-term and long-term interest rates in the long-run. The authors add that most studies on the factors influencing credit demand include an economic activity variable (such as industrial production or real GDP) and financing costs (interest rates) as the main determinants. Basset et al. (2014) or Del Giovane et al. (2011), however, mention that it is challenging to identify macroeconomic effects of credit shocks because many of the factors that affect credit demand also affect credit supply (normally, negative macroeconomic shocks cause tightening of the bank supply). It is also a rather empirical question whether those macroeconomic factors affect the demand for traditional loans and the demand for CF finance equally.

In the empirical literature, we can usually find three macroeconomic factors determining credit demand. The first is GDP (usually PPP-based per capita), which is seen as a budget constraint. Generally, it is expected that higher GDP per capita leads to growth of demand for loans. Schadler et al. (2004) claim an almost unitary correlation between GDP per capita and demand for credit. Nevertheless, Kiss et al. (2006) also provide some theoretical arguments for a negative relationship between the growth of GDP and demand for credit (via traditional loans). They claim that higher productivity and profits (when the economy is growing) reduce the need for external funding, while households might try to smooth consumption by increasing their debt level (in times of crisis).

The second determinant is an interest rate. Authors such as Backé et al. (2005), Calza et al. (2003), Calza et al. (2003a), Hofmann (2001), Kiss et al. (2006), or Schadler et al. (2004) use different interest rates (short-term or long-term, real or nominal) as a proxy for the price of traditional loans. Since we are dealing with the demand for CF funding, we do not consider the interest rate to be the price of a CF loan, but the price of a substitute – a traditional loan. However, the literature on shadow banking and non-bank financial intermediaries considers both possible

reactions, positive and negative, of non-bank loans to changes in interest rates. See the following subchapter 2.1 for more information.

The third factor explaining the demand for credit is inflation. Most authors believe that higher inflation leads to a decrease in credit demand. Kiss et al. (2006) claim that high inflation impacts credit constraints, especially in the case of long-term loans. However, empirical evidence provides rather mixed results (see Backé et al., 2005, and Kiss et al., 2006). We will further expect that high inflation decreases the purchasing power of money; therefore, creators of reward-based projects ask for more credit via CF to fund their business.

These “traditional” factors influencing the demand for credit can partly explain the demand for CF financing, as suggested above. We, however, have to investigate other, more nuanced factors, given that we are dealing with reward-based crowdfunding. Breedon (2012) claims that the recent development of crowdfunding may help fill gaps in the supply of bank funding. Although entrepreneurs have more financing options in developed economies, high-risk entrepreneurial ventures still face an uphill battle in their search for capital. Bruton et al. (2015) add that when an entrepreneur initially fails to get a loan from traditional banks, they eventually turn their attention to crowdfunding financing. The authors claim that traditional investors may consider the new products too risky, while reward-based CF-platform investors are willing to offer their funds because their investment is rather small. This suggests that the attractiveness and availability of traditional bank loans can play a role in the demand for loans through CF platforms. That is why we are also trying to answer two questions that are closely linked. First, does the demand for reward-based CF financing response similarly to the demand for other non-bank finances? Second, does this demand respond to the efficiency, availability, and credibility of the banking sector? The following subchapter shows the empirical base of these questions and helps us to compile a suitable empirical model.¹

2.1 Reward Based CF as a Non-Bank Financial Intermediary

We have not found any literature explaining the factors influencing the demand for reward-based crowdfunding financing. Therefore, as mentioned above, we combine “traditional” macroeconomic determinants of the demand for credit with determinants of the quality of banks and the banking sector. However, we can rely on literature that is somewhat broader and deals with various types of non-bank financial intermediaries. Our research focuses on non-banking intermediation and

¹ Besides the factors of banking sector quality, some studies focus more on the microeconomic characteristics of borrowers, especially on lending-based crowdfunding. Duarte et al. (2012) or Herzenstein et al. (2011) address the question of the role of appearances in peer-to-peer lending. Duarte et al. (2012) find that borrowers whose facial features appear more trustworthy have a higher probability of having their loans funded. Such borrowers also tend to have better credit scores and default likelihood assessments. Others examine the role of borrower personal claims in influencing lenders' decision-making regarding personal loans. Herzenstein et al. (2011) argue that a higher number of positive characteristics claimed by borrowers leads to higher loan funding. Similar to Duarte et al. (2012), they find that claims of being trustworthy or successful are associated with increased loan funding. Let us add that we do not have data on the characteristics of individual lenders, and therefore, we choose to analyze macroeconomic factors.

the potential factors behind the rise of this type of financial intermediation in recent years. Non-bank intermediaries are called a shadow banking sector (shadow banks) by a substantial part of the recent papers on non-bank financial intermediaries (Noeth and Sengupta, 2011; Kodres, 2013; Gennaioli et al., 2013, or Adrian and Ashcraft, 2016).

The current literature offers various definitions of shadow banking (Pozsar et al., 2010 or Claessens et al., 2012). In brief, shadow banks are financial intermediaries that conduct maturity, credit, and liquidity transformations, while not having access to central bank liquidity or public sector guarantees, or even more simply, they are financial intermediaries that are not regular banks. Crowdfunding is an integral part of shadow banking and some authors see it as an important part of fintech and collaborative finance (Macchiavello, 2017; Cai, 2018) and some as a deeper sign of financial inclusion (Jenik et al., 2017; Muneeza et al., 2018).²

Non-bank intermediaries differ from banking intermediaries in many respects, mainly in that they are often not subject to strict regulation (Adrian and Ashcraft, 2012; Huang, 2018). In our paper, due to the lack of data, we deal only with reward-based crowdfunding, which has many specifics. However, crowdfunding in general, most typically debt-based crowdfunding, is a typical representative of non-bank financial intermediaries.³ It is worth noting that in addition to the benefits that these forms of financing offer, there are also many neuralgic points. Those specific forms of market-based finance are less resilient due to maturity mismatches, credit enhancement, risk of liquidity shortages or missing access to public backstops (Luttrell, 2012; Claessens et al., 2012). As for crowdfunding, it also meets some of the potential risks listed above and several papers address systemic risk stemming from very large crowdfunding platforms (Zetzsche, Preiner, 2018).

Hodula et al. (2020), together with several strands of literature (Gorton and Metrick, 2011; Acharya et al., 2013a; Sunderam, 2012; Demyanyk and Loutskina, 2016 or Buchak, 2018), find out that EU non-bank financial intermediation is highly procyclical and positively related to increasing demand of long-term institutional investors, more stringent capital regulation, faster financial development and to other factors. They find evidence that shadow-banking entities can act as both complements and substitutes to traditional banking. Literature also mentions that

² Subjects in the shadow market are, however, also hedge funds, direct investment funds, investment arms of conventional banks, securities brokers and dealers, money market funds, issuers against securitized assets, or special purpose vehicles (SPV). It can also include insurers and reinsurers (Pozsar et al., 2010). Importantly, these non-bank intermediaries are often not sufficiently separated from "classic" banks. Some of their chain operations may involve commercial banks and other institutions from the conventional sector that sponsor shadow institutions and use them as a source of liquidity (IMF, 2017).

³ If we had more complete and granular data available, it would be useful to pay close attention to distinguishing CF types in the empirical analysis. In considering the behavior of both founders and donors, it is crucial to distinguish among the various types of crowdfunding. In donation-based projects, which lack the prospect of earning revenue, the donors only contribute for altruistic reasons and disregard concerns of return on investment. Comparing debt-based and equity-based projects, donors are interested in the creator's solvency in the former, whereas in the latter they are mainly interested in the future development of the project.

regulatory requirements or high information costs encourage the rise of alternatives to traditional bank loans (Bernanke and Lown, 1991; Duca, 1992; Edwards and Mishkin, 1995). In general, it is usually referred to as regulatory arbitrage (Gorton and Metrick, 2011; Buchak, 2018). However, other factors such as insufficient bank branch network development (Acharya et al. 2013a), or other central government measures (Acharya et al., 2020) are behind the growth of non-bank financial intermediaries.

If we understand reward-based CF as a part of non-bank financial intermediation, it is also necessary to mention how the applied monetary policy reflects in this type of intermediation. Goda et al. (2013) or Lysandrou (2014) suggest that investors in reaction to low interest rates will „search for yield“. The lower yields associated with lower policy rates and lower market interest rates motivate investors to search for higher returns in riskier places. Other studies, on the other hand, claim that the relationship between monetary policy rates and CF financing can be positive (Loutskina, 2011; Den Haan and Sterk, 2011; Nelson et al., 2018). Nelson et al. (2018) mention so-called “waterbed effect” of monetary policy rates, meaning that non-bank intermediaries’ assets tend to expand rather than contract in response to the negative monetary policy shock. One possible explanation of this phenomenon on the demand side is that higher market rates increase repayment costs on existing loan contracts, which might increase the motivation to refinance bank loans within the shadow banking system (Hodula et al., 2020).

3. Methods and Data

3.1 Data

We analyze reward-based crowdfunding campaigns using a rich and unique dataset extracted from the Crowdsurfer web service. The dataset includes information on 127,149 reward-based crowdfunding campaigns from 45 platforms including Kickstarter (47.89% of the sample), Indiegogo (25.30%), Crowdfunder UK (13.13%), RocketHub (1.49%), and others, in 27 OECD countries (AT; AU; BE; CA; CL; CZ; DE; DK; ES; FI; FR; GB; GR; HU; CH; IE; IT; JP; KR; MX; NL; NO; NZ; PL; PT; SE; US). The dataset, however, does not contain data for all years for some countries, see Appendix Table A4.

The data on the crowdfunding campaigns was scraped using algorithms used by the Crowdsurfer web service. We only had limited information from these crowdfunding campaigns, but we were able to determine how much funds each campaign was requesting through the platform. We then calculated the total amount of funds requested through these reward-based funding campaigns for each year from 2009 to 2016 as the sum of all projects launched in a particular country in each period (year), multiplied by their respective goal amounts (requested funds). Our dependent variable, required finance (RF_{it}), is then computed as the annual percentage change in this amount of money demanded.

Due to the limited sample of countries and the limited time period over which data were collected, we can theoretically construct a data matrix that contains 216 observations. However, data from crowdfunding campaigns were not available for every country in every year (see Appendix Table A4), and therefore none of the

regressions reach the full number of observations. In addition to data from the Crowdsurfer web service, we collected data for the data matrix from the World Bank (WB) database, OECD database, BIS database, IMF database, and the Financial Development Index (FDI) database by Svirydzenka (2016). The relatively small number of observations is a limitation of our analysis. Data sources and percentage coverage of observations are depicted in Appendix Table A1. The correlation matrix of explanatory variables as well as their descriptive statistics are in Appendix Table A2.

We have tested for stationarity of all variables included. Since our original variable of required finance through CF platforms was non-stationary, we use the growth rates of this variable as stated above. Let us mention that we work with a very short panel ($T = 8$) and unit root tests may not be completely reliable and probably not necessary with such a short sample (see e.g. Baltagi, 2008).

3.2 Empirical Model and Description of Variables

Our estimation approach is Ordinary Least Squares (OLS) regression with Fixed Effects (FE). Following similar empirical studies on panel data, we use FE regressions to control for further country-specific heterogeneity. Moreover, we use robust standard errors (White period robust covariance) in all our regressions, since residuals of most of the estimated models seem to be auto-correlated. Regarding time-specific factors, our analysis is limited by the low number of observations. Thus, we assume that these factors may not be relevant in a short time period (8 observations over time). If we were to include time dummy variables for all time periods, the degrees of freedom would be significantly reduced. However, in the robustness analysis, we use a lagged unemployment variable to check for at least some time-related changes.

3.2.1 Baseline Model

First, we use a basic empirical model similar to that of Calza et al. (2003), Calza et al. (2003a), Backé et al. (2005), and Kiss et al. (2006). Nevertheless, we offer some adjustments to account for the fact that we are dealing with reward-based crowdfunding rather than traditional loans. As discussed above, we include GDP per capita growth (we expect a positive effect), interest rates (where we expect a positive effect, since interest rates measure the prices of traditional loans), and the inflation rate (with ambiguous effect).

We therefore specify our baseline model as follows:

$$RF_{it} = \alpha \Delta GDP_PC_{it} + \beta INFL_{it} + \gamma INTRATE_{it} + \mu_i + \varepsilon_{it} \quad (1)$$

where the dependent variable, RF_{it} , is the annual percentage change in the funding requested via reward-based CF platforms, ΔGDP_PC_{it} is the real GDP per capita annual rate of change, $INFL_{it}$ is inflation measured by the consumer price index, $INTRATE_{it}$ denotes interest rates on 10-year government bonds.

Data on ΔGDP_PC_{it} are in percentages and calculated as the growth rate from the data on GDP per capita in constant (2010) US dollars. We presume that a higher standard of living (the growth of ΔGDP_PC_{it}) will lead to a higher demand for money. When the standard of living is growing, people are more likely to possess

information about CF projects and they expect higher demand for their products. They are thus willing to create new reward-based projects.

Inflation, $INFL_{it}$, is measured by the consumer price index (CPI). Since inflation decreases the purchasing power of money, we expect that a higher rate of inflation will lead to more investment activity, including investment into CF projects. But we can also find a reasonable explanation for the opposite relationship. If the “investment” in such projects falls under household consumption rather than the investment category, people will also save more and decrease their demand for this “promise of reward”. Therefore, we expect that the variable $INFL_{it}$ will have either a positive or a negative effect on total funding wanted from CF projects.

We expect that higher interest rates ($INTRATE_{it}$) will lead to higher demand for crowdfunding projects. Higher interest rates increase costs of traditional loans, and therefore economic subjects are motivated to start new projects through CF platforms. Let us however add that we must generally consider both directions of impact of interest rates, positive and negative, based on the literature on shadow-banking (see above). Interest rates from 10-year government bonds (EMU convergence criterion bond yields) are often considered to be a measure of the price of money in an economy. One may argue that using money market rates is more convenient, because they do not include a risk premium. Nevertheless, since we use data for 16 countries of the euro area, we cannot use this data.⁴

3.2.2 Model with Extensions

We also consider the competitive environment of the banking sector in the extended model. We assume that more available, efficient, and trustworthy banks will be a strong competitor of funding through crowdfunding platforms. At the same time, we are adapting our baseline model to the fact that even reward-based CF can be understood as a part of shadow banking, i.e., as a non-bank financial intermediary.

In terms of our enlarged model, it is in line with the findings of the literature mentioned below:

$$RF_{it} = \alpha \Delta GDP_{PC_{it}} + \beta INFL_{it} + \gamma INTRATE_{it} + \delta FDI_{it} + \theta CREDIT_HH_{it} + \mu_i + \varepsilon_{it} \quad (2)$$

We add two variables (FDI and $CREDIT_HH$) to equation 1. First, we include the FDI index, which represents the country's level of financial development. The financial development index (Svirydzenka, 2016) should

⁴ Concerning the use of the nominal versus the real interest rate, Calza et al. (2003), Hofmann (2001), or Schadler et al. (2004) use (either long- or short-term) real interest rates. On the other hand, Backé et al. (2005) or Calza (2003a) use both the nominal interest rate and inflation as two separate variables. Although we realize that economic decisions on investment and consumption are based on real – rather than nominal – interest rates (even though results provided by Kiss et al., 2006, suggest that it is the nominal interest rate that truly matters), we choose to use nominal interest rates and inflation separately. This is because the effect of inflation is not only to decrease nominal interest rates, but also to decrease the purchasing power of money. Moreover, with this approach we do not have to rely on estimation of expected inflation.

overcome the shortcomings of single indicators as proxies for financial development. The financial development index (FDI) summarizes how developed financial institutions and financial markets are in terms of their depth, access, and efficiency. FDI distinguishes between the development of financial institutions and financial markets, and for each of these subcategories is further divided into the above-mentioned depth, access, and efficiency sub-indexes. These sub-indices are called FID, FIA, FIE, FMD, FMA, and FME, where the letters I and M denote institutions and markets, and the letters D, A, and E denote depth, access, and efficiency. We are primarily interested in the subcategory dedicated to financial institutions. The FID (Financial Institutions Depth) subindex mainly expresses assets (and credit) available to the private sector. The FIA (Financial Institutions Access) subindex mainly expresses the availability of traditional banking services (number of branches and ATMs per capita). The FIE (Financial Institutions Efficiency) subindex then mainly includes indicators of the efficiency of the banking sector such as ROA, ROE, or net interest margin⁵.

Hodula et al (2020) show that while FDI increases shadow banking (defined as the sum of financial corporations other than MFIs), it also reduces the volume of shadow banking loans (defined as the sum of loans granted by OFIs and IFs). Therefore, we assume that the development of the traditional financial sector and its institutions (FDI and its subindexes) should reduce rather than increase the volume of loans (in our case, finance for reward-based CF projects) that non-bank CF intermediaries receive.

On the supply side of crowdfunding, we look mainly at households. It is precisely households that spend money in the reward-based crowdfunding. We look at credit available to households (credit to GDP ratio) and assume that higher credit to GDP (*CREDIT_HH*) should improve the possibilities of financing CF projects. However, it should be added that higher household debt may also mean that highly indebted households are more likely to cut back on some crowdfunding spending as excess spending. This would imply a negative relationship.

Lombardi (2017) claims that household debt boosts GDP growth in the short run, mostly within one year. By contrast, a one percentage point increase in the household debt-to-GDP ratio tends to lower GDP growth in the long run by 0.1 percentage point. Thus, higher credit to GDP of households may actually increase their supply of CF financing. However, this is probably only true up to a certain level of debt. As Lombardi (2017) add the negative long-run effects on GDP growth only matter as the household debt-to-GDP ratio exceeds 70%. Also, Czalleng (2020) provides empirical evidence that funding liquidity drives market liquidity. A priori, we are not sure of the effect, which can be both positive and negative.

As an additional controls and for robustness check purposes, we also use variables *UNEM*, Δ *STOCK*, Δ *BRANCH* and Δ *CA* in robustness checks section; see subchapter 4.2 for more details.

⁵ The FMD, FMA and FME subindexes similarly use data on depth, access, and efficiency, but on the financial markets. Detailed description of all subindexes and categories and their composition is provided by Sviryzdenka (2016), Table 1 and Table 2.

4. Results

This section presents our empirical results regarding the determinants of the money amounts required through reward-based crowdfunding platforms. In each specification, we report estimates for the 2009-2016 period for most OECD countries. Section 4.1 presents results of our baseline model (1) and the model with extensions (2) and Section 4.2 presents robustness checks.

4.1 Results of the Baseline Models

The first regression (Reg. 1) in Table 1 reports effects of macroeconomic control variables on funds required through crowdfunding for the period 2009-2016. It turns out that only the interest rate is significant with the expected sign and remains significant in most of the other regressions. Other variables are slightly non-significant, but some become significant the moment we extend the model with the variables of primary interest.

We then add variables dealing with financial development (*FDI*) and household credit (*CREDIT_HH*) in Reg. 2. The variables approximating for the financial development and households' credit are statistically significant with expected signs. Moreover, the inclusion of these variables improves the overall results of the models. Some of the insignificant controls are now significant and the adjusted R^2 of all subsequent models increases. As expected, the development of the traditional financial sector and its institutions (*FDI*) reduces the volume of requested CF funds. The results also show that higher credit to household GDP increases requested funds from CF crowdfunding. This may be because households have expanded financing options as their credit grows and therefore increase the demand for crowdfunding. As mentioned in the previous section, it is households that are the main investors in reward-based crowdfunding. However, as we noted in the methodology section, increased household debt could also lead to the opposite effect, a decline in demand for crowdfunding. Therefore, an alternative explanation for the positive effect could be that both credit to households and demand for CF funds are simply part of the overall demand for credit. In that case, credit to households would control for the general cyclical pattern of credit demand. Moreover, the coefficients of this variable are on the borderline of statistical significance and its significance was not confirmed by the robustness check (see below).

4.2 Extensions and Robustness Checks

When checking the robustness of the results, we first focus on the subcategories of FDI indexes, institutions *FII* and markets *FMI* (reg. 3) and on also to its more detailed components (*FIA, FID, FIE*) and (*FMA, FMD, FME*) in regression 4. Both main subcategories of FDI show the same sign as the overall index, the higher development of financial institutions and the higher development of financial markets leads to a decline in demand for reward-based funds. As they are indices, they are in principle directly comparable. Thus, we can state that the quality of institutions contributes significantly more to the decline in demand for CF funding than the quality of financial markets (significance verified by Wald test of

beta coefficients). Some of the coefficients of the more detailed components also show the same and statistically significant results.

Table 1 Determinants of Requested Reward-Based CF Funds, 27 OECD Countries 2009-2016, Baseline Model, Model with Extensions and Robustness Checks

Dependent variable: RF	Reg. 1	Reg. 2	Reg. 3	Reg. 4	Reg. 5
ΔGDP_PC	35.132 (26.698)	68.865* (37.727)	73.884** (32.888)	130.672*** (47.422)	83.634** (35.420)
<i>INFL</i>	-70.521 (44.912)	-155.552* (85.213)	-145.739 (99.127)	-155.550* (80.655)	-100.525 (66.921)
<i>INTRATE</i>	105.926** (48.456)	139.920** (63.934)	177.358** (71.707)	242.318*** (83.065)	119.165 (89.551)
<i>FDI</i>		-126.683*** (30.361)			
<i>FII</i>			-108.020*** (21.980)		-83.513** (35.53)
<i>FIA</i>				-67.473** (33.598)	
<i>FID</i>				-11.534 (24.979)	
<i>FIE</i>				-48.759*** (9.593)	
<i>FMI</i>			-32.705* (18.822)	-32.407* (19.291)	
<i>FMA</i>					-4.117 (19.666)
<i>FMD</i>					-8.868 (12.990)
<i>FME</i>					-13.790** (6.372)
<i>CREDIT_HH</i>		20.545* (10.992)	19.682** (9.544)	25.725* (14.159)	23.490* (13.498)
<i>CONSTANT</i>	1758.235*** (11.693)	-9587.656*** (2127.274)	10711.600*** (2047.159)	9975.412*** (3153.664)	8352.514*** (2850.190)
<i>Cross-section</i>	27	27	27	27	27
<i>Periods</i>	8	8	8	8	8
<i>Observations</i>	160	160	160	160	160
<i>Adj. R2</i>	0.200	0.283	0.271	0.298	0.228

Notes: Dependent variable is required funds (RF). FE OLS with robust standard errors (White period robust covariance) is used in all models. Standard errors in parentheses. ***, **, * represent 1%, 5%, and 10% significance level.

Table 2 provides other extensions and robustness checks. As a first extension, we added a variable that represents the real economy, namely the unemployment rate (see reg. a1 – a3). A variable $UNEM_{it}$, refers to the share of the labor force without work but available for and seeking employment. We presume that the unemployed are less likely to secure a bank loan. A possible solution for the unemployed is to start a reward-based crowdfunding project. The advantage of reward-based projects is that founders do not need large “starting” capital. Their potential contributors, unlike the banks, are not interested in the founder’s income (they expect future benefits, rewards, from the project instead). Based on this

microeconomic intuition, we claim that the growth of the variable $UNEM_{it}$ will cause an increase in funding wanted as at least some of the unemployed (those with the necessary knowledge and skills) can apply for CF.

Variable $UNEM$ gives us an interesting picture of CF project creators' behavior. This control variable suggests that higher unemployment is associated with a greater amount of newly created reward-based CF projects, presumably as the unemployed look for alternative forms of livelihood. We use also lagged unemployment rate (Reg. a4) to avoid possible causal inference problems with the link between CF and the real economy.⁶ Note that the lagged unemployment rate continues to enter our regressions significantly, suggesting a time lag in establishing new CF projects and requesting money through CF platforms. Let us also add that replacing the variable $UNEM$ by its lag does not compromise other results. Therefore, the model seems to be robust to time-related changes.

Table 2 Determinants of Requested Reward-Based CF Funds, 27 OECD Countries 2009-2016, Robustness Checks

<i>Dependent variable: RF</i>	<i>Reg. a1</i>	<i>Reg. a2</i>	<i>Reg. a3</i>	<i>Reg. a4</i>
ΔGDP_PC	75.559** (38.304)	110.365*** (40.859)	174.784** (69.264)	223.755*** (78.858)
$INFL$	-155.734* (80.709)	-208.911** (91.206)	-409.641*** (110.261)	-574.959*** (101.895)
$INTRATE$	112.669* (61.925)	189.293* (105.695)	477.874*** (137.970)	691.493*** (141.901)
FDI	-93.942*** (34.304)			
$CREDIT_HH$	3.934 13.513			
$UNEM$	110.395* (62.733)	183.051*** (57.401)	194.170*** (60.905)	
$UNEM(-1)$				366.272*** (86.935)
$\Delta STOCK$		-9.170** (3.868)	-7.378** (3.514)	-7.514** (3.555)
$\Delta BRANCH$		-25.733 (18.544)	-39.115* (20.179)	-54.294*** (17.475)
ΔCA			-24.489*** (8.796)	-14.539 (9.121)
$CONSTANT$	7670.720*** (2480.504)	444.203 (624.337)	-467.902 (691.677)	-3042.27*** (999.646)
<i>Cross-section</i>	27	27	22	22
<i>Periods</i>	8	8	8	8
<i>Observations</i>	157	137	112	111
<i>Adj. R²</i>	0.266	0.302	0.422	0.550

Notes: Dependent variable is required funds (RF). FE OLS with robust standard errors (White period robust covariance) is used in all models. Standard errors in parentheses. ***, **, * represent 1%, 5%, and 10% significance level.

⁶ The variable $UNEM(-1)$ is in fact significant and positively signed in all of our regressions (from Reg. a1 to Reg. a4) if added instead of non-lagged $UNEM$. These results are available upon request.

A second extension and robustness check is replacing FDI with other indicators of the effectiveness, availability, and trustworthiness of the banking sector and financial markets. The FDI index may be too aggregated for our purposes and hides other important relationships between the banking sector and financial markets on the one side and reward-based CF on the other. According to Rossi (2014), the choice of financing is driven by the costs of the sources, which are primarily determined by the costs of solving the asymmetric information problem and the expected costs associated with non-payment of debt. He suggests three main forms of financing: bank loans, the stock market, and venture capital. Since it is unlikely that CF creators would have access to venture capital, we focus on the remaining two possibilities.

Thus, at this point, we assume that those who solicit funds through CFs can raise funds for their business also in alternative ways, such as investing in the stock markets. However, the question is the degree of substitutability of these two ways of raising funds. Therefore, one may also consider that a growing stock market may attract a supply of household funds that will invest in stocks instead of crowdfunding. Either way, we would expect a negative sign between these two variables. Indeed, Reg. a2 – a4 show a negative relationship between the requested funds and stock prices. An increasing value of stocks to GDP ratio decreases the amount of money requested through CF platforms, meaning that potential investors in CF projects will probably prefer standard investments over reward-based crowdfunding. This also implies that contributors will spend more money on CF campaigns in countries with a lower value of stocks to GDP ratio.

Beck et al. (2007) measure financial sector outreach and investigate its determinants. They use determinants such as the number of bank branches per 1,000 km², number of bank ATMs per 100,000 people, number of bank ATMs per 1,000 km², or number of loans per 1,000 people. We follow their approach, and because we consider CF platforms as an alternative to traditional loans, we need to deal with both qualitative and quantitative features of the banking industry. The first variable is linked with the number of branches of commercial banks ($\Delta BRANCH_{it}$). These are retail locations of resident commercial banks and other resident banks that function as commercial banks that provide financial services to customers and are physically separated from the main office, but not organized as legally separated subsidiaries. We compute the variable $\Delta BRANCH_{it}$ as the annual percentage change in the number of branches per square kilometer (km²). Reg. a2 – a4 then show that a lower number of bank branches per km² increases the amount of requested reward-based CF funds as expected.

It is most likely the regressions a1 and a3 that we consider crucial in our robustness tests. They show that the FDI composite indicator can be replaced by more specific indicators without somehow compromising the basic model outputs and the influence of the control variables. While the influence of the control variables is quite quantitatively variable, this is due to the large variability of the dependent variable, with percentage changes in the required funds changing by leaps and bounds from year to year (also due to the overall low volume of these funds). In addition, it should be taken into account that regression a3 contains a few dozen fewer observations compared to regression a1, due to the unavailability of some explanatory variables for some countries.

We also focus on the other sides of availability and efficiency of the banking financing. The variable ΔCA_{it} is the annual percentage change in average capital to assets ratio in each country, i.e., the ratio of bank capital and reserves to total assets. Capital includes tier 1 capital (paid-up shares and common stock) and total regulatory capital (tier 2 and tier 3 capital). Total assets include all nonfinancial and financial assets. In the years analyzed, the capital ratio grew largely due to stricter capital requirements. The growth in the capital ratio may reflect tighter capital requirements and banks may therefore restrict commercial lending and demand for funds may shift to crowdfunding. On the other hand, increasing capital ratios may mean that the banking sector is stabilizing after the financial crisis and with increased stability comes increased demand for lending through traditional banks. The growing capital to asset ratio may thus reflect greater security and credibility (trustworthiness) in the banking sector, which in turn could reduce request for funding through CF. The results of regression 3 would indeed suggest this effect but are not confirmed in regression 4. Let us state here that examining the relationship between capital ratios (and possibly capital requirements) goes far beyond the scope of this paper. The relationship between macroprudential policies (including capital requirements) and investment in shadow banking is currently rather unclear and the literature on it is still emerging (see Kim et al. 2018; Mazelis, 2020; Irani et al., 2021).

The robustness check also shows that the variable (*CREDIT_HH*) is no longer statistically significant. Both credit to GDP and demand on CF are credit demand, so they behave similarly and the positive effect in the Baseline model could be spurious. The influence of credit available to households on reward-based CF is thus at least questionable.

5. Conclusions and Discussion

The current status and possibilities of reward-based crowdfunding financing in developed countries have attracted interest as an alternative form of financing start-ups, projects, and new products. This paper highlights that among the crucial factors influencing demand for finance through crowdfunding platforms are also the availability, effectiveness, and depth of the traditional banking sector institutions and financial markets. In other words, if the banking sector in a particular country is of poor quality and interest rates are high, the borrowers tend to seek alternatives, and reward-based crowdfunding platforms offer them a modern way of financing start-ups and various innovative projects.

We focus only on reward-based CF, which has specific features. We are therefore also interested in the question of whether applications for reward-based CF financing behave similarly to the entire non-financial intermediaries' sector (or the shadow banking sector). It is because many studies (Demyanyk and Loutskina, 2016, Buchak, 2018 or Hodula et al, 2020), actually show that non-bank financial intermediaries respond to the quality of the banking sector and even to regulatory measures in the traditional banking sector. Finally, we are also interested in whether the reward-based CF responds to the development of the real economy, specifically to unemployment.

Specifically, to contribute to the debate on this novel form of financing, we propose an empirical model showing that the volume of requests for reward-based CF financing depends on several macroeconomic factors and factors of banking competition. Most importantly, these include: (i) GDP growth, unemployment, and interest rates as macroeconomic factors; (ii) Financial Development Index as factor of development and quality of banking institutions and financial markets in a given country, (iii) the average price of stocks, number commercial bank branches and the capital to assets ratio as more nuanced factors of banking competition.

Our analysis shows that macroeconomic variables such as GDP growth affect the demand for reward-based CF financing in the same way they influence demand for traditional bank loans. Interest rates, however, have the opposite impact, presumably because they are not the price of a CF loan, but rather the price of a substitute – traditional loans. Here we can also refer to the “waterbed effect” (Nelson et al., 2018) of monetary policy rates, which implicates that the non-bank intermediaries’ assets tend to expand rather than contract in response to the negative monetary policy shock.

Reactions of reward-based CF project founders to unemployment are surprisingly counter-cyclical, meaning that higher unemployment is associated with the larger amount of money requested through CF campaigns. This may show that in times of rising unemployment, people are more motivated to start new crowdfunding projects. This surprising mechanism can relieve the strained economic situation during recession, when the demand for labor is low. The specific characteristics of reward-based crowdfunding need to be considered. Unlike debt-based crowdfunding, investors into reward-based CF do not care whether the creator of the project is employed (and therefore potentially solvent). Therefore, reward-based crowdfunding can be a channel that can reduce the decline in household disposable income in times of crisis, unlike the debt-based CF. However, let us state that for the operability of this mechanism, the volume of CF financing and CF platforms would have to increase many times over, as today they form only a very small part of the real economy.⁷ We should add that our analysis is not primarily aimed at exploring this relationship, which may in fact be much more complex. To explore this relationship would require data over a longer period of time and probably over more countries.

Our paper primarily focuses on the role of the banking sector environment. We hypothesize that a less competitive banking sector can lead to higher demand for money through CF platforms. Our empirical analysis indeed clearly shows that with

⁷ Also, creators of projects supposedly differ in their behavior across the different types of crowdfunding. We expect that higher unemployment leads to a greater amount of newly created reward-based CF projects, as the unemployed will look for alternative forms of making a living. In the case of debt-based projects, we would however expect the opposite situation. Debt-based projects are likely to behave similarly to traditional loans in this respect – if one is unemployed, no one (bank or CF donor) is likely to lend to them. Those unemployed borrowers probably will not apply for micro-finance loans for that reason. On the other hand, in reward-based crowdfunding, the donor is not interested in the current income of the founder. In a sense, we can argue that an unemployed founder may be more likely to apply for reward-based projects and less likely to apply for debt-based projects. However, this consideration would require further empirical studies.

a lower financial development (represented by Financial Development Index) of financial institutions and financial markets the attractiveness of CF financing is growing. This is in line with the literature examining the responses of shadow banking loans to the level of development of banks and financial markets (see e.g., Hodula et al., 2020).

In the same manner, we show that the lower number of commercial bank branches per squared kilometer, a low capital to assets ratio, or lower stock prices lead to higher amounts of money requested via CF platforms. Concerning the number of traditional bank branches and the capital to assets ratio, we claim that their growth represents a developing banking industry, higher competitiveness of the banking sector, and therefore higher availability of traditional loans. The same applies to the above-mentioned interest rates – their reduction will eventually lead to lower demand for CF financing. Generally, when traditional loans are more available, there will be less need for financing through crowdfunding projects.

Our results suggest two rather general recommendations for the banking sector and for policy makers. First, the use of CF financing depends on the quality of the banking sector, and this presumably poses a challenge for the existing banking sector in the future. Crowd-funding financing (even the reward-based form) seems to respond consistently to the quality of the banking sector and the availability of bank loans and if the importance of crowdfunding projects will continue to grow in the future, as is expected, banks may be forced to offer higher quality of services and more affordable loans.

The implication for policymakers and regulators is that maintaining a less regulated environment for crowdfunding loans may provide a way to indirectly encourage better and more accessible bank financing for beginning entrepreneurs and start-up businesses. On the other hand, the increasing popularity of CF financing may bring a challenge to regulators in the form of the need to regulate also other non-banks (shadow banks). Indeed, recent research (Irani et al, 2021) shows that there may be leakages from the traditional banking sector to the non-banking sector if macro-prudential measures are tightened. These macroprudential measures generally do not affect the non-banking sector and may create new risks for the financial sector. Of course, specifically reward-based crowdfunding is not yet (given the overall volume of lending in the economy) too much of a risk in terms of financial stability. On the other hand, even though relatively small amounts invested are associated with reward-based crowdfunding, there have been a few larger projects in the past that ultimately failed and investors lost their investments. Thus, at a microeconomic level, for households, investing in crowdfunding can still be quite risky.

It would also be interesting to examine the effects of the COVID-19 pandemic on CF. Unfortunately, our dataset does not include data from this period. The data was purchased as a package and unfortunately cannot be updated without additional financial resources. Indirectly, however, we can conclude that the negative economic consequences may have a rather positive effect on CF. We see that the growth of unemployment in the observed period had a positive impact on CF projects. In addition, some types of CF campaigns may benefit from increased altruism during a pandemic (social, health, etc., see Farhoun et al., 2021). Moreover, CF platforms offered various types of support, such as the Local Business Relief

Program by IndieGoGO, a seven-day project extension provided by Kickstarter, or the Coronavirus Crisis Loan provided by Wefunder (see Easyship 2020 for more details). Nevertheless, this topic remains somewhat uncovered in our paper and can be interesting for further research.

APPENDIX

Table A1 Sources of Data Used, Description of Variables, and Signs Expected in the Regressions

variable	Units	Exp. sign	Description	% coverage	Data provider
<i>RF</i>	percentage		annual percentage change of money required through CF campaigns	74	Crowdsurfer Web Service*
ΔGDP_PC	percentage	+	annual percentage change of GDP per capita	100	The World Bank Database: https://data.worldbank.org/
<i>INFL</i>	percentage	+/-	inflation measured by the consumer price index (CPI)	100	The World Bank Database: https://data.worldbank.org/
<i>INTRATE</i>	percentage	+	interest rates from 10-year government bonds	100	OECD Database: https://data.oecd.org/
<i>FDI and its components</i>	index	-	Financial Development Index and its subcomponents	100	Svirydzhenka (2016) and IMF database of FDI index (https://data.imf.org/?sk=F8032E80-B36C-43B1-AC26-493C5B1CD33B)
<i>CREDIT_HH</i>	percentage	+	total credit to households (core debt) as a percentage of GDP	100	BIS statistical warehouse: https://www.bis.org/statistics/totcredit.htm
$\Delta STOCK$	percentage	-	annual percentage change of the ratio of total value of stocks traded to GDP	82	The World Bank Database: https://data.worldbank.org/
$\Delta BRANCH$	percentage	-	annual percentage change in number of branches per square kilometer	99	IMF Database: https://www.imf.org/en/Data
ΔCA	percentage	-	annual percentage change in average capital to assets ratio in given country	81	The World Bank Database: https://data.worldbank.org/
<i>UNEM</i>	percentage	+	unemployment rate	98	The World Bank Database: https://data.worldbank.org/

* Data is not freely available. It was purchased via the Czech Science Foundation Grant (17-25924S: "Comparative Study of Crowdfunding Projects in the EU: Access to Finance, Risks and Regulation").

Table A2 Correlation Matrix of Independent Variables and Descriptive Statistics

	ΔGDP_PC	<i>INFL</i>	<i>INTRATE</i>	<i>FDI</i>	<i>CREDIT_HH</i>	$\Delta STOCK$	$\Delta BRANCH$	ΔCA	<i>UNEM</i>
ΔGDP_PC	1.000								
<i>INFL</i>	-0.160	1.000							
<i>INTRATE</i>	-0.219	0.278	1.000						
<i>FDI</i>	-0.106	-0.218	-0.488	1.000					
<i>CREDIT_HH</i>	-0.157	-0.188	-0.290	0.785	1.000				
$\Delta STOCK$	0.089	-0.143	-0.011	0.029	-0.042	1.000			
$\Delta BRANCH$	0.200	0.315	-0.071	0.016	-0.150	-0.143	1.000		
ΔCA	-0.038	-0.165	0.202	-0.070	0.080	0.022	-0.211	1.000	
<i>UNEM</i>	-0.096	-0.360	0.486	-0.043	-0.024	0.114	-0.353	0.292	1.000

Table A3 Descriptive Statistics

Variable	Mean	Median	Maximum	Minimum	Std. Dev.
<i>ΔGDP_PC</i>	0.661	0.884	24.377	-6.797	3.246
<i>INFL</i>	1.502	1.473	5.297	-4.478	1.532
<i>INTRATE</i>	3.664	3.278	10.547	-0.362	2.192
<i>FDI</i>	0.725	0.749	0.977	0.378	0.165
<i>CREDIT_HH</i>	70.111	65.500	123.900	13.200	30.370
<i>ΔSTOCK</i>	-2.466	-3.470	166.972	-57.328	27.179
<i>ΔBRANCH</i>	-2.612	-2.600	33.779	-18.048	5.368
<i>ΔCA</i>	6.059	3.375	63.848	-14.325	11.027
<i>UNEM</i>	8.714	7.243	27.466	3.100	5.371

Table A4 Percentage Coverage of the RF Variable in Each Country

country	obs.	% coverage
<i>AT</i>	6	75
<i>AU</i>	8	100
<i>BE</i>	5	62.5
<i>CA</i>	7	87.5
<i>CL</i>	5	62.5
<i>CZ</i>	5	62.5
<i>DE</i>	6	75
<i>DK</i>	6	75
<i>ES</i>	5	62.5
<i>FI</i>	5	62.5
<i>FR</i>	8	100
<i>GB</i>	8	100
<i>GR</i>	5	62.5
<i>HU</i>	4	50
<i>CH</i>	5	62.5
<i>IE</i>	6	75
<i>IT</i>	6	75
<i>JP</i>	5	62.5
<i>KR</i>	6	75
<i>MX</i>	6	75
<i>NL</i>	8	100
<i>NO</i>	5	62.5
<i>NZ</i>	5	62.5
<i>PL</i>	5	62.5
<i>PT</i>	6	75
<i>SE</i>	6	75
<i>US</i>	8	100

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