Research on the effects of business regulations

- Since 2003, 1,578 research articles using *Doing Business* data have been published in peer-reviewed academic journals and another 4,464 have been posted online.
- According to the findings of the research, reforms simplifying business registration lead to more firm creation. Nevertheless, firms that do not see the benefits of formalizing are less likely to respond to policies aimed at improving business regulations.
- Increasing trade openness has larger effects on growth when labor markets are more flexible.
- Research supports the view that the cumbersome, poorly functioning regulatory business environments undermine entrepreneurship and economic performance.
- The introduction of collateral registries and debt recovery tribunals leads to better performing credit markets.

Doing Business has provided new data on business regulations, enabling research on them to flourish. Extensive empirical literature has assessed how the regulatory environment for business affects a broad range of economic outcomes at both the macro and micro levels—including productivity, growth, employment, trade, investment, access to finance and the informal economy. Since 2003, when this report was first published, 1,578 research articles discussing how regulations in the areas measured by *Doing Business* influence economic outcomes have been published in peer-reviewed academic journals. Another 4,464 working papers have been posted online.[1]

To provide some insight into the findings of this fast-growing literature, this chapter reviews articles published in top-ranking economics journals over the past 5 years or disseminated as working papers in the past 2 years.[2] The chapter only covers studies that use *Doing Business* data for analysis or motivation, or else rely on conceptually and methodologically similar indicators (tables 3.1 and 3.2).

The methodologies underpinning empirical work affect the reliability of its findings and ability to influence future research and policies. Papers in the regulatory business environment literature also vary in how much they can demonstrate causal effects between better business regulation and outcomes of interest.

At one end, some studies simply document cross-country correlations between business regulatory variables and outcome variables, showing whether these variables are positively or negatively associated. But such studies cannot indicate whether and how much business regulatory variables changed outcome variables because with this method it is difficult to isolate the effects of other factors.

At the other end, some studies use natural experiments, in the spirit of randomized evaluations, that to some extent control for everything else affecting the outcome variable and can isolate the causal part of this relationship (box 3.1). For example, assume that the goal is to assess how a regulatory reform affects productivity in a given economy. Simple correlations can only show whether the reform is positively or negatively associated with productivity. But natural experiments make it possible to see if the reform has a positive or negative impact on productivity—as well as the magnitude of that impact. A methodology called difference-in-difference estimation, which is similar in principle to natural experiments and is commonly used in the literature, also allows for the assessment of the sign and magnitude of the impact of a reform on an outcome variable (box 3.1).

Other estimation methods frequently used in economic analysis are panel data and instrumental variable analyses, which lie somewhere between pure cross-sectional analysis and natural experiments in terms of their ability to show whether there is a causal link between variables of interest. Panel data include both cross-sectional and time series data—for instance, a dataset that covers multiple economies over time. Such data enable researchers to control for the impact of economy-specific factors that do not vary over time, such as location. This methodology can yield more convincing results than pure cross-sectional analysis. But in many cases, given the complexity of economic settings, they may not establish causality between regulatory changes and outcomes of interest.

BOX 3.1 What are randomized evaluations and natural experiments?

Randomized evaluations bring experimental methods normally used in medicine or chemistry into economics. This approach tries to transform the world into a lab where researchers can clearly define control groups and treatment groups, with the treatment groups receiving interventions and control groups do not. Such experiments can be randomized by design when the choice of being part of either group is random.

For instance, when assessing how school books affect children's learning, one can design a randomized experiment where chance determines which children get books and which do not. Such experiments are almost impossible to conduct for business regulations. For example, it is impossible to randomly assign who has access to a new one-stop shop for business registration and who does not. So researchers look for natural experiments—interventions not designed by them—with treatment and control groups and where the rule assigning the data to the groups is unrelated to the outcome being studied. This is a fundamental characteristic of a natural experiment because without it causal interpretation is not possible.

For business regulations a control group can be formed by collecting data from, for example, cities in an economy not affected by a change in a law, regulation or economic policy, while a treatment group can be formed by collecting the same data from affected cities but otherwise identical to unaffected ones. To see if the change in a law, regulation or economic policy affected an outcome variable—say, income—one can assess whether the incomes of the treatment and control cities differed significantly after the change. For a causal interpretation to be possible, the treatment and control cities should have evolved similarly if the change had not been made. This assumption is unlikely to hold in most cases, making natural experiments rare.

A more commonly used methodology in the literature similar in principle to natural experiments and has weaker assumptions is called difference-in-difference estimation. The main difference between natural experiments and difference-in-difference estimation is that in natural experiments treatment and control groups are assumed to be analogous prior to intervention and evolved similarly in the absence of intervention. In difference-in-difference estimation, these assumptions do not need to hold priori. The differences between treatment and control groups are removed by subtracting the change in means of control group from the change in means of treatment group over the time period considered in the study. The impact of intervention on outcome variable then is estimated using panel data technique and differenced data.

Instrumental variable analysis allows researchers to establish the direction and magnitude of causality by incorporating an exogenous "instrumental variable" closely correlated with the variable being considered (say, regulatory reform) and not with the outcome variable (say, productivity). For instance, Acemoglu, Johnson and Robinson (2002) use an instrumental variable to analyze how institutions affect income per capita. Because economies with strong institutions tend to have high incomes and vice versa, cross-sectional or panel data analysis would not allow the authors to separate the impact of institutions on income from the impact of income on institutions.

To address this two-way relationship, the authors use mortality rates of European settlers as an instrument for institutions because it is closely correlated with the institutional environment in former colonies but not with their incomes. The idea is that European colonizers did not establish institutions in economies with high mortality rates. Thus the mortality rates of colonizers hundreds of years ago shaped the current institutions of many economies, independent of their current incomes, making it an appropriate instrumental variable for institutions and allowing the authors to assess how institutions affect incomes. However, the credibility of this approach depends on the plausibility of the assumption that the instrument has no direct effect on the outcome of interest. For example, if there is a direct link between mortality rates of European settlers and current incomes (for example, through climate, which affects the disease environment), this approach will not be effective in isolating causal effects of institutions on income.

FIRM ENTRY AND LABOR MARKET REGULATIONS

One of the most cited theoretical mechanisms on how excessive business regulation affects economic performance and development is that it makes it too costly for firms to engage in the formal economy, causing them not to invest or to move to the informal economy. Recent studies have conducted extensive empirical testing of this proposition using *Doing Business* and other related indicators.

Bruhn (2011, 2013), among the leading studies employing natural experiments, use quarterly national employment data collected by the Mexican government between 2000 and 2004 and the fact that different regions started implementing business registration reform—called Systems of Fast Opening of Firms (SARE)—at different times to identify how the reform affected the occupational choices of business owners in the informal economy. Bruhn (2011) finds that reform increased the number of registered businesses by 5%, which was entirely because former wage employees started businesses–not because formerly unregistered businesses got registered. Bruhn (2011) also shows that the reform increased wage employment by 2% and reduced the income of incumbent businesses by 3% due to increased competition.

TABLE 3.1 Recent research using *Doing Business* and related indicators by area of study and methodology

Methodology/area of study	Natural experiments and difference-in-difference estimators	Instrumental variable panel estimators	Other panel estimators	Instrumental variable cross-sectional estimators	Other cross-sectional estimators
Firm entry and labor market regulations	Branstetter and others 2013; Bruhn 2013, 2011; de Mel, McKenzie and Woodruff 2013; Kaplan, Piedra and Seira 2011; Monteiro and Assunção 2012		Dreher and Gassebner 2013		Amin 2009
Trade regulations and costs			Chang , Kaltani and Loayza 2009; Busse, Hoekstra and Königer 2012; Portugal-Perez and Wilson 2011; Şeker 2011	Djankov, Freund and Pham 2010; Freund and Rocha 2011	Hoekman and Nicita 2011
Regulations on courts, credit markets, bankruptcy laws and investor protection	Giannetti and Jentzsch 2013; Giné and Love 2010; Lilienfeld-Toal, Mookherjee and Visaria 2012; Love, Martinez- Peria and Singh 2013; Visaria 2009	Cavalcanti 2010; John, Litov and Yeung 2008	Büyükkarabacak and Valev 2012	Houston and others 2010	
Tax regulations	Monteiro and Assunção 2012		Lawless 2013		Djankov and others 2010
Business regulatory environment and economic performance	Amiti and Khandelwal 2011	Barseghyan 2008; Freund and Bolaky 2008	Dall'Olio and others 2013; Dutz and others 2011	Djankov, McLiesh and Ramalho 2006	

Note: Janiak (2013) and di Giovanni and Levchenko (2013) are not included here because they are theoretical papers, not empirical. Nevertheless, the authors use *Doing Business* data to calibrate their theoretical models.

To take into account the effects of individual characteristics of informal business owners on their occupational choices after the reform, Bruhn (2013) separates informal business owners into 2 groups: those with characteristics similar to formal business owners and those with characteristics similar to wage workers. It then estimates the impact that the reform had on the occupational choices of the 2 groups. Bruhn finds that in municipalities with high pre-reform obstacles to formal entrepreneurship, the reform caused 14.9% of informal business owners with characteristics similar to those of formal business owners to shift to the formal economy—while it caused 6% of informal business owners with characteristics similar to those of wage workers to shift to wage employment. These results suggest that the informal economy has different types of business owners who react to reforms differently. For example, some individuals become informal business owners because of cumbersome regulations while others do so temporarily until they find a job.

Kaplan, Piedra and Seira (2011) use the same data from Mexico to construct a counterfactual scenario showing how quickly new firms would have been created without the business registration reform. Their scenario uses two control groups: municipalities that did not adopt the reform and industries not eligible for it. The idea is that control municipalities and industries are good proxies for what would have happened in treatment municipalities and industries in the absence of the reform. The authors find that the simplified entry regulations led 5% of informal firms to shift to the formal economy, though they note that this effect is not permanent.

Bruhn (2013) explains the modest percentage shift of firms from the informal economy in response to the reform as partly resulting from lower benefits of formalization and the fact that the reform only covered business registration at the municipal level and business owners still needed to register with the federal tax authority. But Kaplan, Piedra and Seira (2011) point out that the cost of taxes, the scarcity of marketable ideas and the limited benefits of being formal are far more important obstacles to creating and formalizing firms. Accordingly, they conclude that for reform to have a large impact on formality and firm creation, it should be comprehensive.

Branstetter and others (2013) offer further evidence that simpler business registration helps create formal firms. The authors use nationwide, micro-level matched employer-employee data from Portugal collected in 2000 and 2006 to examine the impact of a reform program, called On the Spot Firms, introduced in 2005. The program substantially cut business registration procedures and costs by introducing one-stop-shops. Using a difference-in-difference methodology based on a comparative analysis of firms established before and after the program to isolate the program's impact on business start-ups, the authors find that reducing the time and cost of firm registration increased the number of start-ups by 17% and created about 7 new jobs a month per 100,000 county inhabitants in eligible industries.

TABLE 3.2 Summary findings of recent research using *Doing Business* and related indicators by methodology

Methodology	Findings of recent research
Natural experiments/ difference-in-difference estimates	In Portugal cutting the time and cost of firm registration increased the number of business start-ups by 17% and created about 7 new jobs a month per 100,000 county inhabitants in eligible industries. The start-ups created after the reform are smaller, more likely to be owned by women, headed by relatively inexperienced and poorly educated entrepreneurs and have lower sales per worker than start-ups created before the reform (Branstetter and others 2013). In municipalities with high constraints to formal entrepreneurship, business registration reform caused 14.9% of informal business owners with characteristics similar to those of formal business owners to shift to the formal economy in Mexico (Bruhn 2013). A reform that simplified business registration in Mexican municipalities increased registration by 5% and wage employment by 2.2%. It also decreased the income of incumbent businesses by 3% due to increased competition (Bruhn 2011). Providing information about registration or paying for it do not necessarily increase formalization, particularly when there are other barriers to it (de Mel, McKenzie and Woodruff 2013). Simplified entry regulations led 5% of informal firms to shift to the formal economy in Mexico, though this effect is not permanent (Kaplan, Piedra and Seira 2011). Mandatory credit reporting systems improve financial intermediation and access, particularly when used in conjunction with credit information systems (Giannetti and Jentzsch 2013). A reform making bankruptcy laws more efficient significantly improved the recovery rate of viable firms in Colombia (Giné and Love 2010). Debt recovery tribunals in India caused a decrease in the borrowing and fixed assets of small firms and an increase in the borrowing, fixed assets, and profits of large firms (Lilienfeld-Toal, Mookherjee and Visaria 2012). Introduction of collateral registries for movable assets increased the firms' access to finance by around 8%. The impact was larger for smaller firms (Love, Martinez-Peria and Singh 2013). Debt recovery tribunals lowered reduced nonperforming loans by 28% and interest rates on larger loans, implying that faster processing of debt recovery suit cut the cost of credit in India (Visaria 2009). Business licensing among retail firms rose 13% after a tax reform in Brazil (Monteiro and Assunção 2012). Import competition leads to much smaller quality upgrading in OECD economies with more cumbersome regulations, while in non-OECD economies with more cumbersome regulations it does not have effect on quality (Amiti and Khandelwal 2011).
Instrumental variable panel estimates	When credit market frictions are low, a reduction in credit market frictions decreases the impact of financial shocks on macroeconomic volatility (Cavalcanti 2010). Strong investor rights lead to higher corporate risk-taking and growth (John, Litov and Yeung 2008). An increase in entry costs of 80% of income per capita decreases total factor productivity by 22% and output per worker by 29% (Barseghyan 2008). A 1% increase in trade is associated with more than a 0.5% increase in income per capita in economies with flexible entry regulations, but has no positive income effects in more rigid economies (Freund and Bolaky 2008).
Other panel data estimates	Cumbersome procedures and high levels of minimum capital are negatively associated with firm entry. Stringent regulations go hand in hand with corruption (Dreher and Gassebner 2013). Increasing trade openness has larger effects on growth when labor markets are more flexible (Chang, Kaltani and Loayza 2009). Better regulations are associated with lower time and costs of trading in developing economies (Busse, Hoekstra and Königer 2012). Good, efficient infrastructure and a healthy business environment are positively linked to export performance (Portugal-Perez and Wilson 2011). Improvements in trade facilitation and entry regulations raise export volumes and reduce distortions caused by restrictions on access to foreign markets (Şeker 2011). Public credit registries and private credit bureaus reduce the probability of bank crises, particularly in low-income economies (Büyükkarabacak and Valev 2012). Complex tax systems are associated with lower numbers of foreign direct investment in an economy but do not affect its level. A high corporate tax rate, on the other hand, is negatively related to both the number and level of foreign direct investment. A 10% reduction in tax complexity is comparable to a 1% reduction in effective corporate tax rates (Lawless 2013). Improvements in the *Doing Business* indicators are positively associated with increases in labor productivity in the manufacturing and services sectors in EU-15 and EU-12 countries, though this association is stronger in EU-12 countries (Dall'Olio and others 2013). *Doing Business* indicators such as getting credit, protecting investors and trading across borders are positively associated with product and process innovation for young firms in non-OECD countries (Dutz and others 2011).

(*continued on next page*)

TABLE 3.2 Summary findings of recent research using *Doing Business* and related indicators by methodology (*continued*)

Methodology	Findings of recent research
Instrumental variable cross-sectional estimates	One day of delay in transport time reduces trade by at least 1%. The impact of this delay is larger for time-sensitive agricultural and manufacturing products and for transit times abroad for landlocked economies (Djankov, Freund and Pham 2010). A 1-day increase in transit time reduces exports by an average of 7% in Sub-Saharan Africa (Freund and Rocha 2011). Stronger creditor rights increase bank risk-taking and the likelihood of financial crises as well as growth. Sharing information among creditors, on the other hand, reduces the likelihood of financial crisis and increases growth (Houston and others 2010). Economies with good business regulatory environments grow faster. Output growth is 2.3% higher for the best quartile in the sample than for the worst (Djankov, McLiesh and Ramalho 2006).
Other cross-sectional estimates	Labor reforms can increase employment in the retail sector by 22% and reduce informal economic activity by 33% (Amin 2009). Import and export costs are highly negatively related to trade volume (Hoekman and Nicita 2011). Higher effective corporate tax rates are associated with lower investment, foreign direct investment and entrepreneurial activity (Djankov and others 2010).

The authors also find that start-ups created after reform tend to be smaller, more likely to be owned by women, headed by relatively inexperienced and poorly educated entrepreneurs and have lower sales per worker than start-ups created before the reform, suggesting that the pre-reform regulatory barriers to entry mattered mostly for marginal firms.

Excessive entry regulation can be detrimental to entrepreneurship and a source of corruption. To test this, Dreher and Gassebner (2013) use panel data for 43 economies from 2003 to 2005. They find that high numbers of procedures and high minimum capital requirements impede firm entry. Furthermore, high levels of regulation go hand in hand with corruption. The authors find that corruption is used to "grease the wheels," reducing the burdensome impact of regulations.

Using a field experiment in Sri Lanka with one control and four treatment groups and offering incentives to informal firms to formalize, de Mel, McKenzie and Woodruff (2013) find that providing information on registration or paying for it do not necessarily increase formalization. These interventions had a low impact because many firms that did not register had informal leases or agreements and were not able to provide authorities with the required proof of ownership for the land where they operated.

Thus business entry regulations cannot be seen in isolation because the benefits of improving the start-up process are conditional on many other factors, including land regulations, taxation and labor regulations. In addition, firms that do not see the benefits of formalizing are less likely to respond to policies aimed at improving business registration. This conclusion is supported by Bruhn and McKenzie (2013), who survey the current literature on business entry reforms. Small informal firms in particular do not seem to benefit from simpler business entry and are not more likely to formalize after such policy interventions.

Overregulated labor markets, like overregulated business entry, can also lead to a large informal economy and high unemployment because they increase barriers to formal employment and make markets too rigid to adjust to changing conditions in an economy. Amin (2009) examines this point using data on 1,948 formal retail stores in 16 major states and 41 cities of India from 2006. Based on cross-sectional regression analysis and controlling for a large number of factors that affect unemployment, he shows that labor regulations in India's retail sector undermine job creation. He further notes that labor reforms could increase employment in the retail sector by as much as 22% for an average store—a significant effect given that the retail sector is India's second largest employer, accounting for more than 9.4% of the formal jobs. Amin also shows that labor reforms can shrink the informal economy by 33%.

Using a theoretical model where a few large firms account for a disproportionate share of economic activity and calibrating this model with *Doing Business* data, di Giovanni and Levchenko (2013) show that reducing entry costs to levels similar to those in the United States improves welfare as measured by real income per capita by 3.3%. One of the study's main assumptions is the distribution of firm size. In economies where large firms do not account for a disproportionate share of economic activity (which is more likely in developing economies), gains from lowering entry barriers–such as those measured by *Doing Business*—are likely to be larger.

TRADE REGULATIONS AND COSTS

As the world's economies have become more interlinked, both public and private sectors have become increasingly concerned about becoming more competitive in global markets. But in many economies, companies engaged in international trade still struggle with high trade costs arising from transport, logistics and regulations, impeding their competitiveness and preventing them from taking full advantage of their production capacity. With the

availability of *Doing Business* indicators on trading across borders—which measure the time, procedural and monetary costs of exporting and importing—several empirical studies have assessed how trade costs affect the export and import performance of economies.

Hoekman and Nicita (2011) use cross-sectional data from 105 economies in 2006 and a gravity-type regression model that controls for logistics quality and several tariff and nontariff costs to show that import and export costs are highly negatively related to trade volume. Similarly, Djankov, Freund and Pham (2010) assess the impact of time delays in exporting on aggregate bilateral trade volumes in 98 economies in 2005 using instrumental variable analysis to identify the causation between time delays and trade volumes. As an instrumental variable they use landlocked economies and their export delays in neighboring economies during the transport of their containers to ports. The intuition here is that trade volumes of an economy are less likely to affect transit times in neighboring economies because they account for a small share of trade in those economies. The authors show that, on average, each day of delay reduces trade by at least 1%. They also find a larger effect on time-sensitive agricultural and manufacturing products and on transit times abroad for landlocked economies.

Portugal-Perez and Wilson (2011) use panel data from 101 developing economies between 2004 and 2007 to assess how infrastructure, border and transport efficiency and the business environment affect export performance. Border and transport efficiency is measured by a *Doing Business* indicator on the number of days and procedures it takes to export and import in an economy, while the measure of the business environment combines various institutional indicators including government transparency, corruption, public trust in government, government favoritism for well-connected firms and irregular payments for exports and imports. After controlling for country fixed effects and several other factors affecting export performance, the authors find that good infrastructure, transport and port efficiency and a healthy business environment are associated with strong export performance.

This conclusion is supported by studies on Sub-Saharan Africa and other developing economies. Using cross-sectional data for Sub-Saharan economies, Freund and Rocha (2011) investigate whether 3 types of export costs—time spent on inland transit, customs and ports, and documents—have different effects on bilateral exports. To control for the potential impact of export volumes on each type of export cost, and to establish causality between export costs and volumes, the authors use instrumental variable analysis for landlocked economies. Each component of export costs listed above is instrumented with the corresponding variable faced by exporters in the transit economy. For example, time spent on exports during inland transit is instrumented by time spent on inland transit in neighboring economies to take containers to ports. The assumption is that export costs incurred in neighboring economies are less likely to be affected by the export volumes of exporting economies.

The authors also separate the impacts of two sets of inland transit time: distance to ports and congestion costs such as border delays, road security, fleet class and competition. Inland transit has the largest negative impact on exports, especially congestion costs. A 1-day increase in transit time reduces exports by an average of 7% in Sub-Saharan Africa, which donors should consider when crafting "aid for trade" policies in Africa and elsewhere. In a related study, Busse, Hoekstra and Königer (2012) use panel data from 2004 to 2009 for 99 developing economies, including 33 of the least developed ones, to show that regulatory improvements are linked to lower trade times and financial costs.

Different types of regulations, not just for trade, can help reap the benefits of international trade. Şeker (2011) focuses on the links between export volumes and regulations on trade and entry. The analysis uses two *Doing Business* indicators—time to export and number of procedures required to start a business—for 137 economies between 2005 and 2007. Şeker finds that improvements in trade facilitation and entry regulations raise export volumes and reduce distortions caused by restrictions on access to foreign markets. These findings suggest that investment climate reforms help economies respond to export opportunities.

Chang, Kaltani and Loayza (2009) use *Doing Business* indicators on labor market flexibility and firm entry and exit to analyze how regulatory reforms supporting open trade affect economic growth. They find that increasing trade openness has larger effects on growth when labor markets are more flexible—making it easier for firms to adjust to changing conditions—and firms can enter and exit markets more easily.

REGULATIONS ON COURTS, CREDIT MARKETS, BANKRUPTCY LAWS AND INVESTOR PROTECTION

Courts, credit markets, bankruptcy laws and investor protection are among the regulatory areas covered by *Doing Business* that have received less attention in most developing economies when it comes to the number of reforms. Recent empirical work provides eye-opening evidence on these issues.

Visaria (2009) uses project loan data for 1993–2000 from a large private bank with branches throughout India to assess how debt recovery rates were affected by debt recovery tribunals introduced by India in 1993 to shorten debt recovery suits and strengthen the rights of lenders to recover assets of defaulting borrowers. To isolate the effect of the tribunals on debt repayments, Visaria analyzes loan repayments in states that had the tribunals relative to states that did not, covering the same period and controlling for state- and industry-specific characteristics. Her analysis finds that the tribunals reduced nonperforming loans by 28%, implying that faster processing of debt recovery suits cuts the cost of credit (figure 3.1).

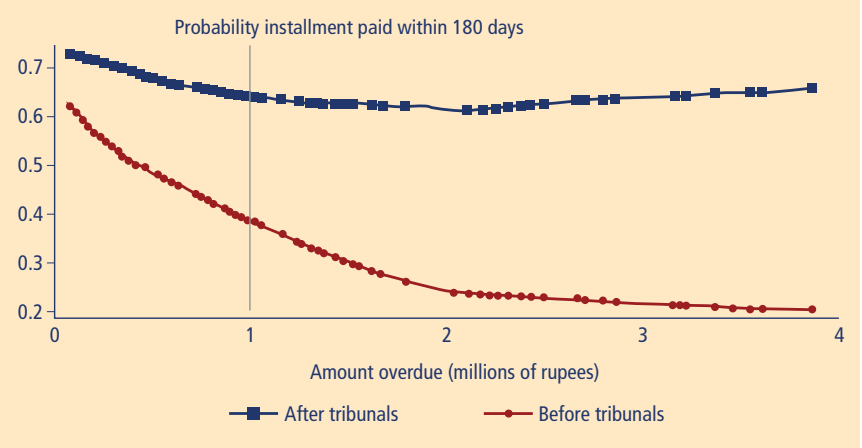
In another study on debt recovery tribunals in India, Lilienfeld-Toal, Mookherjee and Visaria (2012) use firm-level panel data for 1993–2000 and take into account the elasticity of credit supply and the asset size of borrowers. They show that the tribunals caused a reduction in

the borrowing and fixed assets of small firms but an increase in the borrowing, fixed assets and profits of large firms. The reason is that interest rates increased after the tribunals making it harder for small firms to apply for large loans given that they had insufficient collateral.

In the majority of the world economies movable assets are less likely to be accepted as collateral for loans than immovable assets limiting the access of small firms to finance. A study on this point is provided by Love, Martinez-Peria and Singh (2013) who examine the impact of the introduction of movable assets as collaterals on firms' access to bank finance using data from Enterprise Surveys and *Doing Business* indicator on collateral registries for movable assets in 73 countries between 2002 and 2011. Their difference-in-difference estimation that compares firms' access to finance over time and across countries with and without such registries reveals that in countries introducing movable assets as collaterals the number of firms with access to finance increased by around 8%. They also show that the benefits of the introduction of these registries are larger for smaller firms.

Cavalcanti (2010) present theoretical and empirical analyses of the complementary effect of financial shocks and credit market imperfections on macroeconomic volatility using data for 62 economies between 1981 and 1998. They measure credit market frictions by using *Doing Business* indicators on contract enforcement costs and anti-creditor bias. In contrast to the widely held view that the impact of financial shocks on macroeconomic volatility increases with credit market frictions, the authors' theoretical model shows that the effects of financial shocks can increase or decrease with credit market frictions, depending on the source and initial level of such frictions. Their panel data analysis—which instruments indicators on contract enforcement costs and anti-creditor bias with their past values to establish a causal link between them and macroeconomic volatility—shows that in economies with fewer credit market frictions, reductions in both contract enforcement costs and anti-creditor bias dampen the impact of financial shocks on macroeconomic volatility. But in economies with extensive credit market frictions, a reduction in anti-creditor bias actually increases the impact of financial shocks on macroeconomic volatility.

FIGURE 3.1 For all loan amounts, the probability of timely repayment was higher after India established debt recovery tribunals



Note: The figure plots the probability of loan repayments before and after the Indian government created debt recovery tribunals in 1993 to reduce the time taken to resolve cases.
Source: Visaria 2009.

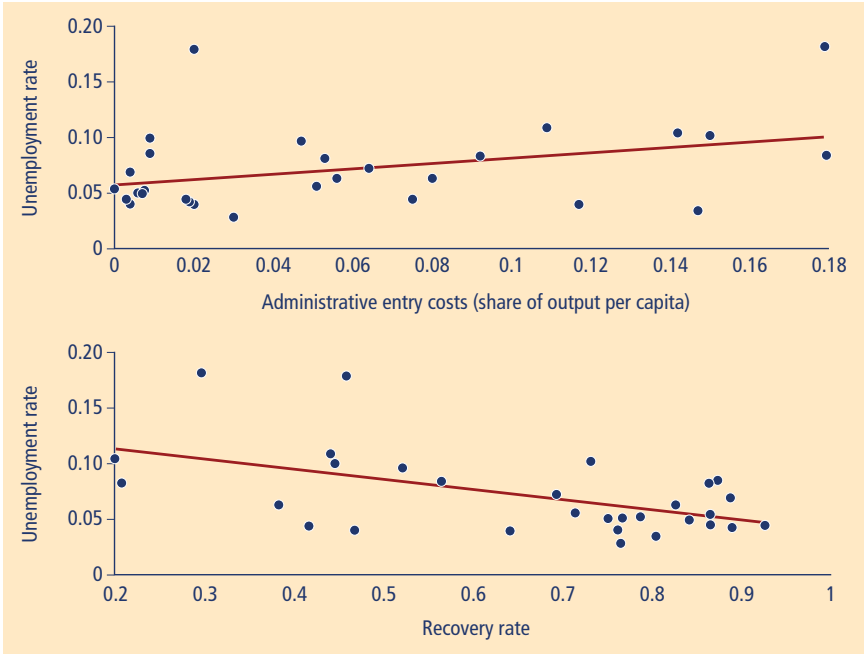
Credit reporting systems reduce information asymmetries in financial markets. Giannetti and Jentzsch (2013) use panel data for 172 economies between 2000 and 2008 to test how credit reporting and identification systems affect financial intermediation. They use a more sophisticated method than standard panel data analysis by creating a synthetic control group that is intended to consist of countries as similar as possible to those that did not implement credit reporting and identification system reforms. The authors find that mandatory credit reporting systems improve financial intermediation and access, particularly when used in conjunction with credit information systems.

Credit information systems can also reduce the likelihood of bank crises because they reduce information asymmetries between banks and borrowers, enabling banks to make better lending decisions. In addition, they increase the probability of loan repayments because bad credit histories make it harder for borrowers to obtain future loans. Büyükkarabacak and Valev (2012) use panel data from 98 economies for 1975 to 2006 to study how sharing credit information affects the likelihood of bank crises. They find that the existence of public registries, private bureaus or both reduced the probability of bank crises, particularly in low-income economies.

Houston and others (2010) reach similar conclusions. The authors merge data for 2002 to 2007 from nearly 2,400 banks in 69 economies with *Doing Business* indicators on creditor rights and credit information sharing. Based on both cross-sectional and instrumental variable regression analyses that use legal origins (English, French, German and Nordic) as instrumental variables for the creditor rights and credit information sharing indicators, they find that stronger creditor rights increase bank risk-taking and the likelihood of financial crises. But stronger creditor rights are also associated with higher growth. On the other hand, sharing information among creditors always seems to have positive effects—reducing the likelihood of financial crisis and raising economic growth.

Laws and regulations that protect investors and help them quickly resolve issues related to their businesses can be crucial for business creation and survival because they encourage investment, facilitate smooth business operations and help viable firms recover if they become insolvent. John, Litov and Yeung (2008) provide an interesting analysis

FIGURE 3.2 Higher entry costs and lower recovery rates are associated with higher unemployment rates



Source: Janiak 2013.

of investor protection. They investigate the relationship between laws and regulations protecting investors, risk-taking and economic growth using firm and national data for 39 economies from 1992 to 2002. Investor protection is measured by variables including the rule of law, disclosure standards and shareholder rights that include minority shareholders. The findings of their instrumental variable panel data regression analysis, which instruments firms' risk-taking by a logarithm of initial assets, disclosure, rule of law and anti-director rights index, show that corporate risk-taking and growth are positively affected by the quality of investor protection, supporting the proposition that protecting investors promotes entrepreneurial activity and economic growth because it enables entrepreneurs to make risky but high value added investments.

To investigate the relationship between efficient bankruptcy laws and recovery rates among economically viable firms, Giné and Love (2010) use data on a large number of firms that filed for bankruptcy in Colombia between 1996 and 2003 and analyze how a 1999 reform in bankruptcy laws affected recovery rates. Their analysis, which compares the length of reorganization and liquidation cases before and after the reform, finds that the reform significantly improved the recovery rate of viable firms.

Janiak (2013) uses a theoretical model calibrated using *Doing Business* data to assess the impact of firm entry and exit regulations on unemployment. He finds that firm exit regulations explain half of the unemployment gap between continental Europe and the United States. These findings are based on the assumptions that there is perfect competition in the market, the degree of returns to scale is 0.85 and firms buy fixed capital on entry, some of which is sunk because of exit regulations. Janiak also finds that when the degree of returns to scale is lower, regulation explains more of the unemployment gap and entry regulations become more influential than exit regulations (figure 3.2). This is because when entry costs are high, firms need to earn more profit to recover those costs by increasing their size. However, when there are decreasing returns to scale (i.e. returns to scale below unity), the marginal product of labor and capital will fall as firms expand, causing firms to decrease their demand for labor, which in turn will increase unemployment. Therefore, the higher the degrees of diminishing returns to scale (the lower the returns to scale from unity) the higher the impact of entry costs on unemployment.

TAX REGULATIONS

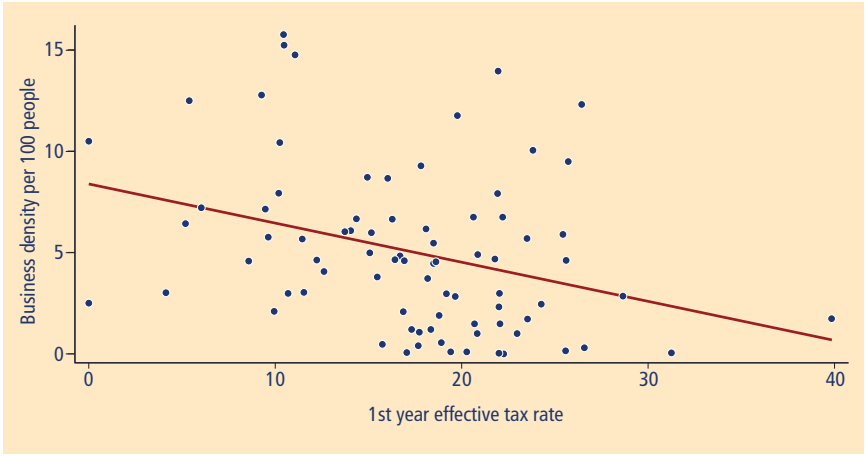
Tax regulations are one of the most contentious topics in public policy and economics and have prompted a large body of theoretical and empirical work investigating the effects of high tax rates and cumbersome and complex tax codes and procedures. Though determining the optimal tax system is difficult because different economies need different systems to maximize their welfare, there is less uncertainty—from both theoretical and empirical perspectives—about the distortionary effects of high taxes and cumbersome tax systems.

Djankov and others (2010) examine how effective corporate tax rates affect entrepreneurship and investment using cross-sectional data from 85 economies in 2004. The authors collected the corporate income tax data based on a standardized case study used for the paying taxes indicator of *Doing Business*. They find that higher effective corporate tax rates are strongly associated with lower aggregate investment, foreign direct investment and entrepreneurial activity (figure 3.3).

Lawless (2013) investigates the impact of high corporate tax rates and tax complexity on foreign direct investment in 57 economies. Using panel data regression analysis and controlling for a wide range of factors affecting such investment, she finds that complex tax systems are associated with fewer—but not smaller—foreign direct investments. A high corporate tax rate, on the other hand, is negatively associated with both numbers and size of foreign investments. Lawless shows that a 10% reduction in tax complexity is comparable to a 1% reduction in effective corporate tax rates in terms of its effect on foreign direct investment.

Monteiro and Assunção (2012) examine the effect on the formal economy of a tax reform, called SIMPLES, that reduced the number of taxes and tax procedures for micro and small firms in Brazil. Based on a cross-sectional survey of firms in Brazilian

FIGURE 3.3 Higher effective tax rates are associated with lower business density



Source: Djankov and others 2010.

state capitals and metropolitan areas, the authors estimate the impact of SIMPLES on formal business licensing through natural experiments that compare firms eligible to benefit from the reform and those that are not. Their finding that business licensing among retail firms rose by 13% after SIMPLES was enacted is robust to a series of sensitivity tests—indicating that tax simplification helps expand the formal economy.

BUSINESS REGULATORY ENVIRONMENT AND OVERALL ECONOMIC PERFORMANCE

The research reviewed so far was about the effects of different business regulations on intermediate outcomes. But it is also important to know whether strengthening the business regulatory environment has a significant impact on the overall economic performance of firms and economies, through for example its effect on growth rate of output, productivity and innovation. A number of studies have assessed how much a good business regulatory environment, as measured by aggregate *Doing Business*, matters for economic growth, higher productivity and innovation.

Djankov, McLiesh, and Ramalho (2006) shed some light on this issue using cross-sectional data from 135 economies covering the period from 1993 to 2002 and instrumenting business regulation indicators with their legal origins (English, French, German, Nordic and socialist), the main religion in the economy (Catholic, Muslim, Protestant or other), percentage of English-speaking population, initial income per capita and geographic latitude. They find that economies with good business regulatory environments grow faster and that output growth is 2.3% higher for the best quartile in the sample than for the worst.

Dall'Olio and others (2013) provide further insight on links between the business environment and growth. Using the aggregate *Doing Business* indicator and its sub-indexes, such as construction permits, trading across borders, paying taxes and employing workers, they investigate whether structural or firm-specific characteristics contributed more to labor productivity growth in the European Union between 2002 and 2008. Panel data analysis found that improvements in the *Doing Business* indicators are positively associated with increased labor productivity in manufacturing and services in EU-15 and EU-12 countries, though the magnitude of this association is larger in EU-12 countries.[3]

Freund and Bolaky (2008) draw on data for 126 economies between 2000 and 2005 and use predicted trade, generated from a regression of bilateral trade on distance, as an instrument for trade openness to establish the direction of causality from *Doing Business* indicators—covering areas including business entry, labor and property registration—to openness. They find that trade leads to higher living standards in economies with flexible regulatory environments but not in those with rigid regulatory environments. They also show that business regulation is more important than financial development, higher education enrollment or rule of law for complementing trade liberalization. In addition, the authors find that a 1% increase in trade is associated with more than a 0.5% increase in income per capita in economies with flexible entry regulations, but has no positive income effects in more rigid economies.

Using World Bank Enterprise Surveys data from a large number of manufacturing firms between 2002 and 2006 in 71 economies, Dutz and others (2011) show that the aggregate *Doing Business* indicator, as well as its sub-indexes (including getting credit, protecting investors and trading across borders), are positively associated with product and process innovation for young firms in non-OECD countries. Based on their findings, the authors emphasize the importance of business environment in spurring incentives for competition and innovation.

The literature has shown that entry costs increase the size of the informal economy and decrease job creation, which are likely to hurt economic performance. Barseghyan (2008) investigates how entry costs affect output and productivity using *Doing Business* data on entry costs for 97 economies and instrumental variable estimation. He instruments entry costs by geographic latitude, share of the population speaking a major European language, European settler mortality rates in the early stages of colonization and indigenous population density in the early 16th century. Barseghyan shows that higher entry costs significantly reduce output per worker by lowering total factor productivity. He finds that an increase in entry costs of 80% of income per capita decreases total factor productivity by 22% and output per worker by 29%.

On a related issue, Amiti and Khandelwal (2011) examine how improvements in business regulatory environment, measured by aggregate *Doing Business*, affect the quality upgrading of products based on disaggregated data from 56 economies for 10,000 products. The authors use panel data regression analysis and a

natural experiment to investigate how the regulatory environment and import competition affect product quality upgrading in economies that are OECD members and those that are not. For OECD members the authors find that import competition leads to much smaller quality upgrading in economies with more cumbersome regulations. In non-OECD economies import competition does not lead to any quality improvements if regulations are more cumbersome. These findings suggest that reforms might be needed for import competition to improve product quality because of impediments created by bureaucratic red tape, nontariff barriers and other entry regulations.

CONCLUSION

The empirical work reviewed in this chapter provides evidence that cumbersome, poorly functioning regulatory business environments undermine entrepreneurship and the economic performance of firms and economies. They do so by, for example, impeding entry to production and labor markets, which promotes the informal economy and unemployment, and by making trading, accessing credit markets and resolving legal issues more expensive for businesses. Thus efforts to promote economic and social development should focus on formulating policies that make business regulatory environments work for entrepreneurs and small and medium-size firms—and not obstruct their creation, productivity and competitiveness.

These results are encouraging, showing the relevance of the policy reforms in the areas measured by *Doing Business*. But further research is needed. For instance, although empirical research provides ample evidence for positive links between better business regulations and economic performance, more rigorous research is needed to better understand whether and to what extent the former causes the latter. Some of the most convincing evidence to date comes from natural experiments, which have focused mostly on firm entry regulation. Other areas of business regulations—such as trade, taxation, labor markets, credit markets and protecting investors—would benefit greatly from future research using similar techniques. Furthermore, given that only a handful of studies separate out the impact of business regulatory environment on the overall performance of economies, such as economic growth, productivity and investment, more research on these issues would substantially enhance our understanding of the multifaceted relationships between business regulations, economic performance and development.

Policymakers contemplating business regulatory reforms should consider designing these reforms and their implementation in ways that lend themselves well to empirical analysis of their effects, so that they can better understand whether their reforms are leading to desired outcomes. This may consist of (i) collecting careful baseline and follow-up data, and (ii) deliberately deciding to phase in reforms for different groups of users, perhaps even randomly selecting locations in which reforms will be piloted, in order to be able to draw conclusions about the causal impacts of their reforms.

NOTES

1. Based on searches for citations in the 9 background papers that form the basis for the *Doing Business* indicators in the Social Science Citation Index and Google Scholar (http://scholar.google.com).
2. The only exception to this rule is that Djankov, McLiesh and Ramalho (2006) is included in the review although it was published more than five years ago, given that it is one of the few studies examining the impact of overall regulatory business environment on economic growth.
3. The EU-12 are those that have joined the European Union since 2004: Bulgaria, Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, the Slovak Republic and Slovenia. The EU-15 consists of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom.