WORLD BANK GROUP

Research & Policy Briefs
From the World Bank Chile Center and Malaysia Hub

No. 23, June 2019

Financial Innovation and Additionality: The Power of Economic Analysis and Data Analytics

Facundo Abraham Sergio L. Schmukler José Tessada

As public and private financial institutions innovate to expand the range of financial products that households and firms use, questions about the additionality of different services have become central. Additional financial services are those that are not already provided by the private sector and that create value added to the overall economy. To identify and measure the contribution of financial services, precise analytical techniques and data are essential. Measuring additionality is challenging but, to the extent that it can be done, it is helpful to assess the multiple effects of financial innovation on the consumers of financial products, the financial service providers, and the economy as a whole.

Introduction

Innovation is a staple of the financial sector. From ATMs, credit cards, and securitization to branchless banking, mobile payments, and crowdfunding, new financial services are constantly transforming the way in which households and firms access and use financial products. These new services help complete markets and, in some cases, integrate marginalized groups and firms into the financial sector.

Both the public and private sectors participate in this process of innovation. For the public sector, providing new financial services is a way to try to increase access to finance. The financial sector fosters investment, technological innovation, risk diversification, and consumption smoothing, among other benefits. As a consequence, several governments around the world have established national strategies to deepen access to finance. These strategies have led to a resurgence of development financial institutions (DFIs) (The Economist 2019a).

In the private sector, both incumbents and new entrants also produce financial innovations when searching for ways to access new segments, increase market share, and reduce costs. For example, rapid advances in information technology, cloud computing, and big data have opened the door to innovative financial services (The Economist 2019b). New financial technology (fintech) firms (such as Akulaku, Cumplo, Go-Pay, Jirnexu, Klarna, Lending Club, Qudian, and Viva Republica) are disrupting banking by offering easier and cheaper access to traditional financial services, as well as completing markets. Large, nonfinancial corporations have also ventured into the financial sector. E-commerce platforms, such as Amazon, Alibaba, Mercado Libre, and PayPal, now offer loans to small suppliers, assessing firms' risk based on their transaction history. Traditional financial institutions have responded to increased competition by offering innovative services, as well. For example, traditional banks have started to become more digital by closing branches and focusing on online services (The Economist 2019b).

The continuous emergence of new financial services has generated great interest in measuring how these services are affecting the bottom line of financial intermediaries and the overall economy (Forbes 2019). Public sector banks, DFIs, and other state-owned entities want to understand which services expand access to finance so they can design more effective policy interventions. Private sector firms want to know whether new services are generating new businesses or are simply leading clients to substitute between services (for example, when firms cannibalize their own products without boosting profits). Moreover, many private firms are interested in demonstrating how their innovations yield positive externalities and benefits to society. Academics also want to understand the effects of new financial services. For example, they might want to ascertain how different financial services offered by the public and private sectors affect users as well as the economy as a whole, or whether new firms are complementing or substituting traditional financial institutions.

Evaluating the "additionality" of financial services can help answer such questions. Measuring additionality requires a new framework or approach that exploits data in the financial system and applies new statistical/econometric methods and economic analyses, with the aim of providing a more accurate evaluation of the impact of financial services.

What Is Additionality?

A financial service is considered additional if it creates value for the economy. In some cases, financial institutions offer new products that already exist in the market. In these cases, even if consumers use them, no value is created. Consumers are simply substituting among similar products. But in other cases, financial institutions innovate and provide new services that did not exist before or offer existing services at lower costs and/or better terms, increasing welfare for users. New financial services can also produce spillovers (positive or negative) to nonusers and other financial intermediaries. Overall, financial innovations create additionality when their net effect on the overall economy is positive, benefiting both consumers and producers of these products (EP 2008).

The concept of additionality was initially conceived for the public sector, particularly to guide interventions by DFIs and multilateral development banks (MDBs). The idea is that public

Affiliation: Development Research Group, the World Bank; Pontificia Universidad Católica de Chile (PUC & Finance UC); and JPAL. E-mail addresses: fabraham@worldbank.org, sschmukler@worldbank.org, jtessada@gmail.com.

Acknowledgement: We received very useful comments from Robert Cull, Aart Kraay, and Norman Loayza, as well as helpful edits from Nancy Morrison. The World Bank Chile Research and Development Center, the FCI group at the Malaysia Global Knowledge and Research Hub, and the KCP and SRP programs provided financial support for this brief.

interventions in the financial sector should add resources beyond those already in the market and should not crowd out the private sector (MDBs 2018). In this context, additionality refers to the provision of financial services that the private sector is not offering (such as when public banks provide microfinance products to low-income households that are not served by traditional banks) or to the mobilization of the private sector to provide services that otherwise would not be provided (such as by reducing risks and/or transaction costs for the private sector) (OECD 2016). For example, when a government establishes a public credit guarantee scheme, the public sector might not provide any financing directly, but instead could promote private lending by reducing risk and the need of collateral for guaranteed borrowers.

Although additionality has been commonly used in the context of public interventions, it is possible to extend this concept to the private sector. In the search for profit maximization, the private sector can produce new value for the economy (The Economist 2019b). For example, when traditional banks and fintech firms (such as Destacame, Lendingkart, and Tala) use nontraditional data to assess clients' risk and provide or facilitate access to lending, they can generate additionality by enabling credit-constrained individuals to access financial resources. Similarly, online platforms that bring together small firms, their large suppliers, and private banks to promote factoring operations (such as ASYX, InvoiNet, Orbian, Prime Revenue, and Taulia) can produce additionality by allowing small firms to obtain working capital. Many times, the private sector can produce additionality by processing existing data on their own operations to better understand their clients and identify gaps in the market, which are then served with new products.

The public and private sectors can create additionality in similar ways. In essence, additionality takes place when institutions address existing market failures that constrain access to finance. Lack of information about borrowers, weak creditor protection, coordination failures, or high costs of serving specific geographical areas, among other frictions, can limit the provision of financial services. Finding innovative ways to mitigate these frictions can lead to new resources being generated or new value being created—whether this is done by the public or private sector (de la Torre, Gozzi, and Schmukler 2017). In fact, in many cases a new additional service provided by the public sector could have been equally provided by the private sector and vice versa. A good example is credit information schemes, which can be established by the public sector (credit registries), the private sector (credit bureaus), or both simultaneously.

Additionality can occur in multiple ways (EP 2008). For example, a financial service can improve overall finance by targeting excluded groups, reducing costs, or improving terms. Another important aspect is whether the service is used for its intended purpose. For instance, various studies of microfinance have found that even though microentrepreneurs gain access to credit, they often use the new financing for consumption instead of investment (Attanasio et al. 2015). Similarly, payday loans might facilitate lending to low-income households, but if this comes at the cost of customers becoming highly indebted and bankrupt, such loans cannot be considered to be generating additionality (Liberty Street Economics 2015). Another way of looking at additionality is to observe whether the service generates an economic impact, for example, in terms of higher growth, more jobs, increased innovation, new markets, and higher education.

How Can Additionality Be Measured?

Measuring additionality is not straightforward. Because it entails measuring the extent to which a financial service produces a net positive outcome to the economy, it requires identifying and quantifying the financial and economic effects of a financial service on its users, nonusers, and financial intermediaries. Whereas measuring additionality comprehensively can be intricate and time-consuming, several approaches help identify the possible implications of financial services and provide insights as to their additionality. Examples of these approaches, which are reviewed next, illustrate some principles of what constitutes a proper approach to start measuring additionality.

To be clear, additionality is typically not properly measured by indicators that only quantify the scale of a financial service (such as the number of clients served, the total disbursements made, or the revenues from those services). Many times, such quantitative indicators are used because they are simple to calculate and communicate. However, they do not provide a good metric of the actual contribution of a service to the economy. They offer no information about whether the service is increasing the overall use of finance or is displacing other services and/or institutions. They also do not provide information about whether the financial services are actually necessary for consumers, how they are being used, or what their economic impact is. Given these limitations, alternative analytical approaches can be used to address these issues.

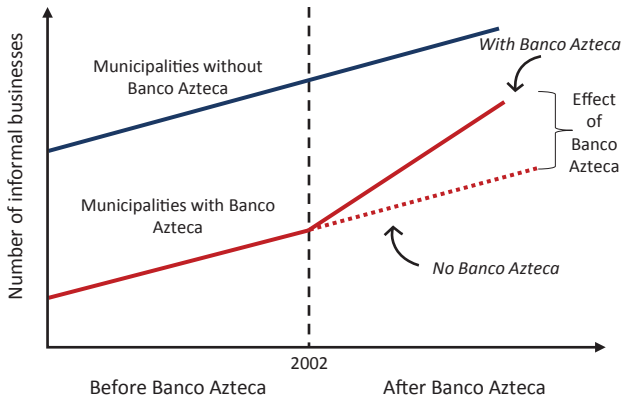
1. Case Studies

One approach is to conduct a case study. This method is mainly qualitative and tries to answer basic questions about a financial service. For example, it could start by identifying what causes the problem of access and who is affected. Then, it could review how the service is designed and how it addresses market failures. Moreover, a case study could examine whether the targeted group is effectively using the service and whether the service is sustainable over time. Comparison with similar services in other countries could also be informative. For services offered by the public sector, a case study could also examine whether the private sector participates, how incentives are aligned, and what different contributions the public sector offers (de la Torre, Gozzi, and Schmukler 2017; CGD 2019). Case studies can be an illustrative way to understand how a financial service is designed, how it addresses gaps in the financial sector, and how it could potentially create value. However, they lack quantitative analysis of the actual impact of the service in practice.

2. Financial System Data Analyses

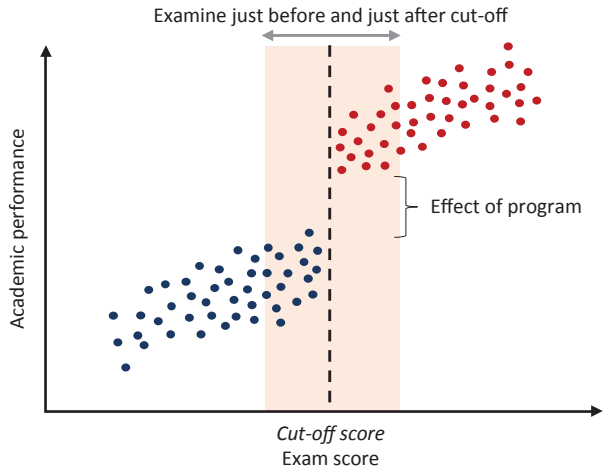
A more data-driven approach is to examine data for the entire financial sector, including public information from central banks, supervisory authorities, and credit bureaus/registries, as well as data from private vendors. These data can offer an overview of the financial sector and how different financial institutions are providing valuable services. For example, analysis of loan and credit bureau/registry data could help determine whether the emergence of new fintech firms allow new individuals and firms to obtain loans (Jagtiani and Lemieux 2017). Moreover, data on how individuals and firms enter and exit financial institutions

Figure 1. Difference-in-Differences



This figure shows the effect of loans to low-income households granted by Banco Azteca on the number of informal businesses in Mexico. Starting operations in 2002, Banco Azteca was initially present in some municipalities but not others, allowing for a before-and-after comparison (Bruhn and Love 2009).

Figure 2. Discontinuity Analysis



This figure shows the effect of a college loan program in Colombia on academic performance. The program granted loans only to those students who scored above a minimum score in their high school exit exams (Melguizo, Sanchez Torres, and Velasco 2016).

could be used to show whether specific intermediaries, such as DFIs or microcredit institutions, are "entry points" to the financial system. In particular, the data could reveal whether customers used other financial institutions before becoming clients or whether clients move to other institutions over time after being served by a DFI or a microcredit institution. For the public sector, an important line of investigation is whether public participation in private operations can lead to better outcomes. For example, some studies examine whether participation of MDBs on syndicated lending can increase the volume and maturity of loans and whether infrastructure projects supported by MDB loans have lower cancellation rates (Broccolini et al. 2015; Marcelo Gordillo and House 2016).

3. Impact Evaluation

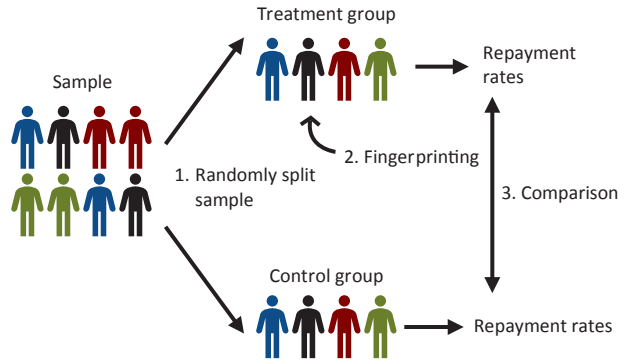
A more focused approach based on data analytics consists of quantifying the effect that a financial service has on its users. The idea is to compare users of a financial service (the "treated group") with a similar group of nonusers (the "control group"), and identify whether users benefit in a way that is not observed for nonusers. Whereas this approach can be very useful when trying to understand the direct effects of a financial service on users, it does not necessarily provide insights on the spillovers to nonusers and other financial intermediaries. For example, an observed increase in lending to the treated group could come at the expense of reduced borrowing by third parties that are not being considered in the analysis. Thus, one has to be cautious when interpreting results. This approach, which is commonly known as impact evaluation, can be applied using different methods (Gertler et al 2016). Some of these methods are reviewed next.

a. *Difference-in-differences.* Some financial services are restricted to specific geographical areas or sectors. In these cases, it is possible to compare trends before and after the service is introduced for both users and nonusers. If after the introduction of the new financial service, users experience a positive change in trend while the trend for nonusers remain unchanged, then it is possible to conclude that the service has beneficial effects for users (Figure 1). Examples include studying the impact of introducing loans to low-income households in some Mexican municipalities but not in others (Bruhn and Love 2009); comparing the removal of subsidized credit for exporters of yarn but not for other exporters in Pakistan (Zia 2008); and examining the effect of access to payday loans by exploiting the assignment of military personnel in the United States to different states with and without payday loans (Carrell and Zinman 2014).

b. *Discontinuity analysis.* In other cases, the eligibility to access a specific financial service depends on a clearly defined cutoff, such as income level, firm size, credit score, or a test score. For example, only households with income below a threshold might receive financial aid or only firms below a certain size could apply for subsidized lending. In these cases, individuals "just below" the cutoff would be very similar to those "just above" (in essence, one group barely does not make it and the other group barely does). In such cases, the only fundamental difference among the two groups is that one uses the financial service by qualifying for it, while the other does not. Thus, it is possible to compare outcomes between them (Figure 2). For example, a student credit program in Colombia that grants credit based on a test score allows researchers to examine the effect of student loans on academic outcomes (Melguizo, Sanchez Torres, and Velasco 2016). Other studies have examined mortgage lending support in the United States to households below a determined income level (Bhutta 2011) and the provision of credit guarantees in Italy to firms based on balance-sheet observables such as leverage or cash flows (de Blasio et al. 2014).

c. *Randomized control trials.* Sometimes, financial services can be tested through a small-scale intervention before being broadly implemented. In particular, the financial service can be randomly assigned among households, firms, or geographical areas. This random assignment means that users and nonusers will not have different characteristics on average, and thus it is possible to compare the difference in outcomes among both groups (Figure 3). In many cases, these experiments are conducted by private and public institutions jointly with researchers. For example, in Malawi a government-owned microfinance institution randomly required farmers applying for agricultural loans to provide fingerprints. The goal was to examine whether borrower identification reduced moral hazard and adverse selection, increasing repayment rates (Giné,

Figure 3. Randomized Control Trial



This figure shows the design of a borrower identification experiment in Malawi. Farmers applying for agricultural loans were randomly fingerprinted. Their loan repayment rates were compared with borrowers who were not fingerprinted (Giné, Goldberg, and Yan 2012).

Goldberg, and Yan 2012). In Senegal, a microfinance institution arbitrarily encouraged new clients to open an account at either a banking agent or a branch. Then, researchers examined how account usage changed depending on how clients opened the account (Buri et al. 2018). In Ghana, a private bank randomly offered a new savings product to clients to analyze how this product affected financial behavior (Buehren et al. 2018).

What Are the Challenges in Measuring the Additionality of Innovations?

Measuring additionality facilitates better evaluations of the impact of financial innovations and thus helps improve the overall allocation of both public and private resources and services in the financial sector. However, measuring additionality is not easy. It requires analysts and practitioners to change the way they think about financial innovations: to abandon the narrow view that financial services should increase finance per se in favor of considering how financial services affect market participants and how successful they are at accomplishing a particular expansion or development goal.

Measuring additionality also requires increased data analyses and coordination. Assessing the additionality of financial services can involve processing and analyzing a substantial body of data. In some cases, financial institutions would need to analyze data from their own operations. Many times, these data are already available, but financial institutions do not have the technical capabilities and expertise to process and exploit them. The academic community could play a useful role in the design and evaluation of financial services and in the validation of results. In other cases, measuring additionality would require looking beyond a financial institution's clients and examining trends in the financial sector as a whole. But doing this would require increased coordination among financial sector participants to share and match relevant information.

The discussion and methodological approaches introduced in this brief can help the public and private sectors start measuring additionality. But these approaches provide only a partial view of the additionality of new financial services. As financial sector stakeholders become more familiar with the concept of additionality, it would be convenient to develop new, more comprehensive gauges of additionality. Achieving a good balance between a measure that is general enough to capture multiple effects but that, at the same time, is not too overly complicated to calculate would be challenging. Academics have already started thinking about the next steps in evaluating additionality (Taylor and Filipski 2014).

References

Attanasio, O., B. Augsburg, R. De Haas, E. Fitzsimons, and H. Harmgart. 2015. "The Impacts of Microfinance: Evidence from Joint-Liability Lending in Mongolia." *American Economic Journal: Applied Economics* 7 (1): 90–122.

Bhutta, N. 2011. "The Community Reinvestment Act and Mortgage Lending to Lower Income Borrowers and Neighborhoods." *Journal of Law and Economics* 54 (4): 953–83.

Broccolini, C., G. Lotti, A. Maffioli, A. F. Presbitero, and R. Stucchi. 2015. "Mobilization Effects of Multilateral Development Banks." IMF Working Paper 19/28, International Monetary Fund.

Bruhn, M., and I. Love. 2009. "The Economic Impact of Banking the Unbanked: Evidence from Mexico." Policy Research Working Paper 4981, World Bank.

Buehren, N., M. Goldstein, L. Klapper, T. Koroknay-Palicz, and S. G. Schaner. 2018. "The Limits of Commitment: Who Benefits from Illiquid Savings Products?" Policy Research Working Paper 8633, World Bank.

Buri, S., R. J. Cull, X. Giné, S. Harten, and S. Heitmann. 2018. "Banking with Agents: Experimental Evidence from Senegal." Policy Research Working Paper 8417, World Bank.

Carrell, S., and J. Zinman. 2014. "In Harm's Way? Payday Loan Access and Military Personnel Performance." *Review of Financial Studies* 27 (9): 2805–40.

CGD (Center for Global Development). 2019. "Case Studies on Access to Financial Services." Center for Global Development.

de Blasio, G., S. De Mitri, A. D'Ignazio, P. Finaldi Russo, and L. Stoppani. 2014. "Public Guarantees to SME Borrowing. An RDD Evaluation." Università degli Studi di Padova.

de la Torre, A., J. C. Gozzi, and S. L. Schmukler. 2017. *Innovative Experiences in Access to Finance: Market-Friendly Roles for the Visible Hand?* Latin American Development Forum, World Bank.

Economist, The. 2019a. "National Development Banks Are Back in Vogue." March 7.

---------. 2019b. "Special Report: A Bank in Your Pocket." May 2.

EP (English Partnerships). 2008. *Additionality Guide: A Standard Approach to Assessing the Additional Impact of Interventions,* 3rd edition. English Partnerships.

Forbes. 2019. "The Fintech Revolution Is Here. Can It Help Build A Better Economy?" February 22.

Gertler, P., S. Martinez, P. Premand, L. B. Rawlings, and C. M .J. Vermeersch. 2016. *Impact Evaluation in Practice,* 2nd edition. Inter-American Development Bank and World Bank.

Giné, X., J. Goldberg, and D. Yan. 2012. "Credit Market Consequences of Improved Personal Identification: Field Experimental Evidence from Malawi." *American Economic Review* 102 (6): 2923–54.

Jagtiani, J., and C. Lemieux. 2017. "Fintech Lending: Financial Inclusion, Risk Pricing, and Alternative Information." Working Paper, Federal Reserve Bank of Philadelphia.

Liberty Street Economics. 2015. "Reframing the Debate about Payday Lending." October 19.

Marcelo Gordillo, D., and R. S. House. 2016. "Effects of Multilateral Support on Infrastructure PPP Contract Cancellation." Policy Research Working Paper 7751, World Bank.

MDBs (Multilateral Development Banks Working Group). 2018. *Multilateral Development Banks' Harmonized Framework for Additionality in Private Sector Operations.*

Melguizo, T., F. Sanchez Torres, and T. Velasco. 2016. "Credit for Low-Income Students and Access to and Academic Performance in Higher Education in Colombia: A Regression Discontinuity Approach." *World Development* 80 (C): 61–77.

OECD (Organization for Economic Co-operation and Development). 2016. "Understanding Key Terms and Modalities for Private Sector Engagement in Development Co-operation." OECD.

Taylor, J. E., and M. J. Filipski. 2014. *Beyond Experiments in Development Economics.* Oxford University Press.

Zia, B. H. 2008. "Export Incentives, Financial Constraints, and the (Mis)allocation of Credit: Micro-level Evidence from Subsidized Export Loans." *Journal of Financial Economics* 87 (2): 498–527.