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## Article

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Article

# Institutional Drivers of Crowdfunding Volumes

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**Abstract:** Crowdfunding improves access to financing, yet cases of crowdfunding's importance, besides traditional financing, are rare and notably localized. In explaining why global crowdfunding volumes are so heterogeneous, previous academic research has focused mainly on the existence of a legal system that is supportive of crowdfunding, but with conflicting results. We argue that a broader range of institutions must be considered to describe the spread of crowdfunding at its current early stage of development, and provide first empirical evidence on the matter. Using a dataset covering crowdfunding volumes of 122 countries over the years 2015–2016, we confirm that the existence of crowdfunding-specific regulations has a positive association with total crowdfunding volumes per capita. We also find that regulation targeted at a specific type of crowdfunding has an economically stronger association with corresponding transaction volumes. In line with our argument, we find that a significantly broader range of less crowdfunding-specific institutions exhibit strong ties to crowdfunding volumes, with strong e-service culture emerging as an especially robust determinant of all types of crowdfunding volumes. Stronger legal rights, greater financial freedom, and higher democracy levels are also associated with greater total crowdfunding volumes, but exhibit varying relevance across different types of crowdfunding.

**Keywords:** crowdfunding; financing; institutions; regulations; norms; culture

## 1. Introduction

Crowdfunding is a digital innovation that has been hailed for its potential to address financing challenges (World Bank Group and People's Bank of China 2018; European Commission 2018). In 2016, global crowdfunding volumes more than doubled compared to 2015, reaching more than \$290 billion USD. At the same time, crowdfunding volume continues to vary significantly between countries, with China, the U.S., and the UK exhibiting volumes per capita which are more than 15 times higher than the global average<sup>1</sup>. Such heterogeneity in volumes explains why crowdfunding is not yet able to compete with traditional sources of financing in economic terms. It was 0.29% of the global stock of domestic credit at the end of 2016 and 0.43% of the global market value of publicly traded shares at the end of 2015<sup>2</sup>. Still, there are examples of crowdfunding taking up a prominent role in financing. One such example can be found in the UK, where crowdfunding contributed nearly a third of all new loans to businesses with an annual turnover of less than £2 million GBP in 2017 (Zhang et al. 2018). The fact that crowdfunding has become important only in certain markets raises the question, why has the adoption of crowdfunding been so uneven across countries?

<sup>1</sup> Authors' calculation based on the data of the Cambridge Centre for Alternative Finance.

<sup>2</sup> Authors' calculations based on data obtained from the Cambridge Centre for Alternative Finance and CIA World Factbook <https://www.cia.gov/library/publications/the-world-factbook/>.

With crowdfunding being both a digital innovation and an added layer of financing, previous research related to these fields may help to address this question. Within the field of digital innovations, [Hinings et al. \(2018\)](#) provide a formidable explanation on why institutional theory should be considered a linchpin for studying the development and spread of digital innovations. They argue that existing institutional arrangements are fundamental to laying the path for new ideas to emerge and disseminate, since these new ideas must first gain legitimacy from critical crowds to become socially accepted. According to institutional theory, institutions provide such legitimacy to social objects and act as vehicles for allocating society's resources ([Ostrom 2008](#); [Parsons 1953](#); [Suchman 1995](#)). The relevance of institutions in determining which objects become more socially acceptable and, therefore, more prominent, also features extensively in literature related to financing activities. The role of institutional factors (e.g., the market for corporate control, bankruptcy code and the tax code, type of financial system), has been also investigated in literature that focuses on the differences in financing patterns of firms across countries e.g., ([Rajan and Zingales 1995](#); [Demirgüç-Kunt and Maksimovic 1999](#); [Moritz et al. 2016](#)). Several papers, such as [Demirgüç-Kunt and Levine \(2001\)](#), [Ergungor \(2004\)](#), [Aggarwal and Goodell \(2009\)](#) find empirical evidence that institutional factors may help explain differences in country-level preferences towards either market-based or bank-based financial intermediation models.

However, we cannot directly link the determinants of crowdfunding volumes to those found in previous literature. First, [La Porta et al. \(1998\)](#) argue that there is no use in distinguishing countries based on firm financing patterns, since market-based and bank-based systems can be complementary ways of financing, and effective institutions, such as a well-functioning legal system, should support both, allowing each to develop independently of the other. Similarly, literature related to crowdfunding highlights this phenomenon as a new and complementary form of financing ([Short et al. 2017](#); [Hervé and Schwienbacher 2018](#)), which therefore should follow its own path of development. Second, as argued by [Ang and Kumar \(2014\)](#), the spread of financial innovation is not necessarily tied to any previous developments in a country's financial system, but instead to the underlying institutional framework. They find that countries that are genetically more distant from frontier countries of innovation tend to be less capable of incorporating innovative ideas within their financial systems. As such, there seems to be little reason to limit ourselves to only those determinants that are associated with the spread of previous, unconnected financial developments.

Still, in connection with the previous literature, we argue that institutional theory as a whole also provides a rich framework for understanding the adoption of crowdfunding. First, as in the related literature on digital (financial) innovations and financial intermediation models e.g., ([Ang and Kumar 2014](#); [Hinings et al. 2018](#)), we expect institutions to act as vehicles of legitimacy for this novel financial development. Therefore, institutional determinants should have significant power in explaining the heterogeneity in crowdfunding volumes between countries. Second, the role of institutions has been shown to lessen over time as innovations move towards general validation e.g., ([Johnson et al. 2006](#)). Thus, the current development stage of crowdfunding provides suitable conditions to test why only some countries have become early adopters of crowdfunding, while others have shown only minute interest. Third, crowdfunding is associated with severe market imperfections, such as information asymmetry ([Belleflamme et al. 2014](#); [Kleinert et al. 2020](#); [Miglo 2020](#)) and moral hazard ([Strausz 2017](#); [Chemla and Tinn 2020](#)). Institutions may mitigate the risk associated with these imperfections by broadly inserting trust within the system ([Bergh et al. 2019](#)). Finally, [Scott \(2014\)](#) emphasizes that while each institutional pillar—regulative, normative and cultural-cognitive—may act towards achieving the same goal, each employ their own mechanisms and may, at times, counteract each other. As such, it is possible for a country to have large crowdfunding volumes even if only one of the three pillars is supportive in providing legitimacy to crowdfunding. Because of this, it is important to consider the role of institutions from all three pillars.

Although [Kshetri \(2015, 2018\)](#) proposes a theoretical framework, based on institutional theory, to explain crowdfunding success, empirical research on crowdfunding has been inhibited by the

highly fragmented nature of the crowdfunding industry and lack of common aggregate statistics. Accordingly, the majority of previous research has focused on data from one specific crowdfunding platform (for a review, see (Gleasure and Feller 2016)). As an example, Cumming et al. (2017) view cleantech crowdfunding across 81 countries, with one of their hypotheses proposing that the prominence of cleantech crowdfunding campaigns is associated with certain cultural characteristics. While they do find that cleantech crowdfunding campaigns more frequently originate from countries with low levels of individualism, their data is limited to only those campaigns hosted on the platform Indiegogo, which is based in the U.S. As a result, more than 80 per cent of the campaigns examined originate from the U.S. and Canada, and all of the campaigns are strictly reward-based, due to the nature of the platform used. Alternatively, Cumming et al. (2019) use data from 93 different platforms and find that a regulative update carried out by Canadian provinces in early 2016 led to a better application of due diligence by platforms, which in turn was positively related to campaigns success and higher crowdfunding volumes. However, all of the platforms under consideration originated from Canada, thus significantly limiting the variation of the wider surrounding institutional framework that may affect crowdfunding volumes. Moving more towards a global approach, Rossi et al. (2018) use a survey to collect campaign data from 185 investment-based platforms spread across nine countries. As their aim is to focus on how certain platform-specific characteristics affect crowdfunding outcomes, they only include some institutional factors as country-level control variables, and do not record any statistically significant association for these variables when tested against money raised. Moreover, even though they consider platforms from multiple countries, they do not specifically aim to capture a representative sample of all crowdfunding volumes in each country. While this type of research helps understand crowdfunding as a phenomenon in specific settings, it does not provide a thorough explanation on how institutional factors affect crowdfunding on a global scale and for different types of crowdfunding.

To the best of our knowledge, there exist only two relevant papers focusing on the country-specific determinants of all types of crowdfunding on a global scale. First, Dushnitsky et al. (2016) investigate the determinants of crowdfunding platform creation. As they focus on the number of platforms, their study does not cover the actual crowdfunding volumes. Moreover, their coverage of institutional aspects is limited to only the regulative pillar, where they consider legal rights and crowdfunding-specific regulations to be important indicators, but find no significant association for the latter. In contrast to this result, the working paper by Rau (2018), which also focuses on how the legal framework of a country affects its crowdfunding volumes, finds that the introduction of explicit crowdfunding regulations does indeed provide a very robust link to crowdfunding volumes. As Rau (2018) considers the legal system to be especially important and does not rely on any firm theoretical foundation for the inclusion of other explanatory variables, he otherwise fails to take a broad range of potentially important institutional indicators into account. Consequently, the models employing crowdfunding volume as a dependent variable only control for, in select specifications, the generalized level of trust within a country as an additional institutional factor beside the introduction of explicit crowdfunding regulations. Compared to Rau (2018), we view the regulative aspects in much more detail, distinguishing between whether the crowdfunding-specific regulation targets only debt-based or equity based types of crowdfunding, and testing how these targeted regulations affect both the total crowdfunding volumes within a country, as well as the volumes of different types of crowdfunding. Furthermore, in contrast to both previous papers, we compare country-level crowdfunding volumes to a broad set of institutional factors, including a total of 12 institutional variables consistent with the theoretical framework of Kshetri (2015, 2018). Hence, our paper provides a comprehensive answer to each of Kshetri's (2015, 2018) institutional theory based propositions, which have thus far been ignored in empirical research. While we use the same underlying data as Rau (2018), we collapse the annual data into average values instead of using a panel setup, since the institutional explanatory variables are unlikely to exhibit significant variation over the two year period observed.

The objective of this paper is to investigate how a wide range of institutional factors that may rely on different operating mechanisms contribute to the adoption of crowdfunding in different countries.

We build on the theoretical framework proposed by [Kshetri \(2015, 2018\)](#) to formulate eight hypotheses. For testing the hypotheses, we use data on crowdfunding volumes gathered by the Cambridge Centre for Alternative Finance (CCAF) for years 2015–2016. The sample covers 122 countries. Determinants of crowdfunding volumes are investigated using cross-sectional regression models.

We confirm that institutions highly targeted at crowdfunding, such as explicit regulation, seem to matter, but also show that a broad range of other regulative and cultural-cognitive institutions are important determinants of crowdfunding volumes. The results concerning the role of normative institutions remain rather inconclusive. We find that countries having crowdfunding-specific regulations, stronger legal rights, greater financial freedom, higher democracy levels, and stronger e-service culture have also tended to experience greater total crowdfunding volumes per capita. The most robust associations across different types of crowdfunding are observed for the presence of crowdfunding-specific regulations, with the economic association becoming stronger when the regulation is explicitly targeted at the corresponding type of crowdfunding, and e-service culture. Some of these institutions, such as crowdfunding-specific regulations, can be developed easily by policymakers. Others, such as e-service culture, are more difficult to influence, but are still important factors to consider. Over time, however, continuous use of crowdfunding in localized settings is likely to increase its acceptance and utilization on a global scale.

This paper contributes to two streams of literature. First, we add to the discussion of the role of institutions in providing legitimacy for the adoption of (digital) financial innovations ([Aggarwal and Goodell 2009](#); [Ang and Kumar 2014](#)). Secondly, we provide much needed empirical evidence on the interlinkages between institutional structures in place and crowdfunding volumes hypothesized in [Kshetri \(2015, 2018\)](#). As such, the empirical results of this paper are important for policymakers, as they provide a pathway to developing institutions that could foster the growth of crowdfunding.

The remainder of this paper is organized as follows. Section 2 provides a brief overview of institutional theory and discusses its implications on crowdfunding, following which we develop a set of hypotheses on how differing institutional structures in countries may affect crowdfunding volumes. Section 3 discusses the data and methodology. Section 4 presents the results of the empirical models and discusses the findings. Finally, Section 5 concludes and discusses the contribution and limitations of this paper as well as the implications for policy considerations.

## 2. Hypothesis Development

A number of leading scholars in the field of new institutional economics e.g., ([North 1990](#); [Ostrom 2008](#); [Williamson 1991](#)), have embraced the term “rules of the game” to describe the role of institutions in macroeconomic analysis. [North \(2008\)](#) defines institutions as a set of formal rules and informal norms, along with the manners in which either are enforced. Organizations, as economic agents, use their skills and strategies to act within the set of rules in order to win the game ([North 1990](#)). Therefore, the success of organizations depends upon a combination of both the “rules of the game” and the set of attributes of each economic agent. As the institutional framework of the economy dictates the skillset that will lead to the greatest possible pay-off, the types of organizations that come into existence in a given economy ultimately reflect the payoff structure of the society ([North 2008](#)).

The ability of the institutional framework to dictate which organizations thrive and which suffer can be traced back to a key concept of institutional theory: the need for legitimacy. [Suchman \(1995, p. 574\)](#) describes legitimacy as “a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions”. According to [Scott \(2014\)](#), the “socially constructed system” Suchman is referring to are the institutions. Although institutional factors alone cannot determine the outcomes, institutions act as structures that individuals use to allocate resources ([Ostrom 2008](#)).

If the institutional theory were to hold for the development of crowdfunding, these concepts could potentially explain the vast heterogeneity of crowdfunding volumes between countries. When applying

institutional theory on crowdfunding, we can view crowdfunding platforms as organizations with rather homogenous skillsets and targeted levels of performance. Platforms are then subjected to different “rules of the game” in various countries, thus resulting in differing levels of perceived legitimacy. In addition to institutional effects, platforms are also subject to different levels of resources, for instance, the level of traditional financial sector development, availability of funds, and general wealth of the population. The combination of these effects is expected to lead to heterogeneous crowdfunding volumes, even when platforms themselves operate in a similar fashion.

Institutions should also be more relevant for newly formed innovations, such as crowdfunding. According to [Johnson et al. \(2006\)](#) only those innovations that are in accordance with a local society’s widely accepted norms, values, and beliefs will find legitimacy and will, thereby, enter use. Once an innovation is locally validated in one society, it will also be more readily adopted elsewhere. Still, its adoption in other locations during the early stages of global diffusion will somewhat depend on how well the innovation conforms to each specific location’s widely accepted values. Eventually, the innovation will become widely accepted as part of the global status quo, framing the future actions of all societies. This implies that if crowdfunding were to become a prominent component of the financial system in at least some countries, further expansion into others would become less reliant on the local values and beliefs of those societies. The latter would hinder the ability of institutions to explain the success of crowdfunding.

Thus far, we have mostly used the term “institutions” to describe a set of rules that either inhibit negative or endorse positive behavior, as defined by society’s widely accepted values. However, there is no agreement amongst institutional theorists on the types of institutions that matter the most. [Scott \(2014\)](#) divides institutions into three pillars: regulative, cultural-cognitive, and normative. The regulative pillar is based on setting formal or informal rules, monitoring compliance, and sanctioning disobedience. The cultural-cognitive pillar refers to a collective, taken for granted, understanding of how objects should be interpreted within a society, shaped by deep-rooted cultural values. The normative pillar assumes that individuals comply because they feel it would be socially appropriate to do so, not because of the threat of sanctions. [Scott \(2014\)](#) argues that although the underlying elements for each of these pillars form a continuum, they are divergent concepts and need to be analyzed separately. This approach enables us to refrain from ruling out the effects of specific types of institutions prematurely but does mean that we must classify each hypothesis only under one specific pillar.

[Kshetri \(2015, 2018\)](#) relied on [Scott’s \(2014\)](#) three-pillar handling of institutions to develop a theoretical framework on how institutional factors may affect to crowdfunding success. We build on his propositions to formulate eight testable hypotheses linking crowdfunding success with various indicators describing institutional structures in place within countries. In order to fully test all of the propositions, we formulate a hypothesis accounting for each of the institutional factors outlined by [Kshetri \(2015, 2018\)](#) in his framework. It is important to note that while formulating our hypotheses, we will use a different dependent variable, crowdfunding volume, instead of fundraising success proposed in [Kshetri \(2015\)](#). Following the logic of [Ahmad and Hoffmann \(2008\)](#), volumes can be considered a suitable measure of crowdfunding performance. When formulating the hypotheses, we expand [Kshetri’s \(2015, 2018\)](#) propositions to include a broader view of crowdfunding. We argue that the legitimacy of all types of crowdfunding (debt-based, equity-based, reward-based, donation-based) is affected by all institutions, albeit to a different extent depending on the type of crowdfunding in question. We also substitute some of the institutional variables proposed by [Kshetri \(2015, 2018\)](#) with variables that we expect to provide a more direct linkage to crowdfunding volumes. The following sections cover the hypotheses related to the three pillars, regulative, cultural-cognitive, and normative institutions, in turn.

### 2.1. Regulative Institutions and Crowdfunding

[La Porta et al. \(1998\)](#) suggest that much of the differences in financial development between countries are a result of the prevailing legal system and how efficiently laws are enforced. [Kshetri \(2015\)](#) considers crowdfunding regulations to be especially important for equity-based crowdfunding. Still,

having formal laws that define the rights and responsibilities of each party is likely to increase the legitimacy of all crowdfunding platforms. Rules and referees should be considered particularly important for situations based on competitive interests, such as markets (Scott 2014). Thus, platforms offering pecuniary rewards should be affected most, as each party is expected to prioritize his/her (financial) interest. Platforms offering non-pecuniary rewards are less likely to be affected by regulations and more likely to be affected by the normative and cultural-cognitive factors. Yet, it is conceivable that the existence of crowdfunding regulations will improve the legitimacy of crowdfunding as a whole, regardless of the type of crowdfunding. Indeed, Miglo and Miglo (2019) note that firms may exhibit an overall preference towards crowdfunding as opposed to traditional bank financing if bankruptcy costs are high. As such, countries with very strict bankruptcy laws may exhibit relatively higher crowdfunding volumes for all types of crowdfunding.

While institutional theory states that regulations legitimize and thus empower social objects, it may still be possible that regulations are put in place as a result of higher crowdfunding volumes. When investigating the timing of crowdfunding regulations' implementation and the development of crowdfunding volumes, we see that both scenarios have been realized in countries where formal rules have been set in place. For example, Belgium, France, Spain, Great Britain, Portugal, and Slovenia have experienced a significant increase in the growth rate of crowdfunding volumes per year following the introduction of regulations compared to the year prior to the introduction of regulations. However, in Austria and Germany, the growth rate of crowdfunding volumes has decreased (but remains positive) following the introduction of regulations.<sup>3</sup> This indicates that the presence of crowdfunding regulations may indeed increase the legitimacy of crowdfunding and may not be just a mere reflection of the increased popularity of this activity. Legitimacy is also increased if the rules are enforced (North 2008). As greater enforcement of crowdfunding regulations is likely if rules are formally written down, we propose that:

**Hypothesis 1 (H1).** *Crowdfunding volumes are greater in countries with regulatory framework supporting crowdfunding activities.*

Due to the relative novelty of crowdfunding, most countries have not yet established crowdfunding-specific regulations. Moreover, the European Commission is of the opinion that member states should take only proportional action in regulating crowdfunding (European Commission 2018). A review of crowdfunding regulation by the European Crowdfunding Network (2017) shows that only 11 out of 32 countries analyzed have regulations in place that specifically target crowdfunding. In light of this, Kshetri (2015) emphasizes the importance of a country's overall regulatory framework in supporting entrepreneurship as a key factor determining the success of equity-based crowdfunding. We argue that crowdfunding is less likely to be influenced by regulations aimed at the general entrepreneurial climate and more likely to be affected by regulations targeted specifically at financial services. Both debt-based and equity-based crowdfunding are likely to be more directly affected by financial services regulations because of their similarities to financial markets. However, spillover effects on the legitimacy of reward- and donation-based crowdfunding could also occur. Therefore, we frame the following hypothesis:

**Hypothesis 2 (H2).** *Crowdfunding volumes are greater in countries with more favorable regulatory climate for the provision of financial services.*

Crowdfunding is (by nature) a highly democratic process, which may be incompatible with authoritarian regimes (Kshetri 2015). In authoritarian regimes, regulatory systems take on extreme

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<sup>3</sup> It is important to note that this analysis does not consider the exact timing of implementing the regulations during the calendar year or how much in advance the public was made aware of such regulations entering force.

values (Scott 2014) and the enforcement of rules is undertaken by non-neutral agents (North 1990). As a result, strong regulations do not always support the legitimacy claims of social objects, because authoritarian regimes may use regulations to further their own interest. The latter may not necessarily combine well with advancements that are democratic by nature. Crowdfunding is highly reliant on the development of information technology which, according to Pitroda (1993), can be considered one of the greatest democratizing tools ever created. As we have seen, some authoritarian regimes (e.g., Russia) have used regulations to control the use of such technology. Kshetri (2015) points out that because crowdfunding calls for the democratic participation of a large group of investors, this is likely to conflict with the measures of top-down control imposed on information and communications technology by authoritarian regimes. We, therefore, propose that:

**Hypothesis 3 (H3).** *Crowdfunding volumes are greater in more democratic countries.*

## 2.2. Cultural-Cognitive Institutions and Crowdfunding

Cultural-cognitive institutions cover the potential effects of attitudes that societies “take for granted” (Scott 2014). These should be viewed separately from regulative institutions because they tend to also incorporate perceptions that have been learned from past institutions (Tabellini 2010). Cultural-cognitive institutions are not formed instantaneously and may, therefore, incorporate a rich history of the development of widely accepted perceptions.

Following this logic, we must also consider the implications of cultural beliefs on the use of e-services (services provided through the Internet). The use of e-services requires certain skills and an attitude favoring their use. Cultural factors determine what people deem sensible (Ostrom 2008). Therefore, if the use of e-services is considered sensible because of trust in machines, speed, etc., then it is likely to also be reflected in their active use. As crowdfunding is based on transactions carried out using the Internet, the countries with more favorable e-services culture are also expected to exhibit greater crowdfunding volumes. Therefore, the hypothesis is:

**Hypothesis 4 (H4).** *Crowdfunding volumes are greater in countries with more favorable e-service culture.*

Crowdfunding may also be influenced by the level of trust within a society because it empowers the claims of legitimacy of crowdfunding platforms (Kshetri 2015). Contributing or investing on crowdfunding platforms usually involves supporting a cause initiated by a stranger, requiring a certain amount of trust in his/her good intentions. Furthermore, crowdfunding is typically characterized by high levels of information asymmetry (Belleflamme et al. 2014; Kleinert et al. 2020; Miglo 2020). Sriram (2005) notes similar issues in his study of the emerging field of microfinance in India, and finds that social trust becomes a highly effective tool to overcome issues arising from imperfect information and enable microfinance to develop. Trust is particularly important in countries with a weak record of enforcing contracts (Wu et al. 2014), effectively becoming a substitute for a strong regulatory environment (Karlan 2005). Accordingly, the trust within a society should be considered especially important in countries without crowdfunding-specific regulations in place. In such countries, lending funds on a crowdfunding platform would leave the lender with little action to take if the borrower defaults (Rau 2018). Therefore, a high degree of thin trust between strangers should support crowdfunding success. We phrase our hypothesis accordingly:

**Hypothesis 5 (H5).** *Crowdfunding volumes are greater in countries characterized by greater trust between strangers.*

Social stigmatization has been associated with a number of economic consequences, such as low institutional ownership, weak analyst coverage, and discounted equity values for companies that are in conflict with social norms (Novak and Bilinski 2018). Similarly, Kshetri (2018) argues that a high degree of stigmatization of entrepreneurial failure would lead to lower crowdfunding



success. While Landier (2005) points out that all entrepreneurial activities are negatively affected by the stigma of failure, Kshetri (2018) argues that this is even more so for funding campaigns conducted on crowdfunding platforms. The reasoning behind this lies in the sheer number of contributors that crowdfunding campaigns normally mobilize. When an entrepreneur fails in a venture financed by more traditional methods, only a small group of experienced investors will know about it and the feeling of shame will be less pronounced. However, as crowdfunding campaigns are open to the wider public, failure will also become public knowledge and the humiliation will, therefore, be greater. It should also be considered that failure is perceived differently in different cultures. For example, the EY Global Entrepreneurship Barometer 2013 points out that attitudes towards business failure are particularly positive in the U.S. where 43% of respondents viewed failure as an opportunity to learn, while the G20 average was 23%. Moreover, risk-taking by individuals tends to vary, depending on whether the country is more collectivistic or individualistic (for a review, see Illiashenko and Laidroo 2020). Kshetri's (2018) proposition regarding this matter is framed through the normative indicator of stigmatization in society, while we believe it is more realistic to measure the cultural-cognitive trait of fear of entrepreneurial failure, which is why we have phrased our hypothesis accordingly:

**Hypothesis 6 (H6).** *Crowdfunding volumes are greater in countries characterized by lower fear of entrepreneurial failure.*

### 2.3. Normative Institutions and Crowdfunding

Following Scott (2014), normative institutions must incorporate the norms and values of the society that are put in place by social obligation. This means that participants on a crowdfunding platform ask themselves whether participating in a campaign would be considered socially appropriate. A key ingredient in normative institutions affecting crowdfunding is the degree of philanthropic involvement present in society (Kshetri 2015). As philanthropy describes involvement in projects that are brought into life in order to forward some mutual values (Ostrander 2007), it is a straightforward example of what Scott (2014) describes as normative institutions. Kshetri (2015) argues that philanthropic involvement is especially important for donation-based crowdfunding but may also affect reward-based crowdfunding. However, because of the uncertainty of returns in crowdfunding in general, we do not cast aside the possibility that the degree of philanthropic involvement in society could also have some positive influence on the volumes of debt-based and equity-based platforms. We, therefore, propose:

**Hypothesis 7 (H7).** *Crowdfunding volumes are greater in countries characterized by greater levels of philanthropic involvement.*

Kshetri (2015) also emphasizes the power of trade associations for providing legitimacy. Trade associations are normative institutions in that they are unable to sanction noncompliant non-members for actions deemed unacceptable, but rather enforce a social obligation to become a member and abide by the common set of rules. There are some signs of the emergence of country-based crowdfunding-specific associations. For example, in the UK, twelve leading crowdfunding platforms established a self-regulatory body that required all members to operate to a defined minimum standard (Crowdcube 2013). However, the online presence of platforms seems to have led to the emergence of mainly continent-wide associations such as the European Crowdfunding Network and the African Crowdfunding Association. The existence of such associations makes it difficult to assess their impact on country-specific crowdfunding volumes. Instead, we focus on the financial services cluster as a whole. If the cluster is well-developed, there are likely to be specific and strong cluster organizations that also provide legitimacy to crowdfunding. We, therefore, phrase our final hypothesis as:

**Hypothesis 8 (H8).** *Crowdfunding volumes are greater in countries with more developed financial services cluster.*

### 3. Data and Methodology

We obtained data on crowdfunding volumes from CCAF. This data is gathered through surveys, wherein platforms self-report their annual volumes and answer numerous questions regarding their businesses. To date, it is the best data source for country-level crowdfunding volumes because alternative sources (e.g., Massolution, TAB Dashboard) have been shown to significantly underestimate crowdfunding volumes, especially outside of the U.S. It is important to note that CCAF may also somewhat underestimate the volumes, as some platforms fail to respond to the survey. CCAF does specify that the data covers nearly 90% of volumes in Europe and about two-thirds of volumes in the Asia-Pacific region.

Crowdfunding in CCAF's survey is distributed into 19 different categories, which we reclassify into the following five types: debt-based, equity-based, reward-based, donation-based, and other crowdfunding. Debt-based crowdfunding covers all platforms that include the term "lending" or "debt" in CCAF's classification, as well as invoice trading, which is also considered a type of debt financing. Equity-based crowdfunding encompasses all platforms, wherein the definition provided by CCAF refers to the use of equity or revenue/profit sharing models. We also consider mini-bonds as equity-based transactions, because of their short duration and unsecured nature. Reward-based crowdfunding includes only the platforms labeled reward-based by CCAF, while donation-based crowdfunding includes platforms labeled donation-based. Other crowdfunding covers the data from platforms that were not distributed into the previously mentioned types, such as community shares and pension-led funding.

The dataset initially includes crowdfunding data for 160 countries across the world during 2015–2016. In estimations, the number of countries decreases to 122 and below due to missing data for some of the control variables. This means that compared to the original CCAF dataset we lose data for at least 38 countries accounting for 0.065% of total global crowdfunding volume, with Middle Eastern and African countries accounting for nearly half of the number of countries lost. In robustness tests, we also use the data for 2013 and 2014 which for most countries has been backfilled during the 2015 survey and covers only 121 countries.

There exists a significant variation in crowdfunding volumes across countries of different sizes. Therefore, the use of raw volumes can provide misleading indications. In order to control for the size of the country, we use a relative measure of crowdfunding volumes ( $cf\_total$ ) calculated as country-specific total crowdfunding volume in USD over the entire estimation period divided by the average population of a country over the same period. The population is preferred as the scale variable due to its lower volatility compared to GDP. A similar approach has been used in several recent studies focusing on crowdfunding and FinTech credit e.g., (Claessens et al. 2018; Rau 2018). This ratio exhibits significantly greater values for five countries—China, the U.S., Great Britain, Estonia, and New Zealand. In Table A5 in Appendix A under robustness test 2, we provide some results for regression models excluding these extreme observations. As the results were not significantly affected, we decided to keep these somewhat extreme observations and there through also maintain the sample size. Instead, in regression models, we use a log transform of  $cf\_total$  to cope with its extreme values and the skewness of its distribution. In addition to the indicator for total crowdfunding volume, we employ similar country-specific volume measures for the specific types of crowdfunding defined above.

Institutional variables are selected based on the empirical proxies which could be obtained for the maximum number of countries. In case several alternatives were identified, preference was given to those variables which could be more directly linked to crowdfunding activity. We were also forced to make some compromises when determining the measurement unit of variables. For example, as the trust between strangers has been measured using different scoring systems in two different surveys covering somewhat different sets of countries, the number of observations could be maintained only through the use of a dummy variable. Table 1 presents the variables used for each of the pillars with their description and descriptive statistics. The first letter of each institutional indicator refers to either regulative (*r*), cultural-cognitive (*c*), or normative (*n*) pillar, as explained in Section 2.

**Table 1.** Descriptive statistics for 2015–2016.

Variable	Description	Data Source	Hyp.	Sign	Obs.	Mean	Std.dev.	Min	Max
<b>Crowdfunding Volumes</b>									
<i>cf_total</i>	total crowdfunding volume to population (USD)	Authors, based on CCAF		N/A	122	9.99	36.02	0.00	245.84
<i>cf_totalgdp</i>	total crowdfunding volume to GDP (%)	Authors, based on CCAF		N/A	122	35.9	378.14	0.00	4176.5
<i>cf_debt</i>	debt-based crowdfunding volume to population (USD)	Authors, based on CCAF		N/A	122	8.67	33.91	0.00	242.53
<i>cf_equity</i>	equity-based crowdfunding volume to population (USD)	Authors, based on CCAF		N/A	122	0.84	3.03	0.00	23.72
<i>cf_reward</i>	reward-based crowdfunding volume population (USD)	Authors, based on CCAF		N/A	122	0.33	0.67	0.00	3.58
<i>cf_donat</i>	donation-based crowdfunding volume population (USD)	Authors, based on CCAF		N/A	122	0.16	0.70	0.00	5.43
<b>Regulative Variables</b>									
<i>rleg</i>	legal rights index, 0–12 (best)	World Bank Doing Business	H1	+	107	5.55	2.76	1.00	12.00
<i>rlawd</i>	1 if the country has specific crowdlending regulation, or 0	European Crowdfunding <a href="#">European Crowdfunding Network (2017)</a> and Internet	H1	+	122	0.10	0.28	0.00	1.00
<i>rinvp</i>	strength of investor protection index, 0–10 (best)	World Bank Doing Business	H1	+	108	5.70	1.12	3.15	8.25
<i>rlawe</i>	1 if the country has specific equity crowdfunding regulation, or 0	European Crowdfunding <a href="#">European Crowdfunding Network (2017)</a> and Internet	H1	+	122	0.12	0.32	0.00	1.00
<i>rfjfr</i>	financial freedom, 0–100 (best)	Heritage Foundation	H2	+	113	55.49	16.64	10.00	90.00
<i>rfree</i>	Freedom House aggregate score up to 100 (best)	Freedom House	H3	+	122	66.59	25.30	10.00	100.00
<b>Cultural-Cognitive Variables</b>									
<i>cacc</i>	% of people above 15 years of age who used a mobile phone or the Internet to access an account in the past year	World Bank Financial Inclusion Index database	H4	+	108	8.67	9.01	0.08	33.98
<i>cpay</i>	% of people above 15 years of age who used the Internet to pay bills or to buy something online in the past year	World Bank Financial Inclusion Index database	H4	+	108	20.79	23.39	0.43	78.98
<i>ctrust</i>	1 if the indicator for the trust between strangers was above the median of surveyed countries, or 0	Authors, based on World Values Survey and European Values Study	H5	+	77	0.48	0.50	0.00	1.00
<i>cfear</i>	fear of failure rate (%)	Global Entrepreneurship Monitor	H6	-	69	35.93	8.52	15.91	53.41
<b>Normative Variables</b>									
<i>ngiv</i>	world giving total score up to 100 (best)	Charities Aid Foundation	H7	+	117	34.56	11.35	11.50	73.00
<i>nclust</i>	1 if the country has a top10 financial center in a world, or 0	Authors, based on Z/Yen Group	H8	+	122	0.07	0.26	0.00	1.00
<b>Non-Institutional Control Variables</b>									
<i>mgdpp</i>	log transform of GDP per capita	Authors, based on World Bank	N/A	?	122	9.40	1.13	6.58	11.69
<i>mremit</i>	personal remittances received (% of GDP)	World Bank Financial Development database	N/A	?	122	4.07	5.76	0.01	31.36
<i>mtop5</i>	top 5 bank asset concentration	World Bank Financial Development database	N/A	+	122	77.51	15.39	28.27	100.00
<i>mfdi</i>	financial development index, 0–10 (best)	International Monetary Fund	N/A	?	118	0.39	0.23	0.05	0.94

Notes: Hyp. refers to the hypothesis that the institutional variable corresponds to. Obs. refers to the number of observations available for the corresponding variable. Mean is the arithmetic mean of the variable. Std.dev. is the standard deviation of the variable. Min is the minimum value of the variable. Max is the maximum value of the variable. Sign refers to the expected association between crowdfunding and explanatory variable.

We also control for several non-institutional country-specific indicators covering economic development, the size of the non-traditional financial sector and characteristics of the traditional financial sector. Economic development is proxied with a log transform of GDP per capita (*mgdpp*). The size of the non-traditional financial sector is proxied by the personal remittances received as a % of GDP (*mremit*) because remittances have been shown to act as substitutes for the traditional financial sector in countries with less developed financial systems (Giuliano and Ruiz-Arranz 2009). Characteristics of the traditional financial sector are proxied by the top 5 bank concentration ratio (*mtop5*) and the financial development index (*mfdi*).

All of the regression estimations in this paper will be based on a cross-sectional dataset due to the following reasons. First, reliable estimates for crowdfunding volumes are present only for two years (2015–2016). Therefore, a panel design would add little value in light of many of the explanatory variables having very low variation across such a short time period. Second, even if institutional variables change over time, their impact may be more clearly visible several years after the change. A potential caveat of the cross-sectional design is the omitted variable bias and the low number of observations. We try to address these concerns by considering different model specifications and reducing the number of control variables.<sup>4</sup> The estimations remain vulnerable to endogeneity concerns. In order to respond to the endogeneity concerns, we did estimate some equations with explanatory variables taken from 2014 (see Tables A4 and A5 in Appendix A); however, it did not significantly change the results reported hereafter. As the explanatory variables do not also vary significantly over time, we decided to use the average of 2015–2016 in baseline estimations. We also have to consider multicollinearity. This was done by checking variance inflating factors (VIFs) and pair-wise correlations. The mean of VIFs for all estimations are presented at the bottom, of each table containing the results. The pair-wise correlations of explanatory variables are presented in Table A1 in Appendix A. As country-based controls *mgdpp* and *mfdi* are strongly correlated, the baseline combination will include only the former indicator.

We estimate each cross-sectional regression model using simple ordinary least squares with robust standard errors. All explanatory variables in these models represent an average over 2015–2016. In those robustness tests where we use crowdfunding volume data covering the period of 2013–2016, the explanatory variables are calculated as averages over 2013–2016. In order to see the explanatory power of different types of institutional variables and to maintain the maximum number of observations per model, the first set of regression models is estimated so that each hypothesis is tested in a separate model:

$$CF_i = f(Inst_i, mgdpp_i, mremit_i, mtop5_i) \tag{1}$$

The dependent variable ( $CF_i$ ) refers to the log transform of the crowdfunding volume per capita (*cf\_total*) in country *i*. The institutional variable sets (*Inst*) include one institutional variable at a time with the exception of H1 which includes two regulatory variables at once. Country-specific non-institutional variables will be the same in every model.

In order to control for the simultaneous impact of several institutional variables, the following set of regression models will include all institutional variables with the exception of trust and entrepreneurial failure (H5 and H6). The latter variables are excluded due to their significantly lower number of observations. The models take the form:

$$CF_i = f(rleg_i, rlawd_i, rfifr_i, rfree_i, cacc_i, ngiv_i, nclust_i, mgdpp_i, mremit_i, mtop5_i) \tag{2}$$

$$CF_i = f(rinop_i, rlawe_i, rfifr_i, rfree_i, cpay_i, ngiv_i, nclust_i, mgdpp_i, mremit_i, mtop5_i) \tag{3}$$

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<sup>4</sup> As an alternative strategy for reducing the number of explanatory variables, one could consider the use of principal components. We have tested this by creating pillar-based principal components for the regulative and normative pillar. Only the first principal components of the regulative pillar obtained a statistically significant positive coefficient. However, due to the interpretation difficulties of the principal components, we decided not to use these in this paper.

$$CF_i = f(rleg_i, rlawd_i, rfi fr_i, rfree_i, cacc_i, ngiv_i, nclust_i, mremit_i, mtop5_i, mfdi_i) \tag{4}$$

Equations (2) and (3) differ in terms of the first two variables used to capture regulatory framework (H1) and variables *cacc* and *cpay* used to capture e-service culture (H4). In Equation (4), compared to Equation (2), the GDP per capita (*mgdpp*) indicator is replaced with the financial development index (*mfdi*). As the simultaneous consideration of hypotheses increases the number of control variables, the estimations are followed by a backward elimination procedure until the model includes only those explanatory variables which are statistically significant at  $p < 10\%$  level. All three equations will be estimated with total crowdfunding volumes and Equation (2) for all types of crowdfunding excluding equity-based crowdfunding. Equation (3) will be employed to estimate the determinants of equity-based crowdfunding.

Several robustness tests will also be carried out. First, Equations (2)–(4) (together with backward eliminations) will be run including also variables for trust (*ctrust*) and fear of entrepreneurial failure (*cfear*). This reduces the number of observations, but enables to see the results of the simultaneous consideration of all institutional variables. Second, Equation (2) (together with backward eliminations) will be estimated for the time period 2013–2016 for total crowdfunding volumes and its types (with the exception of Equation (3) estimated for equity-based crowdfunding). This reduces the number of countries and increases the vulnerability of the estimations to the potential misstatements. However, it does enable to capture the robustness of reported associations over a longer time period. Third, in order to address the endogeneity concerns, we estimate the Equations (1) and (2) using explanatory variables from 2014. Fourth, to address the concerns over the potential impact of outliers, we estimate Equation (2) excluding the observations of the five countries with the greatest volume per capita.

#### 4. Results and Discussion

##### 4.1. Crowdfunding Volumes across Regions and Countries

As can be seen from Table 2, the total crowdfunding volume during 2015–2016 for the 122 countries amounted to \$428 billion USD; 97.2% of this amount stemmed from debt-based crowdfunding, 1.5% from equity-based crowdfunding, followed by reward- and donation-based crowdfunding. The lowest country-specific volumes characterize the Middle East and Africa (MEA). The greatest means of country-specific volumes can be observed in the Asia Pacific region (APAC), followed by the Americas and Europe. On a per capita basis, the mean of country-specific volumes in Europe outperforms the mean volumes in the Americas in all cases, except for donation-based crowdfunding. However, when looking at medians, European countries exhibit the greatest volumes both in total terms and on a per capita basis. Large standard deviations refer to the uneven distribution of crowdfunding volumes across countries.

**Table 2.** Crowdfunding volumes during 2015–2016 across regions and types of crowdfunding.

Type	Region	Total Volume (USD bn)	No. of Countries	Country-Based Volume (USD mln)			Country-Based Volume to Population (USD)		
				Mean	Std.dev.	Median	Mean	Std.dev.	Median
All	APAC	341.0	19	17,940.0	77,500.0	4.8	21.50	59.87	0.14
	Americas	72.1	30	2404.0	12,900.0	4.7	9.57	40.12	0.35
	Europe	15.1	41	368.9	1820.0	7.1	12.64	31.58	1.33
	MEA	0.2	32	6.2	11.8	1.9	0.17	0.22	0.10
	Total	428.0	122	3511.0	31,200.0	4.4	9.99	36.02	0.25
Debt-based	APAC	336.0	19	17,680.0	76,500.0	1.0	20.28	58.24	0.08
	Americas	67.6	30	2252.0	12,200.0	2.8	7.86	37.70	0.24
	Europe	12.7	41	309.3	1600.0	4.7	10.61	28.17	0.87
	MEA	0.1	32	1.7	4.7	0.0	0.03	0.09	0.00
	Total	416.0	122	3412.0	30,700.0	0.1	8.67	33.91	0.00
Equity-based	APAC	1.7	19	91.4	361.0	0.3	0.50	1.35	0.00
	Americas	2.7	30	90.4	445.0	0.0	1.13	4.49	0.00
	Europe	1.8	41	43.2	184.0	0.0	1.34	3.40	0.00

Table 2. Cont.

Type	Region	Total Volume (USD bn)	No. of Countries	Country-Based Volume (USD mln)			Country-Based Volume to Population (USD)		
				Mean	Std.dev.	Median	Mean	Std.dev.	Median
Equity-based	MEA	0.1	32	3.8	6.6	1.0	0.11	0.16	0.05
	Total	6.3	122	52.0	281.0	0.0	0.84	3.03	0.00
Reward-based	APAC	2.8	19	148.8	620.0	0.3	0.37	0.71	0.01
	Americas	1.3	30	42.5	210.0	0.1	0.30	0.83	0.02
	Europe	0.5	41	12.4	28.4	1.5	0.58	0.71	0.24
	MEA	0.0	32	0.2	0.3	0.1	0.01	0.02	0.00
	Total	4.6	122	37.8	266.0	0.3	0.33	0.67	0.02
Donation-based	APAC	0.3	19	17.3	58.5	0.0	0.35	1.25	0.00
	Americas	0.6	30	18.7	72.6	0.0	0.28	0.96	0.00
	Europe	0.1	41	3.4	12.7	0.0	0.09	0.23	0.00
	MEA	0.0	32	0.5	1.2	0.1	0.02	0.03	0.00
	Total	1.0	122	8.6	43.5	0.0	0.16	0.70	0.00

Notes: APAC refers to the Asia Pacific, MEA refers to the Middle East and Africa. Data source: authors, based on data obtained from the CCAF.

In order to shed more light on crowdfunding volumes on a per-country basis, Figure 1 presents these on two-dimensional plots. The horizontal axis for each subfigure represents the total per capita volumes for each country over 2015–2016 and the vertical axis for each subfigure refers to either the total debt-, equity-, reward-, or donation-based crowdfunding volumes for each country during 2015–2016 per capita. As such, a country’s position on the horizontal axis remains the same for all subfigures, while its position on the vertical axis changes based on which type of crowdfunding is examined in the respective subfigure, enabling to quickly comprehend which types of crowdfunding are more prevalent in which countries.

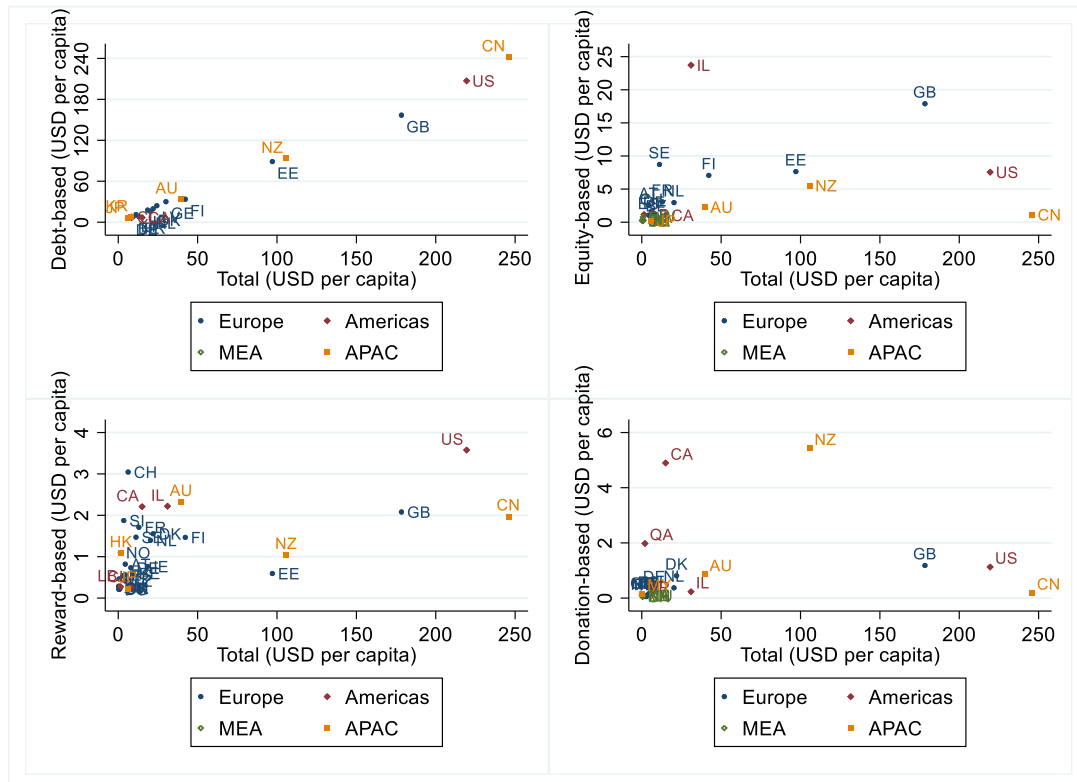


Figure 1. Total crowdfunding volumes during 2015–2016 per capita by types of crowdfunding across countries. Notes: APAC refers to the Asia Pacific, MEA refers to the Middle East and Africa. Countries are represented by two-letter codes. Data source: authors, based on data obtained from CCAF.

In terms of total crowdfunding volumes, China, the U.S., and Great Britain are ahead of all others with volumes over 2015–2016 exceeding \$150 USD per capita. They are followed rather closely by New Zealand, Estonia, Finland, and Australia. The same countries are in the lead in terms of debt-based crowdfunding. In equity-based crowdfunding, the situation is a bit different—Israel in the lead with \$23.7 USD per capita, followed by Great Britain, Sweden, Estonia, Finland, and the U.S. In the context of reward-based crowdfunding, the U.S. is in the lead with \$3.6 USD per capita followed by Switzerland, Australia, Israel, and Canada. Country-specific indicators for donation-based crowdfunding exhibit rather different patterns with New Zealand in the lead with \$5.4 USD per capita, followed by Canada, Qatar, Great Britain, and the U.S. This indicates that although the U.S. reaches the top five list of volumes in most types of crowdfunding, there exist rather significant differences in the ordering of countries based on volumes. Given the low country-specific volumes for most types of crowdfunding, the following analysis and discussion will concentrate more on the total crowdfunding volumes.

#### 4.2. Determinants of Total Crowdfunding Volumes

##### 4.2.1. Results of Testing Each Institutional Variable Set Separately

Table 3 presents the estimates of Equation (1) for each set of regulative determinants of crowdfunding. The results show that, in line with expectations, all selected regulative variables exhibit a statistically significant positive association with crowdfunding volumes with the exception of the variable focusing on investor protection (*rinvp*). As the latter variable is less crowdfunding specific, it can be considered of lower importance compared to indicators focusing on crowdfunding regulations. This indicates that if we do not simultaneously control for other institutional characteristics, H1, H2, and H3 are supported. The presence of crowdlending or equity crowdfunding regulations is associated with an increase in crowdfunding volumes per capita by 17 to 18 times. A one standard deviation change in the legal rights index is associated with a 154% increase in total crowdfunding volumes per capita. One standard deviation changes in financial freedom (*rfifr*) and democracy (*rfree*) scores are associated with a 264% and 214% increase in crowdfunding volumes per capita, respectively. These are very significant changes in economic terms.

**Table 3.** Regulative determinants of total crowdfunding volumes during 2015–2016 per capita.

Model	M11a	M11b	M12	M13
Constant	-10.750 *** (2.093)	-8.765 *** (2.386)	-8.294 *** (1.987)	-9.803 *** (2.315)
<i>rleg</i>	0.339 *** (0.082)			
<i>rlawd</i>	2.854 *** (0.571)			
<i>rinvp</i>		0.113 (0.227)		
<i>rlawe</i>		2.913 *** (0.641)		
<i>rfifr</i>			0.078 *** (0.018)	
<i>rfree</i>				0.045 *** (0.013)
<i>mgdpp</i>	0.691 *** (0.174)	0.614 *** (0.224)	0.307 (0.230)	0.643 ** (0.255)
<i>mremit</i>	-0.098 ** (0.044)	-0.065 (0.039)	-0.077 * (0.039)	-0.064 * (0.037)
<i>mtop5</i>	0.019 (0.015)	0.016 (0.016)	0.005 (0.016)	-0.004 (0.015)
No. of obs.	107	108	113	122
Adj. R2	0.39	0.31	0.34	0.35
F-stat.	29.2 ***	19.1 ***	17.6 ***	19.7 ***
Mean VIF	1.2	1.3	1.4	1.3

Notes: Dependent variable log transform of country-specific total crowdfunding volume during 2015–2016 per capita (*cf\_total*). For variable descriptions see Table 1. The second number marking the columns after “M1” refers to the number of the hypothesis that the specification is testing. Robust standard errors in parentheses. No. of obs. refers to the number of observations included in the corresponding model. Adj. R2 refers to the adjusted coefficient of determination of the corresponding model. Statistical significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table 4 presents the estimates of Equation (1) for each cultural–cognitive and normative determinant of crowdfunding. All cultural–cognitive determinants of crowdfunding (models M14a to M16), with the exception of the fear of entrepreneurial failure (*cfear*), exhibit a statistically significant positive association with crowdfunding volumes. The insignificance of the latter result (H6) may be partly due to the lower availability of data, which leads to only 69 observations. Still, these results do show that e-service culture and trust play an important role in crowdfunding activity (strong support for H4 and H5). The coefficients of these variables are also economically significant. A 1 percentage point increase in the number of people using a mobile or the Internet to access an account (*cacc*) is associated with a 16% increase in crowdfunding volumes per capita. A 1 percentage point increase in the number of people using the Internet to pay bills or buy something online (*cpay*) is associated with an 11% increase in crowdfunding volumes per capita. In countries where trust is above the median of other countries, crowdfunding volumes per capita are 3.3 times greater.

**Table 4.** Cultural-cognitive and normative determinants of total crowdfunding volumes during 2015–2016 per capita.

Model	M14a		M14b		M15		M16		M17		M18	
Constant	−7.134	***	2.119		−12.300	***	−17.010	***	−13.310	***	−11.660	***
	(2.406)		(2.918)		(4.584)		(4.331)		(2.572)		(2.416)	
<i>cacc</i>	0.154	***										
	(0.0)											
<i>cpay</i>			0.100	***								
			(0.013)									
<i>ctrust</i>					1.205	**						
					(0.558)							
<i>cfear</i>							−0.036					
							(0.047)					
<i>ngiv</i>								0.017				
								(0.024)				
<i>nclust</i>											2.467	***
											(0.814)	
<i>mgdpp</i>	0.428	**	−0.533	*	0.973	**	1.642	***	1.148	***	0.972	***
	(0.205)		(0.282)		(0.417)		(0.457)		(0.197)		(0.216)	
<i>mremitt</i>	−0.005		−0.040		−0.070		−0.006		−0.061		−0.051	
	(0.043)		(0.042)		(0.056)		(0.077)		(0.037)		(0.035)	
<i>mtop5</i>	0.010		0.001		0.024		0.023		0.013		0.016	
	(0.015)		(0.015)		(0.024)		(0.024)		(0.017)		(0.015)	
No. of obs.	108		108		77		69		117		122	
Adj. R2	0.35		0.49		0.24		0.18		0.26		0.28	
F-stat.	21.2	***	35.3	***	7.7	***	5.4	***	12.0	***	17.1	***
Mean VIF	1.4		1.8		1.5		1.4		1.1		1.2	

Notes: dependent variable log transform of country-specific total crowdfunding volume during 2015–2016 per capita (*cf\_total*). For variable descriptions see Table 1. The second number marking the columns after “M1” refers to the number of the hypothesis that the specification is testing. Robust standard errors in parentheses. Statistical significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.5$ , \*  $p < 0.1$ .

Normative determinants of crowdfunding (models M17 and M18) provide more mixed results. In line with H8, the coefficient for the cluster indicator (*nclust*) exhibits a positive coefficient. Countries that have a top10 financial center exhibit 11 times greater crowdfunding volumes per capita compared to countries that do not have such centers. At the same time, the coefficient of the world giving score (*ngiv*) remains statistically insignificant.

The results presented in Tables 3 and 4 also show that from the non-institutional variables, GDP per capita (*mgdpp*) exhibits the most stable significant and positive association with total crowdfunding volumes. As exceptions, this indicator does remain insignificant in specification M11b and exhibits a negative sign in M14b. Dushnitsky et al. (2016) also reported a positive association between GDP per capita and the number of crowdfunding platforms. Although Rau (2018) observed more mixed results for this variable, in most specifications a positive association with crowdfunding volumes emerged. Remittances exhibit an expected negative association with crowdfunding volumes only in



three specifications. Bank concentration remains statistically insignificant in all specifications. This is surprising, as [Rau \(2018\)](#) reported a positive association between crowdfunding volumes and top 5 bank concentration ratio.

#### 4.2.2. Results of Testing Institutional Variables from All Three Pillars Simultaneously

Table 5 presents the results of Equations (2)–(4) including institutional variables from all three pillars simultaneously. We see that the positive association between crowdfunding volumes and regulatory framework (H1) remains robust across different specifications. Although the coefficient for investor protection (*rinvp*) remains statistically insignificant, legal rights (*rleg*), and the existence of crowdfunding regulations (*rlawd*, *rlawe*) exhibit a positive association with crowdfunding volumes. The magnitude of the association between crowdfunding volumes and regulative indicators does decrease after controlling for other institutional variables. However, the associations continue to remain economically significant. A unit increase in the strength of legal rights is associated with a 20% to 30% increase in crowdfunding volumes per capita. The presence of crowdlending regulations is associated with a 5- to 8-fold and the existence of equity crowdfunding regulations with a 3-fold increase in crowdfunding volumes per capita.

**Table 5.** Institutional determinants of total crowdfunding volumes during 2015–2016 per capita.

Model	M2a		M2b		M3a		M3b		M4a		M4b	
<i>Constant</i>	−2.284		−3.985	***	5.946	*	5.528	**	−5.307	***	−4.763	***
	(2.605)		(1.441)		(3.021)		(2.777)		(1.878)		(1.302)	
<i>rleg</i>	0.180	**	0.198	**					0.254	**	0.262	***
	(0.087)		(0.082)						(0.097)		(0.082)	
<i>rlawd</i>	2.125	***	2.133	***					1.811	***	1.687	***
	(0.525)		(0.490)						(0.564)		(0.515)	
<i>rinvp</i>					0.047							
					(0.230)							
<i>rlawe</i>					1.160	**	1.305	***				
					(0.465)		(0.465)					
<i>rfifr</i>	0.021				0.036	**	0.044	**	0.010			
	(0.018)				(0.016)		(0.019)		(0.021)			
<i>rfree</i>	0.028	**	0.030	**	0.014				0.023	*	0.027	**
	(0.014)		(0.012)		(0.014)				(0.013)		(0.013)	
<i>cacc</i>	0.115	***	0.129	***					0.087	**	0.101	***
	(0.0)		(0.0)						(0.0)		(0.0)	
<i>cpay</i>					0.081	***	0.086	***				
					(0.016)		(0.015)					
<i>ngiv</i>	−0.046	*	−0.043	*	−0.056	***	−0.055	***	−0.045	*	−0.044	*
	(0.025)		(0.026)		(0.020)		(0.019)		(0.026)		(0.026)	
<i>nclust</i>	1.167	*	1.125	*	0.627				0.598			
	(0.641)		(0.588)		(0.540)				(0.709)			
<i>mgdpp</i>	−0.276				−1.002	***	−0.902	***				
	(0.290)				(0.330)		(0.283)					
<i>mremit</i>	−0.056				−0.078	**	−0.075	**	−0.032			
	(0.042)				(0.039)		(0.036)		(0.044)			
<i>mtop5</i>	0.006				−0.001				0.010			
	(0.013)				(0.014)				(0.013)			
<i>mfdi</i>									2.036		2.708	**
									(1.850)		(1.300)	
No. of obs.	100		100		101		101		98		98	
Adj. R2	0.52		0.52		0.56		0.57		0.53		0.54	
F-stat.	22.4	***	33.9	***	29.6	***	41.7	***	20.6	***	27.5	***
Mean VIF	1.7		1.4		2.0		2.0		1.9		1.6	

Notes: dependent variable log transform of total country-specific crowdfunding volume during 2015–2016 per capita (*cf\_total*). Specifications marked with “a” contain all institutional variables used to test H1, H2, H3, H4, H7, and H8. Specifications marked with “b” present the results of backward elimination of specification “a”. For variable descriptions see Table 1. Robust standard errors in parentheses. Statistical significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

The results remain less robust with respect to other regulative institutions (H2 and H3). Still, in several specifications, we do observe that a more favorable regulatory climate for financial services, reflected in greater financial freedom (*rfifr*) and greater democracy level (*rfree*), is associated with greater crowdfunding volumes. A one standard deviation increase in financial freedom is associated with an 82% to 109% and a one standard deviation increase in the democracy level with a 77% to 114% increase in crowdfunding volumes per capita.

As in Table 4, support for the relevance of the cultural-cognitive factor e-service culture (H4) remains strong. A positive association exists irrespective to the used proxy (*cacc* or *cpay*). A 1 percentage point increase in the number of people using a mobile or the Internet to access an account (*cacc*) is associated with a 2.3% to 3.1% increase in crowdfunding volumes per capita. A 1 percentage point increase in the number of people using the Internet to pay bills or buy something online (*cpay*) is associated with a 9% increase in crowdfunding volumes per capita. These are economically significant changes (although lower than those reported in Table 3).

The normative institutions provide some results that we did not observe in previous simpler specifications. The world giving score (*ngiv*) exhibits a negative association with crowdfunding volume in all six specifications. This result is contrary to H7. In terms of the financial services cluster, we observe that countries with a top10 financial center have three times greater crowdfunding volumes per capita. Still, the support for H8 is not very robust to different combinations of explanatory variables.

The simultaneous inclusion of institutional variables in Table 5 reduces the significance of non-institutional variables compared to Tables 3 and 4. Economic development, reflected in GDP per capita, remains insignificant in the baseline M2 models and becomes statistically significant and negative in M3 specification. The latter result seems to be partly driven by a rather strong correlation between GDP per capita (*mgdpp*) and the number of people using the internet to pay bills or buy something online (*cpay*). If we would remove *cpay* from model M3, the coefficient of *mgdpp* becomes statistically insignificant and a significant positive coefficient emerges for democracy (*rfree*) and the cluster indicator (*nclust*). If *mgdpp* is replaced with a proxy for financial development (*mfdi*), its positive association with crowdfunding emerges after backward elimination (see model M4). The support for a negative association with remittances appears in one specification out of the three.

#### 4.2.3. Robustness of Results Concerning Total Crowdfunding Volumes

In order to test the robustness of results presented in Section 4.2.2, we run a separate set of models including all institutional variables at once (see Table A2 in Appendix A). This leads to a significant decrease in the number of observations and to a slight decrease in the explanatory power of the models. As a consequence, the support for H2, H3, H7, and H8 disappears. Despite these changes, the support for H1 and H4 remains. This shows that regulations more directly affecting crowdfunding, as well as the e-service culture, are important crowdfunding determinants. The coefficients of the added variables for H5 and H6, trust between strangers (*ctrust*) and fear of failure (*cfear*), both emerge as statistically significant. In line with expectations, countries with above-median trust levels have almost three times greater crowdfunding volume per capita. A 1 percentage point increase in the fear of entrepreneurial failure rate is associated with a 7.7% decrease in crowdfunding volumes per capita.

As an additional robustness test, we run models M2a and M2b also using crowdfunding data from 2013–2016 (see Appendix A Table A3 columns M2a and M2b for total crowdfunding). Similarly to results reported in Table 5, the support for H1 and H4 remains. Support for H3, H7, and H8 disappears. However, an expected positive association is reported for financial freedom (H3) after backward elimination. Considering that in this estimation the number of observations drops from 100 to 86 and the pre-2015 crowdfunding data is prone to greater biases, the loss of significance of some of the previously reported associations in Table 5 is not too surprising.

The robustness test focusing on endogeneity concerns (see Table A4 in Appendix A) shows that all the significant associations reported in Tables 3 and 4 remain. Furthermore, two of the institutional variables which were insignificant earlier (investor protection and giving score) now also exhibit

the expected significant positive association with total crowdfunding volume. When most of the institutional variables are added into the specification together (see Appendix A Table A5 columns for robustness test 1), we do observe that the coefficients for the legal rights, giving score, and cluster lose their statistical significance compared to Table 5. However, the remaining institutional variables maintain their significant associations after the elimination of insignificant control variables.

Additional robustness tests are presented in Table A5 in Appendix A as test 2 and 3. When the total crowdfunding volume is scaled by the GDP (see robustness test 2), the results remain rather similar to those reported in Table 5. The positive association with crowdfunding regulations and e-service culture remains and the non-institutional variables exhibit greater significance. It can be argued that countries with very high crowdfunding volumes may somehow influence the reported results. However, the exclusion of the five countries with the greatest per capita crowdfunding volumes (see robustness test 3) does not lead to significant changes in the reported results. Compared to Table 5, the only change concerning institutional variables is the significant positive coefficient reported for financial freedom, which previously was insignificant in the same specification.

#### 4.2.4. Discussion of Total Crowdfunding Volumes' Determinants

Our results show that in the context of total crowdfunding volumes the strongest support exists for H1 and H4, reflected in legal rights, crowdfunding specific regulation and e-service culture. It is not surprising that among the indicators for the regulative pillar, H1 has the strongest support. Specifically, the existence of crowdfunding-specific regulations should have a more pronounced association with total crowdfunding volumes, in comparison to more general laws and the ruling regime, because of their direct and explicit nature. The positive association with legal rights seems consistent with Miglo and Miglo (2019), who suggest that crowdfunding may be preferred in countries with relatively higher bankruptcy costs, which are captured through this variable. Previous studies have similarly shown that legal rights tend to be positively associated with the number of debt-based crowdfunding platforms (Dushnitsky et al. 2016) and crowdlending regulations with crowdfunding volumes (Rau 2018). An important conclusion from this result would be that implementing regulations that are specific to crowdfunding could enable to boost crowdfunding activity. However, it is important to note that, due to data restrictions, we are unable to explicitly test for causality, which does leave the possibility that regulations are implemented as a response to greater crowdfunding volumes. Still, crowdfunding-specific regulations are a rare example of institutions that could be changed within a short timeframe. Other institutional variables do not tend to change so rapidly. An example of such an institution can be found in H4, which focuses on the extent of trust in internet transactions. Similarly to crowdfunding-specific regulations, this can also be considered a rather direct indicator of the attractiveness of crowdfunding activity in a country compared with other institutional variables like thin trust between strangers or fear of entrepreneurial failure. However, it remains more difficult to change, because of the reliance on perceptions that have evolved over long periods of time. Still, the promotion of e-services by the government could be a way to gradually increase the public interest in crowdfunding.

Depending on the specification and number of observations, slightly weaker support exists for the relevance of regulative institutions reflected in financial freedom (H2) and the level of democracy (H3). This shows that the overall strength of different regulative institutions is an important crowdfunding determinant and the creation of a regulatory climate that is more suitable for the provision of different financial services, as well as higher levels of democracy, could contribute to more active crowdfunding.

Cultural cognitive institutions reflected in trust (H5) and fear of entrepreneurial failure (H6), provide less robust results. The lower significance of these variables can be explained by the fact that the data for their proxies was not available for many of the covered countries. Still, the existing results do show that crowdfunding volume tends to be greater in countries with greater trust between strangers, which is consistent with the expectation that thin trust acts as an alleviative to issues related

to imperfect information. Furthermore, the increased visibility of crowdfunding campaigns may deter entrepreneurs if the culture holds a particularly negative view on failure.

The most intriguing results emerge for the normative institutions. There is a weak positive association with the presence of a strong financial services cluster (H8). As we used a very simple proxy for that variable (presence of top10 financial services center), future studies could try more elaborate metrics with closer linkages to crowdfunding. However, the results concerning philanthropy (H7) remained opposite to expectations—greater allocation of time, money and resources allocated for the benefit of others is associated with lower crowdfunding volumes per capita. It does seem to support the view that the dominance of debt- and equity-based crowdfunding in total crowdfunding volumes could cancel out the potentially philanthropic motive driving reward- and donation-based crowdfunding. The latter hypothesis may be better suited for models using donation-based crowdfunding as a dependent variable. As the determinants of crowdfunding volumes may vary across different types of crowdfunding, we investigate this aspect in the following Section 4.3.

It is rather surprising that non-institutional variables provided significantly less robust results in the estimations compared to institutional ones. It does seem that the simultaneous consideration of different institutional variables from all three pillars tended to increase multicollinearity issues and there through reduced the ability to detect the association between these variables and crowdfunding volumes.

#### 4.3. Determinants of Crowdfunding Volumes by Types of Crowdfunding

Table 6 presents the results of Equation (2) for debt-, reward-, and donation-based crowdfunding and Equation (3) for equity-based crowdfunding. In terms of regulative indicators, none of the indicators appear statistically significant in donation-based crowdfunding. This is not too surprising as donations are driven by the free will of individuals rather than regulations. In other types of crowdfunding, regulative indicators remain rather important. The support for H1 remains the strongest, however, more in the context of crowdfunding-specific related regulations (*rlawd*, *rlawe*). For these indicators, it is also worth noting that, economically, the association between regulation targeted at debt and at equity is significantly stronger towards the corresponding types of crowdfunding than they were for either indicator in Table 5, when compared with total crowdfunding volumes. This seems to indicate that not only is the general existence of crowdfunding-related regulation important, the association also is more prominent when the regulation is targeted at specific types of crowdfunding. Financial freedom (*rfifr*) appears statistically significant only in debt-based crowdfunding and after backward elimination exercise. The overall democracy level maintains its statistical significance only in reward-based crowdfunding. Interestingly, this indicator takes a negative, albeit statistically insignificant coefficient when tested against equity-based crowdfunding volumes. If we consider the democracy level of a country to be generally indicative of overall transparency in the society, this result would be consistent with the theoretical model proposed by Belleflamme et al. (2014), which suggests that information asymmetry has a negative effect on reward-based crowdfunding, but a positive effect on equity-based crowdfunding. However, aside from this, the support for H2 and H3 seems to remain more vulnerable to the type of crowdfunding.

From the remaining institutional indicators, the support for the relevance of cultural-cognitive factors reflected in e-service culture (H4) remains very robust across all types of crowdfunding. Results remain less explicit with respect to normative institutions. Philanthropy (H7) remains insignificant irrespective of the type of crowdfunding and support for the relevance of financial services cluster (H8) emerges only in reward-based crowdfunding.

When comparing our results to those of Dushnitsky et al. (2016), we observe some differences. They find a negative association between legal rights and the number of donation-based or equity-based platforms (insignificant in our models). However, unlike in this paper, Dushnitsky et al. (2016) find no significant association between crowdfunding regulations and numbers of any type of crowdfunding platforms. This may be partly due to the use of the annual count of new crowdfunding platforms (not crowdfunding volume) as a dependent variable. The only result of Dushnitsky et al. (2016) that

matches ours is the positive association reported for the number of debt-based crowdfunding platforms and legal rights.

**Table 6.** Institutional determinants of total crowdfunding volumes during 2015–2016 per capita by types of crowdfunding.

Type of Crowdfunding	Debt-Based		Equity-Based		Reward-Based		Donation-Based	
	M2a	M2b	M3a	M3b	M2a	M2b	M2a	M2b
Constant	−6.094 (3.824)	−8.618 *** (1.546)	12.390 *** (3.727)	12.300 *** (3.258)	−11.310 *** (1.985)	−11.250 *** (1.464)	−4.129 (2.625)	−5.671 *** (0.371)
rleg	0.234 (0.149)	0.245 * (0.132)			0.056 (0.049)		0.043 (0.080)	
rlawd	3.341 *** (0.889)	3.660 *** (0.713)			1.473 *** (0.370)	1.379 *** (0.322)	0.716 (0.790)	
rinvp			−0.036 (0.296)					
rlawe			2.060 * (1.043)	1.961 * (1.030)				
rfifr	0.051 (0.032)	0.063 ** (0.028)	0.018 (0.021)		−0.004 (0.014)		0.005 (0.018)	
rfree	0.016 (0.018)		−0.009 (0.014)		0.027 ** (0.010)	0.028 ** (0.012)	0.016 (0.011)	
cacc	0.1 ** (0.1)	0.1 ** (0.0)			0.077 *** (0.0)	0.1 *** (0.0)	0.089 ** (0.0)	0.1 *** (0.0)
cpay			0.099 *** (0.023)	0.100 *** (0.020)				
ngiv	−0.048 (0.034)		−0.003 (0.021)		−0.025 (0.017)		0.023 (0.023)	
nclust	0.932 (1.191)		0.083 (1.078)		1.036 * (0.530)	0.837 * (0.473)	0.023 (1.123)	
mgdpp	−0.065 (0.392)		−1.718 *** (0.410)	−1.700 *** (0.344)	0.616 *** (0.219)	0.585 *** (0.219)	−0.288 (0.275)	
mremi	−0.114 * (0.068)	−0.107 * (0.063)	−0.112 ** (0.048)	−0.112 ** (0.048)	0.010 (0.039)		−0.085 ** (0.034)	−0.071 ** (0.033)
mtop5	−0.011 (0.023)		−0.027 * (0.016)	−0.027 * (0.016)	0.006 (0.010)		−0.014 (0.013)	
No. of obs.	100	100	101	101	100	100	100	100
Adj. R2	0.42	0.43	0.37	0.40	0.66	0.66	0.26	0.27
F-stat.	19.2 ***	32.4 ***	13.3 ***	22.0 ***	39.4 ***	74.2 ***	5.6 ***	15.4 ***
Mean VIF	1.7	1.4	2.0	1.8	1.7	1.6	1.7	1.2

Notes: dependent variable log transform of country-specific total crowdfunding volume during 2015–2016 per capita by type of crowdfunding. Specifications marked with “a” contain all institutional variables used to test H1, H2, H3, H4, H7, and H8. Specifications marked with “b” present the results of backward elimination of specification “a”. For variable descriptions see Table 1. Robust standard errors in parentheses. Statistical significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

From the non-institutional control variables, the robust significant association remains only for remittances for all types of crowdfunding with the exception of reward-based crowdfunding. Similarly to results presented in Table 5, in equity-based crowdfunding using the number of people using the Internet to pay bills or buy something online (*cpay*) variable, the GDP per capita has a negative coefficient. At the same time, a positive association is reported for reward-based crowdfunding. This contradiction is driven by the strong correlation between *cpay* and *mgdpp*. Bank concentration ratio appears significant only in models focusing on equity-based crowdfunding. As the coefficient is negative, it indicates that equity crowdfunding is greater in countries with lower bank concentration.

In order to test the robustness of the abovementioned results, the models presented in Table 6 were re-run with crowdfunding indicators covering a period of 2013–2016 (see Table A3 in Appendix A). The extension of the period reduces the number of observations and explanatory power of models for all types of crowdfunding with the exception of reward-based crowdfunding. The support for H1 (crowdfunding regulations) and H4 (e-service culture) remains very robust. Slightly stronger support for a positive association with financial freedom (H2) is observed in the context of debt-based crowdfunding. However, the support for the relevance of democracy (H3), in the context of reward-based crowdfunding, disappears. Results concerning philanthropy (H7) remain inconclusive and support for H8 (presence of top10 financial center) is observed only for reward-based crowdfunding (as in Table 6). The significance

of other control variables decreases, especially for remittances (*mremit*). Contradicting signs for GDP per capita across different types of crowdfunding remain.

The above-mentioned results show that donation-based crowdfunding remains the least affected by different institutions, exhibiting a significant positive association only with e-service culture (H4). This is rather surprising given that Kshetri (2015) proposed it to have strong linkages also with democracy (H3) and philanthropy (H7). The lack of significance of philanthropy in this paper can be partly explained by the use of an indicator capturing not just money, but also time and other resources for the benefit of others.

The initial propositions of Kshetri (2015, 2018) indicated the lack of relevance of some of the hypotheses for some types of crowdfunding which we observe as significant in our models. These include the positive association with the regulatory framework (H1) observed for reward-based and debt-based crowdfunding and positive association with financial freedom (H2) observed for debt-based crowdfunding. We do see that the relevance of institutional factors across different types of crowdfunding does vary, as also hypothesized by Kshetri (2015, 2018). This does indicate that it would be desirable to investigate the determinants of crowdfunding volumes more thoroughly by types of crowdfunding in future studies. The latter requires improved availability of data on volumes of different types of crowdfunding across countries. It should be borne in mind that the dataset used in this paper had many countries with no data for some specific types of crowdfunding. We assumed in such cases that it would be 0 if the country had some data available on some other types of crowdfunding. This simplification may be too naïve of an expectation and may also reduce the possibilities to detect some significant associations between the variables.

## 5. Conclusions

Overall, the results of our paper show that many of the institutional aspects proposed in the theoretical literature as relevant crowdfunding determinants do indeed survive the empirical tests. Institutions seem to be important vehicles in the spreading acceptance of crowdfunding, as they provide legitimacy to this novel way of financing and mitigate woes such as imperfect information, moral hazard, and diverging incentives. Regulative and cultural cognitive institutions are especially important determinants of crowdfunding volumes, while normative institutions provide rather inconclusive results. The results of this paper should be considered especially important for policymakers, as governments have numerous levers to influence a country's institutional structures. For instance, if policymakers are interested in promoting crowdfunding to improve access to financing, implementing, and enforcing clear crowdfunding-specific regulations could help legitimize crowdfunding in the eyes of both investors and those seeking funds. Shaping cultural beliefs with initiatives promoting the use of e-services as a reliable way of transacting could also contribute to the increase of crowdfunding volumes. In addition to policymakers, managers of crowdfunding platforms could campaign for stronger industry regulations and promote their platforms as a credible way of obtaining financing or investing money for the wider public, in an attempt to increase the legitimacy of their businesses and, with that, the volume of transactions mediated through their platforms.

It is noteworthy that institutional variables provide a more significant and robust association with crowdfunding volumes compared to country-specific non-institutional variables. This implies that even if crowdfunding could be an economically rational choice for projects looking for financing in some countries, we may still see only minuscule crowdfunding volumes in such countries if local institutions are unwelcoming towards crowdfunding. These results also provide significant insight for future research by indicating a need to incorporate institutional variables as controls in future models focusing on crowdfunding volumes. However, there are some important caveats to consider when interpreting these results. First and foremost, we were not able to explicitly test for causality due to data restrictions, which leaves a possibility that some variables (i.e., crowdfunding-specific regulations) may exhibit correlation with crowdfunding volumes because they themselves are responding to the change in crowdfunding volumes. Another factor to keep in mind is that the role of institutions may

become less pronounced over time, as crowdfunding becomes more widely accepted as a widely approved method of raising funds.

In conclusion, this paper provides a much-needed understanding of at least one set of factors that help to explain the adoption rate of crowdfunding globally. It, therefore, breaks away from the academic literature on crowdfunding that has so far mostly focused on single platforms or regions and gives a more generalized view of this phenomenon. The paper also contributes to a growing area of empirical research that highlights how institutions interact with digital innovations and what role they have in determining whether these innovations are legitimate and, therefore, accepted for wider use. Keeping in mind the fast growth of crowdfunding and the more proactive stance some countries have taken in regulating this phenomenon in recent years, it would be interesting to repeat this study in the future to examine how the effects of institutions evolve over time.

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## Appendix A

**Table A1.** Pairwise Correlations between Explanatory Variables.

	<i>rleg</i>	<i>rlawd</i>	<i>rinop</i>	<i>rlawe</i>	<i>rfifr</i>	<i>rfree</i>	<i>cacc</i>	<i>cpay</i>
<i>rleg</i>	1.00							
<i>rlawd</i>	−0.07	1.00						
<i>rinop</i>	0.26	0.21	1.00					
<i>rlawe</i>	0.09	0.83	0.32	1.00				
<i>rfifr</i>	0.28	0.27	0.45	0.36	1.00			
<i>rfree</i>	0.18	0.38	0.43	0.42	0.63	1.00		
<i>cacc</i>	0.21	0.26	0.40	0.43	0.55	0.43	1.00	
<i>cpay</i>	0.16	0.45	0.44	0.56	0.65	0.63	0.81	1.00
<i>ctrust</i>	0.00	0.19	−0.05	0.22	0.25	0.21	0.44	0.46
<i>ngiv</i>	0.12	0.11	0.22	0.32	0.32	0.24	0.50	0.42
<i>nclust</i>	0.17	0.07	0.23	0.29	0.41	0.27	0.45	0.46
<i>cfear</i>	−0.10	0.24	0.19	0.25	0.12	0.03	0.17	0.32
<i>mgdpp</i>	−0.01	0.34	0.49	0.38	0.60	0.51	0.55	0.74
<i>mremit</i>	0.11	−0.20	−0.23	−0.23	−0.25	−0.20	−0.42	−0.39
<i>mtop5</i>	−0.05	0.02	0.06	0.06	0.21	0.21	0.22	0.24
<i>mfdi</i>	0.05	0.42	0.55	0.53	0.61	0.51	0.67	0.76
	<i>ctrust</i>	<i>ngiv</i>	<i>nclust</i>	<i>cfear</i>	<i>mgdpp</i>	<i>mremit</i>	<i>mtop5</i>	<i>mfdi</i>
<i>ctrust</i>	1.00							
<i>ngiv</i>	0.37	1.00						
<i>nclust</i>	0.18	0.32	1.00					
<i>cfear</i>	−0.06	−0.01	0.05	1.00				
<i>mgdpp</i>	0.28	0.26	0.35	0.42	1.00			
<i>mremit</i>	−0.11	−0.19	−0.18	−0.30	−0.39	1.00		
<i>mtop5</i>	0.07	0.07	−0.11	−0.08	0.06	−0.16	1.00	
<i>mfdi</i>	0.21	0.38	0.57	0.44	0.79	−0.39	0.02	1.00

**Table A2.** All Institutional Determinants of Total Crowdfunding Volumes during 2015–2016 per Capita.

Model	M2a		M2b		M3a		M3b		M4a		M4b	
<i>Constant</i>	-2.886 (6.944)		0.297 (1.335)		14.970 (12.200)		1.756 (1.324)		-0.696 (2.967)		0.297 (1.335)	
<i>rleg</i>	0.230 (0.110)	**	0.216 (0.094)	**					0.272 (0.118)	**	0.216 (0.094)	**
<i>rlawd</i>	2.166 (0.672)	***	2.329 (0.642)	***					1.755 (0.784)	**	2.329 (0.642)	***
<i>rinvp</i>					0.139 (0.398)							
<i>rlawe</i>					1.555 (0.648)	**	1.095 (0.574)	*				
<i>rfifr</i>	0.012 (0.025)				0.021 (0.028)				0.001 (0.029)			
<i>rfree</i>	0.001 (0.021)				-0.021 (0.024)				0.007 (0.018)			
<i>cacc</i>	0.1 (0.1)	**	0.123 (0.0)	***					0.098 (0.0)	**	0.123 (0.0)	***
<i>cpay</i>					0.097 (0.034)	***	0.064 (0.012)	***				
<i>ctrust</i>	1.086 (0.538)	*			0.658 (0.625)				1.112 (0.601)	*		
<i>cfear</i>	-0.080 (0.033)	**	-0.081 (0.040)	**	-0.107 (0.034)	***	-0.098 (0.039)	**	-0.090 (0.037)	**	-0.081 (0.040)	**
<i>ngiv</i>	-0.070 (0.047)				-0.068 (0.042)				-0.081 (0.051)			
<i>nclust</i>	0.236 (0.792)				0.445 (0.751)				-0.354 (0.939)			
<i>mgdpp</i>	0.343 (0.692)				-1.276 (0.939)							
<i>nremit</i>	-0.008 (0.136)				-0.062 (0.151)				0.038 (0.135)			
<i>mtop5</i>	0.010 (0.020)				0.007 (0.022)				0.010 (0.020)			
<i>mfdi</i>									4.126 (3.516)			
No. of obs.	51		51		52		52		51		51	
Adj. R2	0.42		0.45		0.47		0.48		0.45		0.45	
F-stat.	9.7	***	19.4	***	11.5	***	18.2	***	10.9	***	19.4	***
Mean VIF	2.1		1.1		2.4		1.2		2.3		1.1	

Notes: dependent variable log transform of country-specific total crowdfunding volume during 2015–2016 per capita (*cf\_total*). Specifications marked with “a” contain all institutional variables used to test all hypotheses H1 to H8. Specifications marked with “b” present the results of backward elimination of specification “a”. For variable descriptions see Table 1. Robust standard errors in parentheses. Statistical significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .



**Table A3.** Institutional Determinants of Crowdfunding Volumes during 2013–2016 per Capita by Types of Crowdfunding.

Type	Total Crowdfunding				Debt-Based				Equity-Based				Reward-Based				Donation-Based			
Model	M2a		M2b		M2a		M2b		M3a		M3b		M2a		M2b		M2a	M2b		
<i>Constant</i>	-6.369	**	-5.445	***	-12.890	***	-14.640	***	13.430	***	9.203	***	-12.750	***	-13.390	***	-2.194	-5.345	***	
	(2.596)		(1.122)		(4.432)		(2.386)		(4.816)		(3.012)		(1.867)		(1.348)		(3.380)	(0.285)		
<i>rleg</i>	0.251	**	0.212	**	0.226								0.080				0.070			
	(0.113)		(0.100)		(0.196)								(0.061)				(0.121)			
<i>rlawd</i>	2.861	***	2.923	***	3.655	***	3.397	***					2.012	***	2.041	***	1.287			
	(0.582)		(0.534)		(1.071)		(1.018)						(0.429)		(0.465)		(1.086)			
<i>rinvp</i>									0.050				(0.303)							
<i>rlawe</i>									2.552	**	2.539	**								
									(1.254)		(1.178)									
<i>rfifr</i>	0.036		0.050	**	0.078	*	0.086	**	0.016				0.012				0.014			
	(0.022)		(0.021)		(0.040)		(0.039)		(0.024)				(0.013)				(0.023)			
<i>rfree</i>	0.008				0.001				-0.008				0.015				0.000			
	(0.019)				(0.026)				(0.019)				(0.012)				(0.015)			
<i>cacc</i>	0.096	**	0.103	***	0.088		0.101	*					0.068	**	0.077	***	0.101	**	0.122	***
	(0.040)		(0.030)		(0.064)		(0.051)						(0.028)		(0.017)		(0.047)		(0.032)	
<i>cpay</i>									0.108	***	0.101	***								
									(0.024)		(0.021)									
<i>ngiv</i>	-0.028				-0.030				-0.025				-0.015				0.000			
	(0.024)				(0.032)				(0.020)				(0.016)				(0.024)			
<i>nclust</i>	0.941				1.000				0.334				1.076	*	1.067	**	0.173			
	(0.716)				(1.048)				(1.172)				(0.557)		(0.522)		(1.351)			
<i>mgdpp</i>	0.047				0.626		0.687	*	-1.793	***	-1.569	***	0.659	***	0.891	***	-0.261			
	(0.312)				(0.437)		(0.377)		(0.483)		(0.348)		(0.220)		(0.126)		(0.332)			
<i>mremit</i>	0.001				-0.041				-0.064				0.032				-0.081	*		
	(0.060)				(0.081)				(0.095)				(0.032)				(0.045)			
<i>mtop5</i>	0.018				-0.013				-0.023				0.017		0.018	*	-0.020			
	(0.015)				(0.025)				(0.019)				(0.010)		(0.010)		(0.015)			
No. of obs.	86		86		86		86		85		85		86		86		86		86	
Adj. R2	0.54		0.54		0.46		0.48		0.34		0.37		0.73		0.72		0.20		0.23	
F-stat.	27.2	***	47.0	***	25.1	***	54.5	***	12.8	***	33.0	***	56.2	***	90.1	***	4.3	***	14.9	***
Mean VIF	1.9		1.5		1.9		1.8		2.1		2.2		1.9		1.4		1.9		1.0	

Notes: dependent variable log transform of country-specific total crowdfunding volume during 2013–2016 per capita by type of crowdfunding. Specifications marked with “a” contain all institutional variables used to test H1 to H8. Specifications marked with “b” present the results of backward elimination of specification “a”. For variable descriptions see Table 1. Robust standard errors in parentheses. Statistical significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

**Table A4.** Robustness of Regulative, Cultural-Cognitive, and Normative Determinants of Total Crowdfunding Volumes during 2015–2016 per Capita.

Model	M11a	M11b	M12	M13	M14a	M14b	M15	M16	M17	M18
<i>Constant</i>	−14.780 (2.342)	−11.900 (2.627)	−8.746 (2.042)	−8.869 (2.287)	−7.952 (2.509)	1.995 (3.189)	−12.690 (4.435)	−18.330 (4.331)	−15.140 (2.575)	−11.040 (2.480)
<i>rleg</i>	0.451 (0.105)									
<i>rlawd</i>	2.834 (0.664)									
<i>rinvp</i>		0.283 (0.165)								
<i>rlawe</i>		2.809 (0.680)								
<i>rfjfr</i>			0.082 (0.017)							
<i>rfree</i>				0.050 (0.014)						
<i>cacc</i>					0.158 (0.026)					
<i>cpay</i>						0.103 (0.014)				
<i>ctrust</i>							1.120 (0.557)			
<i>cfear</i>								0.025 (0.043)		
<i>ngiv</i>									0.031 (0.018)	
<i>nclust</i>										2.501 (0.815)
<i>mgdpp</i>	0.914 (0.179)	0.779 (0.212)	0.280 (0.232)	0.395 (0.255)	0.443 (0.220)	−0.575 (0.303)	1.043 (0.415)	1.487 (0.473)	1.156 (0.212)	0.812 (0.212)
<i>mremit</i>	−0.057 (0.047)	−0.033 (0.042)	−0.069 (0.036)	−0.071 (0.039)	0.019 (0.044)	−0.022 (0.043)	−0.055 (0.055)	−0.058 (0.106)	−0.055 (0.040)	−0.061 (0.036)
<i>mtop5</i>	0.032 (0.014)	0.025 (0.014)	0.011 (0.014)	0.012 (0.014)	0.017 (0.015)	0.006 (0.014)	0.021 (0.020)	0.036 (0.023)	0.032 (0.015)	0.030 (0.014)
No. of obs.	107	107	112	117	107	108	77	62	106	117
Adj. R2	0.35	0.27	0.35	0.34	0.34	0.48	0.23	0.28	0.26	0.25
F-stat.	21.0	20.6	18.3	17.7	20.6	34.8	6.7	8.2	13.6	14.6
Mean VIF	1.1	1.2	1.4	1.3	1.4	1.8	1.4	1.2	1.1	1.2

Notes: dependent variable log transform of country-specific total crowdfunding volume during 2015–2016 per capita (*cf\_total*). All explanatory variables are taken from year 2014. For variable descriptions see Table 1. Robust standard errors in parentheses. Statistical significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

**Table A5.** Robustness of Institutional Determinants of Total Crowdfunding Volumes during 2015–2016 per Capita.

Robustness Test	1				2				3			
Dependent Variable	<i>ln(cf_total)</i>				<i>ln(cf_total_gdp)</i>				<i>ln(cf_total)</i>			
Model	M2a		M2b		M2a		M2b		M2a		M2b	
Constant	-6.551	**	-5.813	***	17.460	***	-4.500	***	-3.192		-5.812	***
	(3.043)		(1.152)		(3.166)		(0.791)		(2.324)		(0.779)	
rleg	0.177				0.141		0.227	*	0.152	*	0.197	**
	(0.117)				(0.116)		(0.131)		(0.090)		(0.085)	
rlawd	2.114	***	1.851	***	2.831	***	2.108	***	1.968	***	2.088	***
	(0.380)		(0.334)		(0.753)		(0.755)		(0.559)		(0.500)	
rfjfr	0.031		0.036	*	0.012				0.030	*		
	(0.021)		(0.020)		(0.023)				(0.018)			
rfree	0.026		0.027	*	0.014				0.036	***	0.039	***
	(0.017)		(0.014)		(0.018)				(0.011)		(0.009)	
cacc	0.115	**	0.117	***	0.148	***	0.060	*	0.073	***	0.077	***
	(0.047)		(0.035)		(0.050)		(0.032)		(0.026)		(0.025)	
ngiv	-0.030				-0.056	*			-0.027	*		
	(0.024)				(0.030)				(0.016)			
nclust	0.965				1.598				1.199	*	1.145	*
	(0.749)				(0.996)				(0.661)		(0.591)	
mgdpp	-0.054				-1.942	***			-0.382			
	(0.350)				(0.351)				(0.259)			
mremit	0.000				-0.148	***			-0.044			
	(0.043)				(0.052)				(0.042)			
mtop5	0.020				-0.040	**			0.012			
	(0.012)				(0.019)				(0.012)			
No. of obs.	95		95		100		100		95		95	
Adj. R2	0.48		0.48		0.34		0.11		0.52		0.50	
F-stat.	30.0		67.1		10.4		8.3		20.5		31.7	
VIF	1.8		1.7		1.7		1.5		1.7		1.3	

Notes: all explanatory variables in robustness test 1 are from year 2014 and the dependent variables is the log transform of country-specific total crowdfunding volume during 2015–2016 per capita (*cf\_total*). Robustness test 2 copies the models presented in Table 5 using the dependent variable log transform of total crowdfunding volume during 2015–2016 to mean annual GDP (*cf\_totalgdp*), including also the five countries with extreme crowdfunding volumes. In robustness test 3 all explanatory variables are averages over 2015–2016 and the five extreme observations of the dependent variables (volume per capita above \$50 USD over 2015–2016) have been eliminated. The dependent variable in test 3 is the log transform of country-specific total crowdfunding volume during 2015–2016 per capita (*cf\_total*). For variable descriptions see Table 1. Robust standard errors in parentheses. Statistical significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

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