Remittance inflows and starting a business

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Abstract

Purpose – Political economy research recognizes that the inflows of external financial resources help the governments enact market-oriented reforms. Since remittances have outpaced other types of financial inflows in many countries, they can potentially increase the government's incentive to implement regulatory reform that can contribute to business-friendly environment. This issue has long been overlooked by the literature on remittances. The purpose of this paper is to examine whether remittances promote business regulatory reform in the recipient countries.

Design/methodology/approach – This study uses balance of payments data on remittances for 114 countries during 2004-2012 period. Since remittances could be endogenous to business regulation, the identification strategy follows an instrumental variable approach. The author assesses the general stability of linear model estimates by fitting the beta regression model.

Findings – The results show that, while the increase in remittance inflows is associated with lower regulatory requirements for starting a business in the recipient economy, this association is stronger in developing countries than in high-income nations. Various sensitivity tests reinforce the robustness of these findings.

Originality/value – One of the most important yet overlooked aspects of remittances is that they can potentially shape the political will to enact regulatory reform for businesses. The incentives for the government to relax burdensome entry regulations tend to stem from potential gains associated with the formalization of remittances. This paper makes a first attempt at studying the link between remittances and the quality of entry regulation.

Keywords Entrepreneurship, Remittances, Formalization, Regulatory reform, Starting a business

Paper type Research paper

1. Introduction

The global economy has witnessed a substantial growth in international remittance flows since the early 2000s. The estimated value of global remittances has increased nearly six-fold from $100 billion in 2000 to $592 billion in 2014 (Ratha *et al.*, 2016). As a result of the sustained increase in outward migration, remittances have emerged as one of the largest sources of financial inflows to many developing countries. Due to persistency in migrants' desire to remit, as seen during and in the aftermath of the global financial crisis, remittances have become more resilient than other types of financial flows to these countries (World Bank, 2011). A large body of research on remittances has documented their robust effects on investment in physical and human capital (Lucas, 1987; Durand, Parrado and Massey, 1996; Yang, 2005), small business and entrepreneurship (Massey and Parrado, 1994; Dustmann and Kirchkamp, 2002; McCormick and Wahba, 2004; Woodruff and Zenteno, 2007; Vaaler, 2011), and financial development (Giuliano and Ruiz-Arranz, 2009; Gupta *et al.*, 2009; Aggarwal *et al.*, 2011; Chowdhury, 2011; Demirguc-Kunt *et al.*, 2011).

From the standpoint of entrepreneurship development, two questions surrounding remittances arise which are of broader economic interest for the recipient country: can these external resource inflows serve as a financial stimulus for domestic entrepreneurs? and if so, how such stimulus shapes the political will to enact business regulatory reform? Some embedded but less visible characteristics such as the regulatory system, bureaucratic efficiency, and the nature of business governance play a critical role in fostering domestic entrepreneurship (Doing Business, 2016). Improving the regulatory environment for

business can make a difference in part because it mitigates the risks for entrepreneurs, new and experienced alike. The countries with lower barriers to entry generally see higher formal sector participation and a greater entry rate of new businesses (Klapper *et al.*, 2006; Ciccone and Papaioannou, 2007; Kaplan *et al.*, 2011).
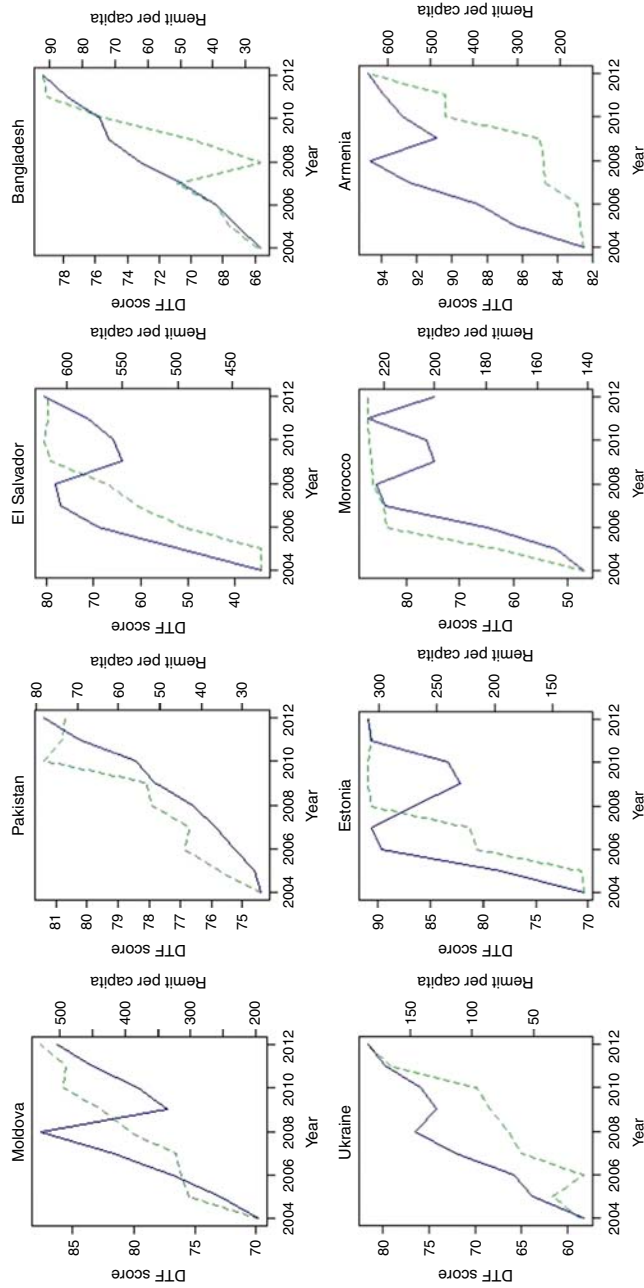
Political economy research has recognized that the inflow of external financial resources can help reforms get launched and sustained by alleviating the costs of reform; and the policymakers who have courageously pursued market-oriented reforms are considered as heroes of the economics profession (see Harberger, 1993; Rodrik, 1996; Malesky, 2008). When more businesses enter the formal sector, the government tax base broadens, yielding additional revenues, thereby enabling the government to further strengthen the policy reforms. Moreover, the increase in the number of registered businesses is associated with greater competition, more job creation, and higher economic growth (Djankov *et al.*, 2002; Klapper *et al.*, 2006).

Some recent studies assert that the inflow of overseas workers' remittances tends to increase government's incentive to implement institutional reform and provide opportunities for revenue enhancement (see Gamlen, 2006; Diedhiou, 2011; Vaaler, 2011). Although remittances are not taxed directly, their presence expands the base for other taxes, such as the VAT (Abdih *et al.*, 2012), and moreover, the financial inclusion of a large section of remittance-receiving households is likely to contribute to building a broader formal economy (see Anzoategui *et al.*, 2014). Even temporary remittance inflows have some tendency to produce an expansionary effect for the economy as a whole; thereby leading to a decline in the share of the informal sector (Chatterjee and Turnovsky, 2016). One key implication of these findings is that the large-scale transfer of private foreign resources, i.e., remittances, to the formal sector of the recipient economy is likely to prompt strategic changes in the regulatory aspects of business and entrepreneurship. In this paper, we first present the real-world scenarios and some case studies to underline the increasing role of remittances in motivating the recipient-country government for business-friendly reforms, and then empirically examine whether remittance inflows help improve the regulatory environment governing the entry of new businesses in the recipient country.

The likelihood that the inflow of remittances can affect the government's incentive to enact business regulatory reform has been increasingly visible in recent years. For instance, Figure 1 displays the time series plots of remittances per capita and the quality of entry regulation of start-up firms for a sample of large remittance-receiving countries. These countries appear to exhibit a positive relationship between remittance inflows and the quality of regulation governing the entry of new businesses.

Given the potential role of remittances in promoting business regulatory reforms, it is worth examining how remittance-receiving households allocate the funds they receive in remittances. Although the results of empirical research on the uses of remittances are quite varied and seemingly contradictory, the literature has identified two most basic expenditure patterns of the recipient households: a substantial amount of remittances is used to buy consumer goods and services, land and houses (Stahl and Arnold, 1986; Durand, Kandel, Parrado and Massey, 1996; Brown, 1997; Adams, 1998; Acosta *et al.*, 2009); and a nontrivial proportion of remittance inflows has been channeled into business investment (Massey and Parrado, 1994; Durand, Parrado and Massey, 1996; Dustmann and Kirchkamp, 2002; McCormick and Wahba, 2004; Yang, 2005; Woodruff and Zenteno, 2007).

While researchers emphasize that expenditures on housing, land and even jewelry constitute saving and investment, the effects of such saving on overall economy should be considered carefully. When existing houses and land change hands, this is not itself a productive activity. It is only when new capital goods such as equipment are purchased and put into service, the aggregate capital stock or its productivity is actually enhanced (Chami *et al.*, 2003). Remittance inflows to the recipient country as a whole, regardless of how these funds are used and what payoff such usage provides to the individuals, are likely

Figure 1.
Remittances per
capita and the quality
of entry regulation
of start-up firms
measured as the
DTF score

Notes: Solid line, DTF score; dotted line, remittances per capita. Annual time-series data, 2004-2012
Sources: Doing Business Database and World Development Indicators (2014)

to promote a wide range of activities in the formal sector. From the macroeconomic perspective, perhaps the most important effect of remittances is their leading role in stimulating aggregate demand by increasing the disposable income for households in the recipient economy (Stahl and Arnold, 1986; Durand, Kandel, Parrado and Massey, 1996; Orrenius *et al.*, 2010).

Nonetheless, it has been perceived that purchasing investment goods in the formal economy is not always a convenient option. To the extent that the property rights of goods purchased with remittances go unrecognized or unenforced, this renders the investments less productive which some economists refer to as "dead capital" (De Soto, 2000). Examining the time and cost of setting up a new business in Peru, De Soto showed that poor are forced to remain within informality because the formal law is too complicated and cumbersome; informality imposes a dead weight loss, hindering the "dead capital" of the poor to yield a proper return or to be used as collateral. With adequate property rights and a simplified formal legal system, this "dead capital" could provide leverage, bolstering growth and development (Menard and Marais, 2008).

On the other hand, imperfections in local credit and insurance markets, common characteristics of the less developed countries, prevent many poor households from accessing formal credits for financing investments in local entrepreneurial activities. Thanks to the migrants' transfers which, unlike other types of external financial inflows, are mainly accrued to the rural areas where much of the migration that generates these transfers originates (see Lucas, 1987; Taylor and Wyatt, 1996). Empirical evidence shows that remittances provide recipient households with the resources that are necessary to make non-trivial up-front investments in entrepreneurial projects (Yang, 2005; Mundaca, 2009). Furthermore, the residential homes and farmland owned by migrants' families generally remain illiquid because of the non-marketable land rights and the lack of complementary investments (e.g. labor, equipment, fertilizer, etc.), which makes it extremely challenging to employ such "dead capital" for financing new and productive investments (Taylor and Wyatt, 1996). Under these circumstances, migrants can effectively serve as informal financial intermediaries to help relieve borrowing and risk constraints on production activities in the rural areas; thereby enhancing productivity, increasing the liquidity of household assets, and mobilizing these resources across sectors (Lucas and Stark, 1985; Lucas, 1987).

The capital constraints induced by institutional factors can negatively affect both market entry and the ability of firms to transition and grow (Desai *et al.*, 2003). As shown by many studies, liquidity constraints play a critical role in shaping the patterns of domestic entrepreneurship. For example, Paulson and Townsend (2004) observe that the entrepreneurial firms around the world face the typical problems of working capital; thanks to the savings and funds from friends and family which provide the bulk of start-up financing for the small firms. What is striking in Paulson and Townsend's observation is that the nature of entrepreneurship is quite similar in Thailand and in the USA despite the obvious differences between these two countries. In Thailand, small firms employ 60 percent of the workforce and account for approximately 50 percent of GDP. In the USA, roughly 50 percent of the workforce is employed in small firms and small firms account for 30 percent of GDP. In both Thailand and the USA, a considerably high proportion, about two-thirds, of the initial investment in these small firms comes from friends and families. These stylized facts may also highlight why the availability of small savings and familial funds matters greatly for the growth of entrepreneurship in every economy, regardless of its stage of economic development.

Migrants transfers to their friends and families provide an opportunity for them to gain a foothold in the formal financial sector and can help them integrate into the mainstream economy (Gupta *et al.*, 2009; Anzoategui *et al.*, 2014). This economic integration process, what is popularly known as "financial inclusion," can be potentially valuable for the

financial intermediaries such as banks and cooperatives which have witnessed a significant increase in deposits and credits as a result of the massive increase in remittance inflows (Aggarwal *et al.*, 2011; Demirguc-Kunt *et al.*, 2011). At the same time, some key remittance-driven investments are expected to expand the portfolio of services offered by formal banks in many developing countries (Kapur, 2004).

Additionally, in an effort to capture the booming remittance market, formal financial institutions in many countries are likely to turn their attention towards small businesses. By including remittances in their product portfolio, micro-finance institutions (MFIs) have been able to contribute successfully to fostering financial access to a large section of the remittance-receiving families (see Ambrosius *et al.*, 2014). The rapid growth in the remittance markets has begun to fuel changes in the financial service industry; thereby pushing formal banks to serve people who were previously "underbanked" and "financially excluded," including many small entrepreneurs and agriculturalists (Grabel, 2008). However, the mainstream banking, particularly in developing countries, may not be able to fully exploit these lucrative opportunities unless perhaps changes in the existing institutional behavior. Consequently, the financial intermediaries including banks and MFIs could be among the chief catalysts for the desirable institutional changes; thereby pursuing the government to relax the existing legal and regulatory burdens imposed on small business and entrepreneurship.

In recent times, remittance inflows are being channeled more directly into the formal sector which has been a policy priority of many development agencies, national governments, and multilateral financial organizations, such as the Inter-American Development Bank and the World Bank. This idea has received serious attention from both the academia and policy circles after the terrorist attack on September 11, 2001 (Orozco and Ellis, 2014). In fact, the increased emphasis on the formalization of remittances primarily originated from the huge undercount of actual flow of remittances. It has been estimated that the size of unrecorded flows through informal channels are believed to be at least 50 percent larger than recorded flows (Ratha, 2012). For instance, in Bangladesh, 46 percent of total remittances enters the country via formal channels and 54 percent of remittances enters through informal channels (Chowdhury, 2011). When remittances pass through informal or underground channels, they do not contribute to official foreign exchange reserves, nor can they be geared to the development policy and priorities of the country (Ghosh, 2006). Rather, remittances may involuntarily be transferred from the society's working class to the politically powerful group who are likely to reap the benefits from these external funds. Such misallocation of financial resources, unless desirable changes in the rules of the game – the prevailing structure of payoffs in the economy, may support largely unproductive activities such as rent seeking, speculative financial transactions, or organized crime (see Baumol, 1990).

In a narrow sense, the formalization of remittances can be described as a process of redirecting remittance flows from traditional methods such as "hundi" and/or "hawala" to formal channels, such as banks, money transfer companies, exchange bureaus, and post offices. However, this is quite far from a simple process. Traditional methods are institutional practices embedded in communities. Despite greater macroeconomic benefits resulting from formal remittance inflows to the recipient economy, numerous problems associated with formal channels make them less accessible to the migrants and their families. One problem is that many countries purposefully keep the costs of using the formal system high to satisfy organized and politically powerful groups. Besides, the lack of operation of formal channels in remote areas, delays in remitting money through the formal system, and the ease of avoiding currency controls and bureaucratic red tape through informal channels are among the key reasons why migrant workers still have significant incentives to send money using traditional methods (see Schaeffer, 2008).

In a broad sense, and which has drawn more attention from academia and policy making in recent times, the formalization of remittances represents the process of streamlining remittance flows to channel them into major development projects. Such streamlining mechanism can enable banks, MFIs, or even governments to create new and additional financial instruments, such as the issuance of so called diaspora bonds by the governments in many countries (Ghosh, 2006; Ratha *et al.*, 2015). A diaspora bond is a debt instrument issued by the country of origin to raise financing from its overseas diaspora. When the labor-exporting country faces difficulties to access international capital markets, the issuance of the diaspora bond seems to be a feasible option for raising external development financing. This strategy is more appropriate for countries with strong and transparent legal system for contract enforcement. A diaspora bond can also provide lower cost and longer term financing than would otherwise be available. In addition, since the diaspora investors' perception of country risk is lower, the risk spread on diaspora bonds would be lower, too. Countries with a large diaspora stock in richer destination countries have a greater potential for successful issuance of diaspora bonds (Ketkar and Ratha, 2015; Ratha *et al.*, 2015). From these perspectives, the formalization of remittances can be recognized as an integral part of the national development strategy in the remittance-receiving countries.

On the other hand, some economists interpret the term "formalization" to refer to the conversion of economies from those in which shadow economies and inconsistent property rights predominate to those in which the legalities of home and business ownership are mostly clear, welcoming, and equally accessible to everyone (Kleiner, 2004). The key to spurring development and securing prosperity is enabling tens of millions of poor entrepreneurs across the developing world to become part of the system rather than excluded from it by bureaucracy and red tape (Clift, 2003). Several case studies reveal that remittances can have a powerful influence on the government's motivation for opening up of the economy in order to boost domestic business and entrepreneurship. Remittance inflows can be seen as the drivers of change, and migrants' considerable economic weight can eventually create a push for policy reforms (Haas, 2005; Gamlen, 2006; Diedhiou, 2011). Stimulated by the investment potential of their diaspora communities resided in industrialized economies, many countries have initiated key measures to formalize the monetary resources transferred by such wealthy communities. For example, the key emigration countries including India, China, Pakistan, Israel, Bangladesh, Mexico, Lebanon, and the Philippines have implemented active policies and institutional arrangements in order to streamline the flow of remittances and to provide incentives for the formal transfer of money from their overseas diasporas (World Bank, 2006).

In a bid to channelize remittances as a formal source of investment capital, the governments in many remittance-receiving countries have issued diaspora bonds targeting their overseas migrants. For example, the governments of India, Israel, and Brazil have issued diaspora bonds to tap into the wealth of their diaspora communities. The governments of India and Israel have raised over $40 billion by issuing diaspora bonds to support their balance of payments needs as well as for financing many development projects (Ghosh, 2006; Ratha *et al.*, 2015). Besides, the relative stability of overseas migrants' desire to invest in the home country has encouraged some emerging economies to use remittances as collateral against which to borrow in international capital markets. In 2001, the Central Bank of Brazil, Banco Central do Brasil, issued $300 million worth of bonds using as collateral future flow of yen remittances from Brazilian workers in Japan. Other countries, including El Salvador, Mexico, and Turkey have also used future workers' remittance-backed securities to raise external financing (Ratha, 2003). An important macroeconomic implication of these policy measures is that the streamlining of remittances as formal financial inflows can generate expansionary effects for the economy as a whole, thereby shrinking the share of the informal sector (Chatterjee and Turnovsky, 2016).

The institutional arrangements formed by some developing countries make it much easier to see how remittance inflows can increase government's incentive to promote entrepreneurship. For example, the federal, state, and local governments in Mexico have initiated targeted programs to capitalize on successful entrepreneurs of their diaspora societies living in the USA. The FONAES (local abbreviation), an investment and credit program run by the Mexican federal government, has been supporting Mexican immigrants who are interested in starting a small business in their hometowns. The governments in large migrant sending states in Mexico, such as Zacatecas, Jalisco, and Michaocan are in the process of instituting a three-party support program, called "Three-For-One," in order to promote productive investments and to encourage small entrepreneurs in these states. This three-fold leveraging has had some notable successes in improving infrastructure as well as establishing more businesses at the local level (Alarcon, 2002; Orozco and Lapointe, 2004; Kapur and McHale, 2005). Either through social remittances or direct transfer of financial resources, the entrepreneurial leaders in diaspora communities have significantly helped improve investment climates, and are assisting the government in their home country to develop supportive institutions for venture capital (Brinkerhoff, 2016). Many Turks, for example, living in Germany are found to contribute to Turkey's recent economic boom as transnational entrepreneurs (Haas, 2005).

For the last several years, India has consistently occupied the topmost spot on the list of remittance-receiving countries in the world. The estimated value of remittances flown to India has increased from approximately $12.8 billion in 2000 to $72 billion in 2015 (World Bank, 2015). The remarkable increase in Indian remittance inflows has been coincided with lower regulations and controls, more flexible exchange rates, and gradual opening of the capital account. India has eliminated the paid-in minimum capital requirement and streamlined the process for starting a business; thereby making it easier for potential entrepreneurs to start a business (World Bank, 2006, 2016; ENS Economic Bureau, 2016). In Egypt, which ranked sixth in 2013 among the top remittance recipient countries in the world (World Bank, 2014), numerous economic reforms have been undertaken to make the environment more conducive to business. Recently, the Egyptian government lowered the minimum capital requirement for starting a new business by 98 percent, from 815 percent of per capita income to 16 percent per capita income. Moreover, the time, procedures, and the cost of starting a business were reduced from 43 days, 13 steps, and 63 percent of income per capita in 2004 to 9 days, seven steps, 28.6 percent of income per capita in 2007 (International Organization for Migration, 2010).

It is interesting to note that it takes six days to start a new business in the US, 11 days in Japan, and 17 days in Luxembourg, whereas it takes less than five days in many less-developed countries, including Macedonia, Azerbaijan, Georgia, Burundi, Armenia, and Rwanda (World Bank, 2017). Evidently, certain aspects of the entrepreneurial environment are similar in both developing and developed countries. More generally, entrepreneurship is omnipresent. The entrepreneurial activities in a less-developed countries, however, may not be directed toward productive ends conducive to economic progress (Coyne and Leeson, 2004). It may take the same amount of time to start a business in both developing and developed countries, but the courts may not protect those firms in the same manner in all countries.

These intriguing facts and the encouraging business regulatory reforms pursued, in particular, by the large remittance-receiving countries seem to provide preliminary support for the view that external financial inflows help promote business-friendly reforms in the recipient economies. This leads to the empirical question whether remittance inflows help enhance the quality of regulation governing the entry of new businesses, which we attempt to investigate in this paper. To our knowledge, this is the first exercise to examine the link between remittances and business regulation. We find a positive and significant association between remittance inflows and the quality of regulatory environment governing the entry of new businesses in the remittance-receiving countries.

The rest of the paper is organized as follows. Section 2 describes the data and sources. Section 3 outlines the econometric method used in the analysis. Section 4 presents the estimation results followed by robustness checks, and Section 5 concludes.

2. Data description and sources

We consider a cross-section of 114 countries, chosen on the basis of availability of data on remittances. The data come from various sources. The remittances data are obtained from the World Development Indicators (2014). Our remittance variable is the average value of remittances between 2004 and 2012, measured as a share of GDP. Remittances are defined as the sum of worker's remittances, compensation of employees, and migrant's transfers. This approach is widely followed in empirical studies (e.g. Aggarwal *et al.*, 2011).

Our response variable is a measure of the quality of entry regulation of start-up firms. It is a composite index of starting a business, computed as the "distance to frontier" score (henceforth DTF score). It encompasses the number of procedures, official time, official cost, and minimum capital requirement that a start-up must bear before it can operate legally. The DTF score for starting a business regulation corresponds to the year 2012, and is taken from World Bank's Doing Business database (2014). The DTF score, by construction, is continuous and restricted to the interval (0, 100), or equivalently (0, 1). In other words, the DTF score varies between 0 and 1, but no score can equal exactly zero or exactly one. In principle, 0 represents the worst performance and 1 the frontier, which stands for the best performance on regulatory practices in the area of starting a business.

In any given year, the DTF score measures how far an economy is from the best performance at that time, benchmarking the economy with respect to the frontier. When compared across years, the DTF score shows how much the regulatory environment for business entry in an economy has changed over time in absolute term. The type of business surveyed for measuring the regulations pertaining to staring a business is assumed to be the limited liability company or its legal equivalent that is most common among domestic firms. The DTF score for starting a business regulation comprises four dimensions or subcomponent indicators, namely, number of procedures required, cost required to complete each procedure (in percentage of income per capita), minimum capital requirement (in percentage of income per capita), and time required to complete each procedure (in calendar days). A higher value in any of these subcomponent indicator implies poor quality of regulation, making it more difficult for the potential entrepreneur to start up a new business in that country.

In this study, we use the average value of explanatory variables over 2004-2012 period. The real GDP per capita (in constant 2010 US$) and economic openness (defined as the sum of import and export as a share of GDP) variables come from the World Development Indicators (2014). The initial real GDP per capita is also obtained from the same source. Both averaged real GDP per capita and initial real GDP per capita variables are expressed in natural logarithm. The real GDP per capita variables control for the effect of the level of economic development on business regulations. Since more open economies are likely to learn more from the outside world and implement better regulatory procedures in the area of business, we need to take this into account. However, domestic businesses face more challenging and competitive environment once they are exposed to the outside world, starting a new business can also involve complex procedures.

In general, legal systems are viewed as indicators of the relative power of the state *vis-à-vis* property owner (La Porta *et al.*, 1999). This indicates that legal traditions can proxy for the influence of state behavior towards business and entrepreneurship. We account for this influence by employing legal origin variables, defined in terms of dummy variables for British common law, Socialist or Communist laws, and French, Germany, and Scandinavian commercial codes. The coastal area (defined as the area within 100 km from a sea or an ocean as a ratio of the total area of the country) is our instrumental variable for remittances, a

commonly used instrument for remittances in the literature. The coastal area and legal origin variables are obtained from the Center for International Development at Harvard University (Shleifer, 1999).

On the other hand, the soundness of legal institutions is indispensable structure for the government to launch and sustain policy reforms (Jutting, 2003). We account for the influence of legal institutions by using rule of law variable as a proxy for the quality of legal institutions. This variable captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence (Worldwide Governance Indicators). The rule of law variable corresponds to the year 2004, measuring the quality of legal institutions in the initial year. We also check for robustness to other measures of institution quality including government effectiveness and control of corruption, both corresponding to the year 2004. All institutional variables come from Worldwide Governance Indicators (2017).

The analysis covers the period 2004-2012. Table I reports the descriptive statistics for the complete set of variables. The data set is available from the author upon request.

3. Econometric method

3.1 Model specification

Our empirical model stems from Busse *et al.* (2013) who propose a framework for studying the drivers of change in business regulations. We examine the link between remittance inflows and the quality of entry regulation by estimating Equation (1):

$$Entry \quad Regulation_{i,2012} = \alpha + \beta_1 Remittances_i + \gamma' X_i + \epsilon_i; \quad i = 1, 2, \cdots, n. \quad (1)$$

where *Entry Regulation* is our dependent variable measuring the quality of entry regulation in the year 2012, computed as the DTF score described earlier; remittances inflow is our main explanatory variable of interest; X_i is the matrix of control variables discussed in Section 2; and ϵ_i is the disturbance term.

Variable name[b]	Mean	SD	Minimum	Maximum
Distance to frontier (DTF∈(0, 1)), 2012	0.7953	0.1497	0.2304	0.9995
Remittances (as a percentage of GDP), average	4.6526	7.5166	0.0048	43.0183
Log of remittances (per capita), average	1.7073	0.7862	−0.8613	3.1744
Log of GDP per capita (in constant 2010 US$), average	3.5467	0.7081	2.1804	4.8178
Log of GDP per capita, 2004 (in constant 2010 US$)	3.6314	0.6848	2.3231	4.9387
Rule of law, 2004	0.0311	0.9767	−1.7052	1.9875
Government effectiveness, 2004	0.1448	0.9984	−1.6046	2.3449
Control of corruption, 2004	0.0362	1.0264	−1.4884	2.5267
Urbanization (% of population), average	57.6874	22.1454	10.7795	100
Openness (trade, % GDP), average	85.7878	45.5989	27.6744	404.7613
Legal origin (British)	0.2631	0.4422	0	1
Legal origin (Socialist)	0.2105	0.4094	0	1
Legal origin (Germany)	0.0438	0.2056	0	1
Legal origin (French)	0.4473	0.4994	0	1
Legal origin (Scandinavian)	0.0350	0.1848	0	1
Coastal area (defined as the area within 100 km from a sea or an ocean as a ratio of the total area of the country)	0.3481	0.3484	0	1
Log of time required to start a business, 2012	1.1772	0.3903	−0.3010	2.1986

Table I.
Summary statistics[a]

Notes: [a]Data set contains a cross-section of 114 countries; [b]Most of the regressors are averaged for the 2004-2012 period

We are interested in testing whether the marginal impact of remittances on the quality of entry regulation, i.e., β_1, is statistically significant. Although the economic theories behind external resource inflows offer positive supports in promoting market-oriented reforms, many empirical studies document an adverse impact of these resource inflows on institutional reform. Therefore, the partial effect of remittances on the quality of entry regulation is *a priori* ambiguous (or that the sign of β_1 is unclear). However, we expect that by shifting the government's incentive toward instituting more liberalized market, remittance inflows should promote regulatory reforms in the area of business and entrepreneurship.

We first perform the linear estimation of Equation (1) by ignoring any issues stemming from the restricted nature of our dependent variable. Since the presence of remittances in the model of regulatory quality could potentially lead to endogeneity as a result of reverse causality, we follow instrumental variable approach to isolate the causality from remittances to the quality of entry regulation.

3.2 Endogeneity

Our first set of OLS regressions does not address issues regarding endogeneity of remittances in the model of regulatory quality. Theoretically, however, it is plausible, and also very likely, that the magnitude of remittances increases with higher quality of business regulations. An improved regulatory environment, by lowering the cost of sending and receiving remittances and boosting migrants' confidence in the home economy, should increase the transfers of money through formal channels, and therefore enhance remittance inflows. This would lead to an overstatement of the effect of remittances on entry regulation. We try to isolate the causality from remittances to the quality of entry regulation via an instrumental variable approach.

There has been an extensive search for a good instrument for remittances. Rajan and Subramanian (2005) use the distance from the country of origin as an instrument for remittances. We use coastal area (defined as the area within 100 km from a sea or an ocean as a ratio of total area of the country) as the instrumental variable for remittances. This variable has been commonly used in the literature. In general, the larger coastal area is associated with a higher ratio of emigrants to the total population, which for obvious reasons leads to higher remittances on average. Accordingly, coastal area appears *a priori* to be an appropriate instrument for remittances (Abdih *et al.*, 2012).

The per capita GDP itself can also be endogenous to the quality of business regulation. While richer countries have more efficient governments and better quality of regulation (La Porta *et al.*, 1999), the regulatory reforms which reduce entry costs and liberalize market entry can lead to rapid growth and higher income (Buttner, 2006). To mitigate this potential endogeneity bias, we replace the average real GDP per capita by initial real GDP per capita. For similar reasons, we select the rule of law variable from the initial year 2004. Another problem may arise with our instrument if it affects the regulation of business entry through other variables not included in the regression, such as urbanization. The larger coastal area can lead to rapid urbanization, thereby contributing to higher living standard and concentration of businesses in the urban sector. To minimize the effect of these correlations on coefficient estimates, we replace per capita GDP by urbanization in another specification.

3.3 Beta regression model

As described in Section 2, our response variable (i.e. the DTF score) measuring the quality of business entry regulation is continuous but constrained to the standard unit interval (0, 1). In other words, the dependent variable varies between 0 and 1, but no observation can equal exactly zero or exactly one. The linear regression model is deemed unattractive in such

situations since it may yield fitted values for the response variable that exceed its lower and upper bounds.

A possible solution could be to transform the response variable so that it assumes value on the real line, and then perform usual linear analysis. The drawbacks of this approach, however, is that the model parameters cannot be easily interpreted in terms of the original response. Another shortcoming is that the regressions involving data from the unit interval are typically heteroskedastic: they display more variation around the mean and less variation as we approach the lower and upper limits of the standard unit interval. Although heteroskedasticity does not destroy the unbiasedness and consistency properties of OLS estimators, it risks producing biased standard errors. Since the standard error is central to conducting significance tests and calculating confidence intervals, biased standard errors can lead to incorrect conclusions about the significance of the regression coefficients. While it is possible to model heterogeneous variance in normal models, it is not readily apparent how one models the variance so that it is also a function of the mean.

To address these shortcomings, we employ beta regression model based on the assumption that the response variable is beta-distributed (see Paolino, 2001; Ferrari and Cribari-Neto, 2004). A beta distribution is often used to model a variable that is bounded between zero and one that can have long tails and excludes the endpoints. This model naturally accommodates non-constant variances and skewness. Since a normally distributed variable can have any variance, with independence between mean and variance, using normal distribution may ignore an important aspect of the data generating process and produce a poorer fit of the data. The beta-distribution involves the variance that can be expressed as a function of the mean. If a researcher is interested not only in how a covariate influences the expected value of the function but also the variance, he can appropriately use beta distribution to model the heteroskedasticity.

The application of beta model does not involve situations that require to impose a regression structure for the variable of interest. Its significance lies in circumstances where the behavior of the response can be modeled as a function of a set of exogenous variables. The main purpose of fitting the beta regression model in this paper is to assess the general stability of our linear model estimates. In beta regression, the unknown parameters are estimated by maximum likelihood (ML). A brief technical outline of the beta regression model is provided in Appendix.

4. Estimation results
4.1 Linear model estimates
As a starting exercise, we ignore the endogeneity of remittances and estimate the linear model of Equation (1) using ordinary least squares (OLS). We are interested in testing whether the marginal impact of remittances on the quality of entry regulation is statistically significant. Column (1) in Table II reports the OLS estimates for the basic specification. We find a positive and statistically significant coefficient on remittances, conforming to the theoretical prediction that external resource inflows help promote regulatory reform for businesses. The coefficient on real GDP per capita is also positive and significant, consistent with the results of many studies that richer countries have more efficient governments and better quality of regulation (La Porta *et al.*, 1999). Another positive and significant coefficient appears with rule of law variable. This is rather expected because the soundness of legal institutions is indispensable for the government to launch and sustain policy reforms (Jutting, 2003).

As the coefficient on openness remains insignificant, we find neither positive nor negative impact of economic openness on business regulation. The dummy for French, Germany, and Scandinavian laws are negative, which are similar to La Porta *et al.* (1999), except that our estimates are statistically significant. While they find a negative and

Variable	OLS (1) Regulation	2SLS (2) Remittances	(3) Regulation	2SLS (variations) (4) Regulation	(5) Regulation
Remittances	0.00427*** (0.0014)				
Remittances (instrumented)			0.01385** (0.0062)	0.01500* (0.0081)	0.01622* (0.0093)
Coastal area		4.54071** (1.9692)			
Real GDP per capita	0.08840** (0.0366)	−4.49887*** (1.6298)	0.12396*** (0.0373)		
Rule of law	0.04927** (0.0243)	−1.02389 (0.9951)	0.05771** (0.0264)		
Openness	−0.00009 (0.0002)	0.02004 (0.0199)	−0.00033 (0.0002)	−0.00030 (0.0003)	−0.00041 (0.0003)
Legal origin (Socialist)	0.03798 (0.0280)	2.05034 (2.5756)	0.02605 (0.0304)	0.03240 (0.0363)	0.04072 (0.0375)
Legal origin (French)	−0.05333** (0.0261)	−1.5441 (1.4610)	−0.04232 (0.0265)	−0.03135 (0.0373)	−0.03748 (0.0421)
Legal origin (Germany)	−0.11494*** (0.0392)	1.55590 (1.8368)	−0.12249*** (0.0327)	−0.11527** (0.0445)	−0.10397*** (0.0393)
Legal origin (Scandinavian)	−0.07241** (0.0297)	1.87556 (1.6201)	−0.08614** (0.0345)	−0.10268*** (0.0357)	−0.10746*** (0.0377)
Real GDP per capita (2004)				0.09895** (0.0480)	
Government effectiveness				0.08203** (0.0382)	0.11497*** (0.0397)
Urbanization					0.00207** (0.0009)
Constant	0.49186*** (0.1299)	17.46568*** (5.9716)	0.34032** (0.1390)	0.39614** (0.1820)	0.63609*** (0.0684)
Number of observations	114	114	114	114	114
R^2	0.441	0.229	0.420	0.227	0.171

Notes: Robust standard errors in parentheses. *$p < 0.10$; **$p < 0.05$; ***$p < 0.01$

Table II.
Remittance inflows
and entry regulation:
OLS and 2SLS
estimates

statistically significant coefficient on Socialist laws dummy, our estimate is positive but insignificant for this dummy. The negative and significant estimates with French, Germany, and Scandinavian laws indicate that these legal traditions are hostile for business reforms.

OLS estimates are likely to be biased when any right side variable is endogenous. One can reasonably argue that the relationship between business regulation and remittance inflows is unlikely to be unidirectional. It is plausible that a more business-friendly environment with fewer regulatory hurdles should increase the transfers of money through formal channels, and therefore enhance remittance inflows. This reverse causation can lead to an overstatement of the effect of remittances on entry regulation, resulting in biased estimates. We, therefore, need an instrument for remittances to isolate the causality from remittances to the quality of entry regulation.

Columns (2)-(5) in Table II report the results from instrumental variables (IV) estimations. Column (2) shows the first stage regression and column (3) shows the second stage regression for the basic specification. The estimated coefficient on the coastal area is positive and statistically significant, which indicates a large impact of coastal area on remittances. Moreover, the F statistic on the excluded instrument for this basic specification is 5.31 (significant at the 5 percent level), suggesting that our instrument does not suffer from significant weakness. The same is true of the F statistic on the excluded instrument for other two sets of 2SLS (variations) specifications presented in columns (4) and (5). Column (3) shows the second stage regression for the basic specification, in which the estimated coefficient on remittances is positive and significant at the 5 percent level.

Furthermore, to lessen the concerns about endogeneity of average real GDP as a regressor, we employ initial real GDP per capita. We also replace rule of law by government effectiveness, a measure of the quality of political institutions. As column (4) shows, the resulting estimate on remittances is positive and significant for this regression. To address the bias concerning the link between the coastal area and urbanization, as described in Section 3.2, our final specification replaces per capita real GDP by urbanization and uses government effectiveness variable instead of rule of law. The coefficient estimate on remittances for this regression still remains positive and statistically significant. Using the standard deviation of remittance variable (which is about 7.517), we can also gauge the quantitative significance of our coefficient estimate on remittances. The results suggest that a one standard deviation increase in remittance inflows measured as a percentage of GDP leads to an increase of around 0.80 in the quality of entry regulation measured as the DTF score, which is more than five times the standard deviation in this variable. More precisely, a one percent increase in remittance inflows as a share of GDP leads the recipient economy approximately one percent closer to the frontier – the frontier being the level of best performance on regulatory practices in the area of starting a business.

For all IV estimations, we find that our main results concerning the marginal impact of remittance inflows on the quality of entry regulation are robust to controlling for the potential endogeneity of remittances. In other words, remittances have significantly contributed to promoting regulatory reforms in the area of starting a business in the remittance-receiving countries. One simple explanation is that the inflow of remittances, which inject more money into the economy is likely to mitigate liquidity constraints and act as a form of financial stimulus for the potential domestic entrepreneurs. When more businesses enter the formal sector, the government tax base broadens, yielding additional revenues; thereby enabling the government to launch more reforms that can contribute to higher quality of regulatory environment for business entry.

4.2 Beta regression estimates
At the outset, we consider the basic linear regression model in Equation (1) and perform the Breusch-Pagan (1979) test against heteroskedasticity. The estimated regression displayed

evidence of heteroskedasticity as the p-value of the test was 0.00012, which would reject the null hypothesis of homoskedasticity. In such situation, Ferrari and Cribari-Neto (2004) recommend the beta regression model (see Section 3.3) as an appropriate remedy. They argue that since the dependent variable is continuous but constrained to the unit interval (0, 1), the normality of error term does not usually hold, and the inference based on the assumptions of homoskedasticity and normality of estimators can lead to misleading conclusions.

We consider five different specifications of the beta regression. Columns (1)-(5) in Table III report the results of these estimations. In column (1), we present estimates from the fitted beta regression model using the same coveriates as in column (1) of Table II. We find a positive and statistically significant coefficient on remittances. A note in the Appendix discusses how the parameter estimates in beta regression model can be interpreted. A simple comparison between the estimates from the linear OLS and the beta regression reveals that these results are roughly identical. The significance level of coefficient on remittances drops from the 1 percent level in OLS regression to the 5 percent level in beta regression, but the size of the coefficient is about the same. The coefficients on both the real per capita GDP and rule of law remain positive and highly significant. The estimate on economic openness retains negative sign and is statistically insignificant. Similar to OLS results, the beta model coefficients on each of French, German, and Scandinavian legal dummies are negative, but the estimate is positive on the Socialist legal dummy. Moreover, the dummies for French and German laws are statistically significant in both OLS and beta estimations.

For the variations in beta regression, we adopt the model specifications that are similar to our linear regressions. We replace real GDP per capita by intial GDP per capita in the second specification and by urbanization in the third specification. Next, we exclude rule of law to replace it by another measure of institutional quality. The institutional quality in fourth specification is control of corruption, and in fifth, it is government effectiveness. As is clear from columns (2)-(5) in Table III, the resulting coefficients on remittances are consistent to earlier findings. The magnitude of coefficient on remittances from all beta regression estimations, including their standard errors, are either equal or very close to those that are obtained from 2SLS regressions performed in Section 4.1.

Our primary goal of fitting the beta regression model is to assess the stability of the estimates from linear models estimation of Equation (1). The difference in estimation techniques has neither altered the direction of association nor has changed the magnitude of the estimated coefficients significantly. This indicates that the positive impact of remittance inflows on the quality of entry regulation is robust to using different estimation techniques. In other words, remittances have significantly helped promote business regulatory reforms in the remittance-receiving countries.

4.3 Robustness checks

Since remittances typically flow from the high-income countries to the developing countries, the relative importance of these financial resources should naturally be greater to the economies that receive them. To this end, a simple robustness test consists of getting a subsample of developing countries and compare the impact of remittances between the full sample and the subsample. A direct way of obtaining a subsample of developing economies is to exclude the member countries of the Organisation for Economic Co-operation and Development (OECD) from the data set. We should find a larger impact of remittances on entry regulation in the non-OECD countries. Nevertheless, given the similarity of entrepreneurial environment and the pattern of small businesses in both the developed and developing countries (see Paulson and Townsend, 2004), the outcome is *a priori* unclear.

To facilitate comparison, we estimate the model using simple OLS, 2SLS, and beta regression as in full sample. Table IV presents estimates of Equation (1) for the

Variable	(1) Regulation	(2) Regulation	(3) Regulation	(4) Regulation	(5) Regulation
Remittances	0.01846** (0.0090)	0.01852** (0.0090)	0.01616* (0.0087)	0.01932** (0.0090)	0.02061** (0.0090)
Real GDP per capita	0.39510*** (0.1469)			0.39357*** (0.1485)	0.26786* (0.1604)
Rule of law	0.38543*** (0.1147)	0.39124*** (0.1140)	0.45784*** (0.0923)		
Openness	−0.00065 (0.0015)	−0.00047 (0.0015)	−0.00102 (0.0015)	−0.00047 (0.0015)	−0.00036 (0.0015)
Legal origin (Socialist)	0.22390 (0.1921)	0.23041 (0.1919)	0.25172 (0.1870)	0.25956 (0.1943)	0.25652 (0.1895)
Legal origin (French)	−0.33373*** (0.1518)	−0.32911** (0.1520)	−0.39918*** (0.1536)	−0.35013** (0.1498)	−0.27610* (0.1516)
Legal origin (Germany)	−0.87098** (0.3523)	−0.84287** (0.3523)	−0.84909** (0.3444)	−0.80481** (0.3553)	−0.83063** (0.3480)
Legal origin (Scandinavian)	−0.56380 (0.4333)	−0.55913 (0.4340)	−0.57044 (0.4286)	−0.67807 (0.4458)	−0.64265 (0.4331)
Real GDP per capita (2004)		0.39238*** (0.1498)			
Urbanization			0.01133*** (0.0033)		
Control of corruption				0.37789*** (0.1176)	
Government effectiveness					0.48899*** (0.1273)
Constant	0.14506 (0.5187)	0.09930 (0.5459)	0.95756*** (0.2318)	0.13057 (0.5250)	0.47875 (0.5456)
Number of observations	114	114	114	114	114
Pseudo R^2	0.434	0.434	0.459	0.445	0.445
Log-likelihood	110	109.7	112	109.8	111.3

Notes: Standard errors in parentheses. [a] Appendix discusses how parameter estimates from the beta regression are interpreted. $*p < 0.10$; $**p < 0.05$; $***p < 0.01$

Table III.
Remittance inflows
and entry regulation:
beta regression
estimates[a]

The table header includes the page number in top margin area "305" which is part of the running header.

Variable	OLS (1) Regulation	First stage (2) Remittances	Second stage (3) Regulation	2SLS (variation) (4) Regulation	β reg (5) Regulation
Remittances	0.00428*** (0.0015)				0.01816* (0.0099)
Remittances (instrumented)			0.01023* (0.0059)	0.01304* (0.0076)	
Coastal area		7.10668** (2.7776)			
Real GDP per capita	0.09769** (0.0428)	−5.50458*** (1.9562)	0.12303*** (0.0418)		
Rule of law	0.07395** (0.0340)	−1.40747 (1.4798)	0.07886** (0.0356)		
Openness	−0.00026 (0.0005)	0.06420 (0.0414)	−0.00070 (0.0006)	−0.00077 (0.0008)	0.00009 (0.0024)
Legal origin (Socialist)	0.05198 (0.0390)	3.05273 (3.4215)	0.03942 (0.0420)	0.03694 (0.0430)	0.3908* (0.233)
Legal origin (French)	−0.06364* (0.0345)	−1.79004 (1.7334)	−0.05740* (0.0432)	−0.06723* (0.0392)	−0.3347* (0.1741)
Real GDP per capita (2004)				0.13077** (0.0546)	0.3570** (0.1786)
Urbanization					
Control of corruption				0.09256** (0.0431)	0.4561*** (0.1720)
Constant	0.49258*** (0.1421)	16.2137** (6.4574)	0.41174*** (0.1382)	0.37552** (0.1861)	0.1586 (0.6278)
Number of observations	80	80	80	80	80
R^2	0.340	0.212	0.313	0.150	0.309

Notes: Robust standard errors in parentheses. [a]Based on data, the legal dummies have only three categories for developing countries. *$p < 0.10$; **$p < 0.05$; ***$p < 0.01$

Table IV.
Regression estimates for developing countries[a]

developing country subsample. The findings reported in columns (1)-(5) show that the relationship between remittance inflows and entry regulation is insensitive to breaking the sample into non-OECD countries. The size of coefficient on remittances across these estimations is either equal or very close to previous estimates. Though these results are not unexpected, the way how remittances are defined may be one of the reasons for the rigidity of estimates. Remittances are expressed as a share of GDP, which in some cases may not be truly representative. To further check whether our estimates are influenced by the scale of measurement, we next examine the link between remittances and business regulation by using an alternative measure of remittance inflows, expressed in per capita terms.

Table V summarizes the results when remittances are in per capita terms. Columns (1)-(3) report estimates for the full sample and columns (4)-(6) report estimates for the developing countries. It is interesting to find that, with the new measure of remittance inflows, the estimated coefficient on remittances varies significantly between the full sample and the subsample. In other words, the effect of remittances on the quality of entry regulation is indeed larger and more robust for developing countries than for high-income nations. This indicates that the existence of asymmetry in treating remittance income in the developed and developing economies cannot be underestimated. Remittances, as one of the major inflows of foreign resources in low-income countries, seem to boost the political will to enact regulatory reform that can contribute to the ease of starting a new business. Overall, these results reinforce our previous findings that the impact of remittances on business entry regulation is positive and statistically significant for the countries that receive these flows.

A further issue is whether the positive impact of remittance inflows on the quality of entry regulation is robust to using a sub-component of starting a business indicator (as measured by the DTF score). Out of the four sub-indexes, we employ the "time required to start a business" for this robustness check. This time-dimension of entry regulation, measuring the length of time needed (in calendar days) to formally set-up and operate a domestic business, is one of the widely recognized indicators of business regulatory

Variable	OLS (1) Regulation	First stage (2) Remittances	Second stage (3) Regulation	OLS (4) Regulation	First stage (5) Remittances	Second stage (6) Regulation
		Full sample			Developing country subsample	
Remittances	0.03463** (0.0163)			0.04149** (0.0180)		
Remittances (instrumented)			0.01497** (0.0064)			0.08563* (0.0470)
Coastal area		4.36359** (1.9791)			0.88714*** (0.2837)	
Real GDP per capita	0.05771* (0.0334)			0.06222 (0.0384)		
Rule of law	0.04760*** (0.0235)	−1.06554 (0.9532)	0.06007** (0.0270)	0.06867** (0.0337)	−0.01976 (0.2430)	0.06660* (0.0338)
Openness	−0.00003 (0.0001)	0.01875 (0.01993)	−0.00032 (0.0002)	−0.00001 (0.0004)	0.00066 (0.0030)	−0.00008 (0.0005)
Legal origin (Socialist)	0.02872 (0.0301)	1.9607 (2.5565)	0.02633 (0.0304)	0.04699 (0.0393)	0.46472 * (0.2354)	0.03223 (0.0433)
Legal origin (French)	−0.05916** (0.0272)	−1.52942 (1.4588)	−0.04100 (0.0263)	−0.06605* (0.0347)	−0.13945 (0.19335)	−0.06417* (0.0340)
Legal origin (Germany)	−0.11553*** (0.0410)	1.39788 (1.8645)	−0.11970*** (0.0327)			
Legal origin (Scandinavian)	−0.07167*** (0.0294)	1.93115 (1.6111)	−0.08983** (0.0351)			
Rea GDP per capita (2004)		−4.52998*** (1.5665)	0.12985*** (0.0401)		0.24393 (0.2213)	0.04659 (0.0490)
Constant	0.56098*** (0.1218)	18.1508*** (5.9432)	0.30123* (0.1539)	0.54686*** (0.1342)	0.44050 (0.8035)	0.52865*** (0.1431)
Number of observations	114	114	114	80	80	80
R^2	0.431	0.228	0.419	0.337	0.218	0.313

Notes: Robust standard errors in parentheses. [a]Remittances per capita (in logarithm) is used as the alternative measure of remittance inflows. *$p < 0.10$; **$p < 0.05$; ***$p < 0.01$

Table V.
OLS and 2SLS
estimates using an
alternative measure
of remittances[a]

environment across countries. We expect an inverse relationship between remittance inflows and the time required to start a business.

We regress the new response variable, the time-dimension of entry regulation, on the basic set of regressors in Equation (1). The results of both OLS and 2SLS estimations are summarized in Table VI, in which columns (1) and (2) report estimates for the full sample and columns (3) and (4) report estimates for the developing countries. The coefficient on remittances is negative and statistically significant as expected, implying that the inflow of remittances leads to a decrease in the length of time required to start a business. This relationship holds true not only for the full sample, but also applies consistently to the developing country subsample. The coefficient estimate on rule of law, the proxy for quality of legal institutions, is also negative and highly significant in both cases. Moreover, these findings are robust to using either measure of remittance inflows. We, however, report the estimates from using remittances as a share of GDP in Table VI.

To summarize, our robustness checks of analyzing developing country subsample, choosing alternative measures of remittance inflows, and modeling a sub-index of starting a business indicator, confirm the findings of the previous sections, namely that remittances have positive and significant impact on the quality of entry regulation in the remittance-receiving countries. These checks also reveal the existence of asymmetry in that remittance inflows have a larger and more robust effect on the quality of entry regulation in developing countries than in high-income nations.

5. Conclusions
We examine the potentially important role of remittance inflows in shaping the political will to enact regulatory reform that can contribute to business-friendly environment.

	Dependent variable: time to start a business[a]			
	Full sample		Developing country subsample	
	(OLS)	(2SLS)	(OLS)	(2SLS)
Variable	Time	Time	Time	Time
Remittances	−0.01048** (0.0047)		−0.01128** (0.0048)	
Remittances (instrumented)		−0.05907* (0.0333)		−0.03633 (0.0212)
Real GDP per capita	0.00812 (0.0771)		0.04154 (0.0900)	
Rule of law	−0.28032*** (0.0723)	−0.33734*** (0.0835)	−0.24263** (0.0985)	−0.27437*** (0.0985)
Openness	0.00013 (0.0009)	0.00132 (0.0018)	0.00107 (0.0014)	0.00286 (0.0024)
Legal origin (Socialist)	−0.08851 (0.1036)	−0.03557 (0.1451)	−0.20574 (0.1293)	−0.16108 (0.1399)
Legal origin (French)	−0.04264 (0.0797)	−0.10157 (0.1209)	−0.08032 (0.0870)	−0.11091 (0.1062)
Legal origin (Germany)	0.26850 (0.2070)	0.29670 (0.2171)		
Legal origin (Scandinavian)	0.25633 (0.1628)	0.32546* (0.1661)		
Real GDP per capita (2004)		−0.15297 (0.1872)		−0.03898 (0.1410)
Constant	1.21111*** (0.2774)	1.93327** (0.7592)	1.10779*** (0.3020)	1.37225*** (0.4828)
Number of observations	114	114	80	80
R^{2b}	0.321	0.388	0.193	0.118

Table VI.
OLS and 2SLS estimates using time-dimension of entry regulation

Notes: Robust standard errors in parentheses. [a]The response variable in naturallogarithm. [b]R^2 for 2SLS regressions are negative. *$p < 0.10$; **$p < 0.05$; ***$p < 0.01$

Better understanding the impact of remittances on business environment is essential given the evidence on the growth-enhancing effects of business regulatory reforms.

We find a positive and significant association between remittance inflows and the quality of regulatory environment governing the entry of new businesses in the recipient country. This result is robust to using different estimation techniques and accounting for the endogeneity of remittances. The findings also reveal the existence of asymmetry in that remittances have a larger and more robust effect on the quality of entry regulation in developing countries than in high-income nations. Fundamentally, the government's motivation for relaxing burdensome entry regulations in low-income countries may be a part of their major revenue enhancement strategies. Though remittances are not a direct source of tax revenue, their presence can expand the base for other taxes such as the VAT. Even temporary remittance shocks have some tendency to produce an expansionary effect for the economy as a whole, thereby leading to a decline in the share of the informal sector (Chatterjee and Turnovsky, 2016).

One implication concerns the impact of remittances on domestic entrepreneurship. The empirical research maintains that the inflow of remittances fosters entrepreneurship by increasing the access to working capital, either directly through the provision of resources, or indirectly by increasing the pool of capital made available by formal financial institutions. Our findings suggest that remittance inflows can promote the growth of entrepreneurship further by easing the entry of new businesses.

Another implication is that, while the relationship between remittances and economic growth has been a topic of ongoing controversy, there is ample evidence that remittances contribute positively to economic growth by increasing investments in physical and human capital, enhancing total factor productivity, and fostering financial development. This paper recognizes a new channel through which remittances can positively affect economic growth, i.e., by enhancing the quality of regulatory environment for business entry in the recipient economy. It is a widely accepted empirical finding that regulatory reforms which reduce entry costs and liberalize market entry are growth-enhancing (e.g. Buttner, 2006). This important yet overlooked channel through which remittances affect economic growth requires further examination in future research.

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Appendix

Beta regression model: a basic framework

As described in Section 2, our response variable is the DTF score, measuring the quality of entry regulation pertaining to the area of "starting a business" in an economy. The DTF score is a continuous but constrained variable. By construction, it holds values in the standard unit interval: ($DTF \in (0,1)$). In other words, the dependent variable varies between 0 and 1, but no observation can equal exactly zero or exactly one. How should one perform a regression analysis in such a situation? One possible choice is to transform the response variable as $\tilde{y} = \log(y/1-y)$ so that $\tilde{y}$ assumes values in the real line and then apply a standard linear regression analysis. However, this approach creates difficulties in interpreting the parameters as they are interpretable in terms of the mean of $\tilde{y}$, and not in terms of the mean of y. Moreover, regressions involving data from the unit interval are typically heteroskedastic. It means that they display more variation around the mean and less variation as we approach the lower and upper limits of the standard unit interval. Also, the data restricted to the unit interval typically exhibit asymmetry, and hence inference based on the assumption of normality of estimators can be misleading. In such situations, one may consider the beta distribution as an appropriate distribution.

Unlike the case of normally distributed random variable where mean and variance are independent, a beta-distribution involves the variance that can be expressed as a function of the mean. So if a researcher is interested not only in how a covariate influences the expected value of the function, but also the variance, he can appropriately use beta distribution to model the heteroskedasticity, while addressing asymmetry. The beta distribution is a continuous probability distribution defined over the unit interval (0, 1) with the beta density expressed as:

$$f(y|\alpha, \beta) = \frac{\Gamma(\alpha+\beta)}{\Gamma(\alpha)\Gamma(\beta)} y^{\alpha-1}(1-y)^{\beta-1}; \quad 0 < y < 1, \tag{A1}$$

where α, beta > 0; $\Gamma()$ denotes the gamma function. In their particular parameterization, Ferrari and Cribari-Neto (2004) formulates the above beta density in the following form:

$$f(y; \mu, \phi) = \frac{\Gamma(\mu)}{\Gamma(\mu\phi)\Gamma((1-\mu)\phi)} y^{\mu\phi-1}(1-y)^{(1-\mu)\phi-1}; \quad 0 < y < 1, \tag{A2}$$

with $0 < \mu < 1$, and $\phi > 0$, where μ and ϕ are expressed as follows:

$$\mu = \frac{\alpha}{\alpha + \beta} \quad and \quad \phi = \alpha + \beta. \tag{A3}$$

The beta-distributed response variable, y, is expressed as $y \sim \mathscr{B}(\mu, \phi)$, such that:

$$E(y) = \mu; \quad and \quad Var(y) = \frac{\mu(1-\mu)}{(1+\phi)}. \tag{A4}$$

Note that the variance is the function of the mean and the parameter, ϕ. The parameter ϕ satisfies the definition of a precision parameter because, for fixed μ, the greater the value of ϕ, the smaller the variance of the dependent variable. The regression parameters are interpretable in terms of the mean of y. In beta regression models, the mean parameter $\mu \in (0, 1)$ of the beta distribution is expressed as a function of covariates. We will see below that $g(\mu_i) = (x_i^T \beta) = \eta_i$ (a linear predictor); and therefore, $\mu_i = g^{-1}(x_i^T \beta)$, implying that μ_i is a function of beta, the vector of regression parameters.

Let $y_1, \ldots, y_n$ be a random sample representing the DTF scores for starting a business regulation across countries such that $y_i \sim \mathscr{B}(\mu_i, \phi)$; $i = 1, \ldots, n$. Then, to map the linear predictor into the space of observed values on the unit interval, the beta regression model analyzed in this paper, using the logit link function, is defined as the following:

$$logitg(\mu_i) = log\left(\frac{\mu_i}{1-\mu_i}\right) = x_i^T \beta = \eta_i, \tag{A5}$$

where $x_i^T = (x_{i1}, \ldots, x_{ik})$ is a $1 \times k$ vector of explanatory variables including remittances (see Section 3), beta $= (beta_1, \ldots, beta_k)^T$ is a $k \times 1$ vector of unknown regression coefficients, and $k < n$. From Equation (A5), we can write:

$$log\left(\frac{\mu_i}{1-\mu_i}\right) = \beta_1 x_{i1} + \ldots + \beta_k x_{ik} = \eta_i. \tag{A6}$$

In general, $x_{i1} = 1$ for all i so that the model has an intercept. The main motivation for applying a link function to the regression structure is such that both sides of the regression equation assume values in the real line. Moreover, an appropriate choice of the link function may lead to the best fit of the model. From Equations (A4) and (A5), we obtain:

$$Var(y_i) = \frac{\mu_i(1-\mu_i)}{(1+\phi)} = \frac{g^{-1}(x_i^T \beta)\left[1-g^{-1}(x_i^T \beta)\right]}{1+\phi}.$$

This illustrates that the variance of y is a function of μ. Therefore, the parameterization based on Ferrari and Cribari-Neto (2004) makes the model inherently heteroskedastic. The log-likelihood function is $\ell(\beta, \phi) = \sum_{i=1}^{n} \ell_i(\mu_i, \phi)$, where:

$$\ell_i(\mu_i, \phi) = log\Gamma(\phi) - log\Gamma(\mu_i\phi) - log\Gamma((1-\mu_i)\phi) + (\mu_i\phi-1)logy_i + \{(1-\mu_i)\phi-1\}log(1-y_i). \tag{A7}$$

As we can see from above, $\mu_i = g^{-1}(x_i^T \beta)$, implying that μ_i is a function of beta, the vector of regression parameters. The parameters of the model are estimated by the method of ML.

Interpretation of parameter estimates
How do we interpret the parameter estimates in the beta regression model? When logit link function is used, the parameter interpretation is equivalent to that of the logistic regression in which exponentiated coefficients are interpreted in terms of odds ratio. By applying the exponential function to both sides in Equation (A6), we obtain:

$$exp\left(log\left(\frac{\mu_i}{1-\mu_i}\right)\right) = exp(\beta_1 x_{i1} + \ldots + \beta_k x_{ik}).$$

From this expression, the ratio of expected value of the DTF score to the difference of the DTF score from its frontier can be written as:

$$\frac{\mu_i}{1-\mu_i} = \exp(\beta_1 x_{i1} + \ldots + \beta_k x_{ik}), \tag{A8}$$

where μ_i is the expected value of the DTF score under initial covariates. Equation (A8) can be described as the ratio of convergence of an economy toward the frontier relative to its divergence from the best performance. Let us assume that μ_i^* is the expected value of the DTF score when we increase x_k by one unit to the right-hand side in Equation (A8), holding all other regressors unchanged. Under this condition, the above ratio can be modified as:

$$\frac{\mu_i^*}{1-\mu_i^*} = \exp(\beta_1 x_{i1} + \ldots + \beta_k(x_{ik}+1)). \tag{A9}$$

Dividing Equation (A9) by that of Equation (A8), we obtain the resulting double ratio as:

$$\frac{\frac{\mu_i^*}{1-\mu_i^*}}{\frac{\mu_i}{1-\mu_i}} = \frac{exp(\beta_1 x_{i1} + \ldots + \beta_k(x_{ik}+1))}{exp(\beta_1 x_{i1} + \ldots + \beta_k x_{ik})}. \tag{A10}$$

By simplification:

$$\frac{\frac{\mu_i^*}{1-\mu_i^*}}{\frac{\mu_i}{1-\mu_i}} = exp(\beta_k). \tag{A11}$$

The coefficient $beta_k$ in Equation (A11) expresses itself as the log of two ratios each representing the convergence of an economy towards the frontier relative to its divergence from the best performance. It is independent of any particular observation, i.e., it does not depend on the particular value of the covariates. The double ratio in Equation (A11) can be interpreted as an effect on the mean efficiency level when the covariate x_k (i.e. remittances) is increased by one unit relative to initial values of all the covariates.

We now consider an example of how to interpret the coefficient estimate from the beta regression model. Assume that the parameter $beta_k$ in Equation (A5) is associated with remittance variable in our beta regression model of quality of entry regulation given by Equation (1) such that $beta_k = 0.01846$ (from column (1) in Table III), and from the exponential function, $e^{(0.01846)} \approx 1.01863$. Substituting for $beta_k$ in Equation (A11):

$$\frac{\frac{\mu_i^*}{1-\mu_i^*}}{\frac{\mu_i}{1-\mu_i}} = 1.01863. \tag{A12}$$

From Equation (A12), we find $\mu_i^* > \mu_i$.

The resulting condition reveals that the increase in remittance inflows helps elevate the recipient economy from a low expected efficiency level to a high expected efficiency level, thereby moving the economy towards the frontier. In other words, a positive coefficient on remittances in beta regression suggests that the inflow of remittances contributes to a higher quality of regulatory environment for business entry.

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