# Access to Credit & the Expansion of Broadband Internet in Peru

RESEARCH PROPOSAL: Financial Inclusion in Latin America and the Caribbean

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## 1 Introduction

While the discussion on the adoption of new digital financial products and it effects over consumers and firms have grown during the last years, evidence on the most obvious relevant constraint is very limited: What is the role played by the expansion of internet broadband or the lack of high-speed internet? This proposal seeks to fill this gap using granular information on the plausibly exogenous roll-out of broadband infrastructure (for example the mobile 4G technology), and credit information at the firm-level in Peru betwen 2014 and 2020. The research question is: What are the effects of the expansion of broadband internet over credit to non-financial firms?

To answer this question, we will look at the effects over the intensive margin of credit (size of loans), the extensive margin (number of loans), the overall effects on credit (intensive plus extensive), non-performing loans and interest payments. In the context of the literature, discussed below, this would be the first paper that looks at small and micro firms. In sum, this project seeks to carefully document the potential gains of investing in future technologies infrastructure (like 5G mobile), which could become a binding constraint on the expansion of financial inclusion in the region, if such investments are not realized or delayed.

To the best of our knowledge, there are only two recent working papers that have address the same question. D'Andrea and Limodio (2019) use information on interbank markets and credit at the bank-level for African banks, to study the effects of high-speed internet. They use as a natural experiment the staggered arrival to Africa of fibre-optic submarine cables, exploiting the variability in the exact geography and timing of this event betwen 2000 and 2013. Their results indicate that lending increases by 17%, while interbank loans also goes up by 15%. In addition, they corroborate their findings using firm-level information on access to finance from the World Bank Enterprise Surveys.

The second paper that looks at the effects of broadband internet over lending is D'Andrea et al. (2021). Differently from the first paper, they use detailed information on credit at the firm-level in Italy. They also have information on the balance sheet of non-financial firms and banks (employees, banks deposits, location of branches). Their key data correspond to the percentage of households in a municipality that has access to broadband (from the *Osservatorio Banda Larga*), available only a few years after the introduction of high-speed internet (their data starts in 2005, and 2002 is the year of the beginning of the expansion of broadband). To solve this issue, they instrument their indicator of access to high-speed

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internet with the distance of the municipality to the infrastructure that allows the connection.[1] Their main results indicate that broadband increase the number of loans in 12%, the size of the credit granted goes up by 28%, and the interest rate falls by 30 basic points.

Our project shares with D'Andrea et al. (2021) the use of granular information about bank credit on firms and broadband data; however, differs in three aspects. First, the roll-out of the mobile broadband in Peru started its general expansion in 2017, and we have information since 2014 (we document this in the following section). Hence, we do not have a problem of information with the starting year of the roll-out of the infrastructure. Second, in our calculations we can use the location of firms, instead of the location of the bank's branch. Third, and pherhaps the most important difference, is that D'Andrea and his coauthors use truncated data on loans, only for amounts above 30 thousand euros, while we have the universe of loans. Naturally, we can measure the effects on all types of firms, in particular, small and micro firms, which constitutes 96% and 23% of the total number and amount of loans in Peru respectively (we will discuss this later).

This project is associated with different strands of the literature, like the effects of internet over the economy (Akerman et al., 2015; DeStefano et al., 2018; Hjort and Poulsen, 2019), the literature on fintech (Buchak et al., 2018; Tang, 2019; among others), and the literature that links new technologies with information problems in financial markets (see Liberti and Petersen, 2018 for a recent review).

## 2 Data

Four data sets are going to be used in the project: (1) data on broadband coverage from OSIPTEL, the Peruvian regulator of telecomunications; (2) data on the universe of loans at the firm level from the supervisor of banks in Peru (SBS); (3) data on firms' location; (4) indicators at the district level, from the RENAMU ('Registro Nacional de Municipalidades').

### 2.1 Data Availability & Restrictions

The first dataset was provided by OSIPTEL to José Luis Castillo on August 13 2021, as part of a project that aims to measure the effects of broadband expansion over exporting firms performance. This information is public and has no restrictions. The second dataset on the universe of loans in Peru was provided by the Peruvian Association of Banks (ASBANC) to Antonio Cusato on July 9 2021, as part of a project that aims to identify the effects of over-priced government contracts over the procurement government official 's credit information. Naturally, this is proprietary data, and the terms of reference of the agreement with ASBANC does not allow the research team to share the detailed information. Data at some level of aggregation can be provided, as well as the agreement with ASBANC. Finally, information on the firm's address is publicly available on the web page of the Peruvian tax authority (SUNAT), while the different RENAMUs are avaible at the web page of the Peruvian Institute of Statistics (INEI).

### 2.2 Broadband Expansion

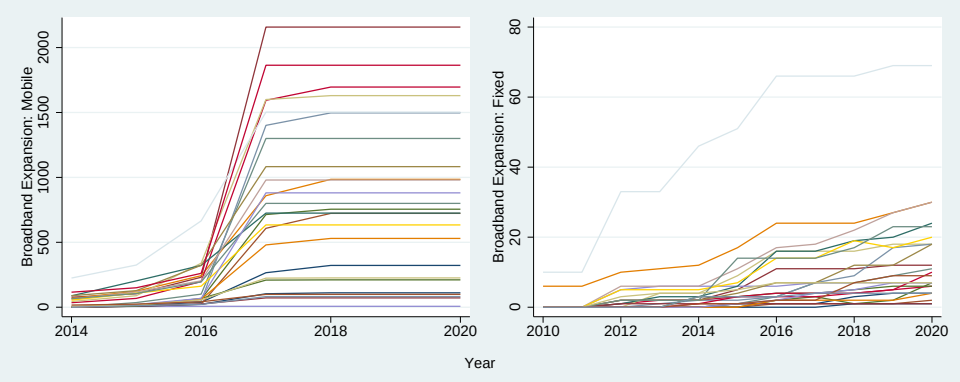
We have data on broadband coverage at the level of 'centro poblado' (CP), which is a smaller jurisdiction than a district. Peru has 24 regions, 1,845 districts and 99,926 CPs. Access is represented by a dummy variable. We have two indicators, one for mobile broadband, and another for fixed broadband internet. In the first case, the technology is Long-Term Evolution (LTE), or 4G LTE; while in the second the

[1] In other words, the identification assumption is that the closer a municipality to the infrastructure, the more likely the municipality had early access to high speed internet in the roll-over process.

definition of broadband refers to FTTx (Fiber to the x) and DOCSIS (Data Over Cable Service Interface Specifications) technologies. See Appendix (4) for maps with the expansion of the technology.

The fixed broadband network expansion in Peru is driven by private and public decisions that interact simultaneously (Argandoña and More, 2020). In the first case, telecommunications companies usually take into account potential demand in future broadband expansion areas, which is linked to population density and income. In the second case, the Peruvian state defines the areas to cover, and then opens a tendering procedure in which telecommunication's companies compete to build and operate the infrastructure. For public decisions, the expansion is not linked to population density and income. Following our discussions with OSIPTEL officials, we can disentangle these two sources of the roll-out for fixed broadband during the period 2010-2020 (in which we have data availability). First, the expansion of the infrastructure in the first four years was mainly driven by the private sector. This initial phase of the roll-out of the network was related to those CPs located in the coast of Peru (where economic activity is concentrated and required smaller investments due to a favorable geography). Since 2014, the expansion continued to other regions (highlands and the jungle areas) and was mainly driven by the public sector.[2]

**Figure 1**. Broadband expansion by region, number of 'centro poblados' with access, mobile (left panel) and fixed (right panel) internet



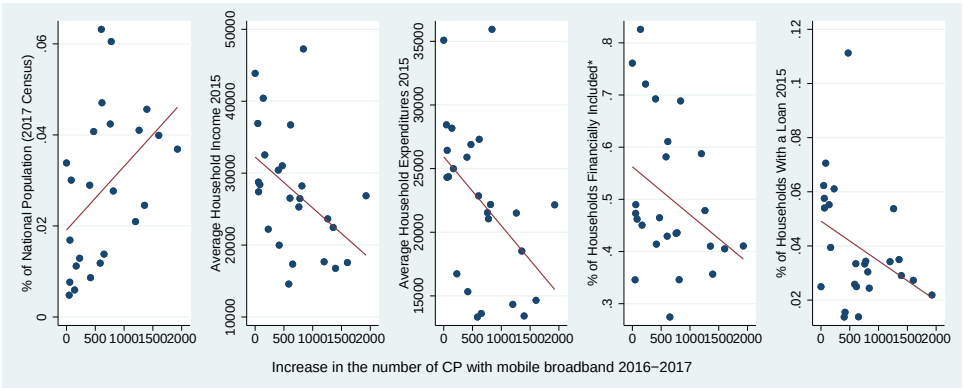

Since our data on credit starts in 2014, in our estimations the fixed broadband expansion will be mainly driven by an 'state plan' and factors different from population and income, like in the article of Bhuller et al. (2021) (currently in R&R at the Review of Economic Studies). To close the discussion about the description of the broadband expansion, in the case of mobile telecommunications, private decisions dominate the network expansion, conditioned on having access to the Radioelectric Spectrum bands. In the years of analysis, two important tendering process were carried out, in 2013 and 2016, which allowed the subsequent expansion of the mobile broadband.

The data on broadband expansion was provided at quarterly frequency, and we expect our estimations to be carried out at this frequency. For this proposal, the information on broadband has been georeferenced using yearly information, but the granular information on credit has not. Hence, to provide a gross overview of the data, in this proposal we analyze the mobile broadband data by Peruvian regions. Also, we use data from household surveys to complement the analysis. Figure 1 shows the evolution of CPs by region that has access to mobile broadband between 2014 and 2019 (for completeness, we also show the case of the fixed mobile network). For the mobile network, there is a clear expansion in 2017. The 4G LTE technology arrived to Peru in 2014, but it required an important investment to change

[2]The National Dorsal Fiber Optic Network project was awarded to Azteca company in 2014. The purpose of this network is to integrate all Peru's regional and provincial capitals (196) to encourage economic progress, socioeconomic development and competitiveness. In addition, the Fondo de Inversión en Telecomunicaciones or FITEL by its Spanish initials, promotes network expansion in rural areas using the lowest-subsidy auction model and Public Private Partnerships (PPPs).

the broadband antennas from the 3G technology to the 4G LTE, conditioned on having access to the Radioelectric Spectrum bands. The 2016 auction explains the expansion of the network in 2017. Looking at the aggregate investment numbers in telecom, during 2013 and 2015 private investment fluctuated around 3.4 thousand millions of soles per year. In 2016, this number jump to 7.1 thousand millions, and withdraw to an average of 3.2 thousand millions for the period 2017-2018.

**Figure 2**. Correlation between the mobile broadband roll-out in 2016-2017 and average household indicators at the regional level in 2015




Notes: Household with a credit or debit card, or with an account in a microfinance institution or bank. Source: Enaho 2015

Following the discussion of Bhuller et al. (2021), the natural question that arises is if this pattern of expansion is correlated with lagged population, income or credit market indicators, since these investments were carried out by the private sector. Figure 2 presents a group of correlations. First, as expected, the increase in the roll-out between 2016 and 2017 is correlated with population (in this case the available data corresponds to the national census of 2017). Interestingly, there is no correlation with indicators of average household income or expenditures in 2015, access to credit in 2015, or if the household had a debit/credit card or an account in a financial (banks or microfinance) institution in 2015. Hence, at least at the regional level, income or credit market indicators do not predict the roll-out patterns. This is consistent with the previous narrative, the year of the largest expansion in the private broadband network (2017) was not mainly driven by demand, but was related to a particular auction run by the government in the previous year. Obviously, this is a not a formal test for the plausibly exogenous roll-out of broadband infrastructure, as we will discuss later. For the development of the project, a similar analysis should be carried out at the district level.

**Table 1**. Database on credit, November 2020

| | Amount (millions of soles) | Obs. | Average (soles) |
|---|---|---|---|
| Corporate credit | 61,051 | 3,060 | 19,951,440 |
| Big firms | 60,359 | 18,579 | 3,248,759 |
| Medium firms | 72,357 | 143,238 | 505,153 |
| Small firms | 41,639 | 965,792 | 43,114 |
| Micro firms | 14,855 | 2,696,223 | 5,510 |
| Total Firms | 250,261 | 3,826,892 | |
| | | | |
| Consumption | 71,887 | 12,032,428 | 5,974 |
| Mortgages | 53,770 | 292,117 | 184,071 |
| Total Consumers | 125,657 | 12,324,545 | |

Notes: These loans refer to 'direct credit'. Contingent loans are not included in this table.

### 2.3 Credit

The database on the universe of loans in Peru is quite rich. We have information on direct credit (loans already disbursed), indirect credit (contingent lines), interest payments ('rendimientos devengados de créditos vigentes'), and information on non-performing loans (direct credit can be split into 'créditos vigentes', 'créditos reestructurados', 'créditos refinanciados', 'créditos vencidos' and 'créditos en cobranza judicial'). The data indicates the financial institution that provides the loan (a bank or a microfinance institution), as well as the ID of the consumer (national identification number) or the firm (tax identification number). We have monthly information from February 2014 up to September 2021. As we point out before, our estimations will be carried out at the quarterly frequency.

Table 1 provides an overview of the granular information as of November 2020.[3] We have almost 4 million observations or loans to firms. If the number is similar for the period 2014-2020, we would have more than 100 million of observations using quarterly frecuency. Importantly, 96% of the observations correspond to small and micro firms, with an average loan of 40 and 5 thousand soles respectively, which is around 10 and 1.3 thousand of dollars at the current exchange rate. Hence, different from D'Andrea et al. (2021), this would be the first study to analyze the impact of broadband expansion for small and micro firms. Also, as part of the project, we will match the tax identification number with the information about firms' location provided by the tax authority (wich is publicly available, the 'padron RUC', which provides information of around 12 million firms), to georeference firms. For the 3.8 million observations or loans reported in Table 1, there are 2.7 million number of firms (unique tax ID). Unfortunately, at the moment of the elaboration of the proposal, we cannot georeference consumers using their ID.

## 3 Methodology

Following Bhuller et al. (2021), we use the roll-out of broadband infraestructure as a natural experiment that provides plausibly exogenous variation in high-speed internet availability (naturally, randomizing the arrival of the technology is not feasible). First, we would carried out an event study analysis

$$y_{ijdt} = \sum_{k=-K}^{K} \delta_k D_{dt}^k + \kappa_d + \tau_{jt} + \hat{\tau}_{it} + \varepsilon_{ijdt} \tag{1}$$

where $y_{ijdt}$ refers to the outcome of interest for firm $i$ located in distric $d$, that has a relationship with a financial institution $j$ during the quarter-year $t$. For each district, we have information of the arrival of broadband internet (fixed or mobile) at the CP ('centro poblado') level. Hence, we can construct a measure of broadband availability at the district level $z_{dt}$, weighting the access by population. Then, we have two options to carry out the analysis. First, we can identify the *largest* increase in the availability of the new technology to identify the 'center' of the event study analysis. In particular, denote that point in time per district as $\xi_d^{\max} = \{t : max_t \left(z_{dt} - z_{dt-1}\right)\}$. We expect in the case of mobile broadband that most of these points correspond to the year 2017. Then, the dummy variables $D_{dt}^k$ take the value of one only around $k$ periods from the event $\xi_d^{\max}$. Formally, $D_{dt}^k$ is an indicator function as $D_{dt}^k = \mathbb{1}\left[t - \xi_d^{\max} = k\right]$. The second option is to define the event as the start of the expansion of broadband, such that $\xi_d^{start} = \{t : min_t \left(z_{dt} > 0\right)\}$ and $D_{dt}^k = 1\left[t - \xi_d^{start} = k\right]$. From a visual inspection of Figure 1, probably this would be the more appropiate indicator for the case of fixed broadband expansion. However, in this proposal it is not possible to make that call.

We aggregate the data on broadband to control for district characteristics, from the RENAMU, or alternatively, to control by district fixed effects $\kappa_d$. Also, we allow for time effects to be specific to the

[3] As expected, the sum of the value of the firms and consumers loans in Table 1 coincides with aggregate direct credit lending reported by the supervisor of banks in Peru (around 375 thousand million soles). See the following link.

financial institution $j$ (we do not have the branches location) or to the firm $i$. These time fixed effects are denoted by $\tau_{jt}$ and $\hat{\tau}_{it}$, respectively (a more flexible specification to be tested would allow for $\tau_{jit}$). Estimations would used standard errors clustered at the district level. Regarding the outcomes of interest, we can measure the intensive margin of the credit relationship between financial institutions and firms using the amount of credit. Also, we can aggregate the outcome of interest at the financial institution $j$ level. In this case, the (log) number of loans by financial institution $j$ in district $d$ at time $t$ would be our measure of extensive margin of credit; the combine effects of the intensive and extensive margins would be calculated at the triplet level $jdt$; the effects of the share of non-performing loans and the average interest rate payments would be calculated using the same triplet level $jdt$. It is worth to mentioned, that we can also extend our analysis to account for firm size, as in Table 1.

Following Sun and Abraham (2021), our parameters of interest, $\delta^k$, are the average treatment effects in period $k$ relative to the 'event' if: (i) there are parallel trends in baseline outcomes, (ii) no anticipation of the event, (iii) there is homogeneity of treatment effects across units in different periods. Naturally, we can formally test for parallel trends looking at the path of $\delta^k$ for $k < 0$, using the information on broadband expansion for $\xi_d^{\max}$ (note that by construction condition (i) would hold for $\xi_d^{start}$). Also, we can perform placebo tests regressing $y_{ijdt}$ on our measure of future broadband availability ($z_{dt+k}$) for periods $t + k$ , where $k > 0$. Naturally, we would except that no future expansions have sistematic effects over previous years' outcomes. To close the methodology discussion, we can formally present the baseline specification

$$y_{ijdt} = \delta z_{dt} + \kappa_d + \tau_{jt} + \hat{\tau}_{it} + \varepsilon_{ijdt} \tag{2}$$

Based on the expected results of the event study analysis, this specification assumes that conditional on (a) district fixed effects, (b) firm and (c) bank time fixed effects, the roll-out of the high-speed internet infrastructure is independent of our measures of interest $y_{ijdt}$. It can be shown that the new coefficient of interest, $\delta$, is just the expected value of a weighted sum of the average treatment effects of the duplet $dt$. Equation (2) follows Bhuller et al. (2013), Akerman et al. (2015) and Bhuller et al. (2021).

## 4 Research Team & Legal Representative

*Antonio Cusato Novelli* [Team Leader]. Ph.D. in Economics (Rutgers University, 2016) and Associate Professor of the Economics Department at Universidad del Pacífico (Lima Peru). Previously, he has been a visiting scholar at the Federal Reserve Bank of Atlanta (2015), and a consultant at the Office of Evaluation and Oversight of the Inter-American Development Bank (2008-2010). His research has been published at the Review of International Economics, Journal of Macroeconomics, and Economics Bulletin. Currently, he is working in three areas: (1) firms export performance, credit, productivity and export subsidies; (2) public procurement, firms, bunching of contracts, and the effects of discretion of public officials; (3) the political economy of sovereign default.

*José Luis Castillo Mezarina*. Ph.D.(c) in Economics (Universitat de Barcelona / 4th year student). He has held different positions at the Ministry of Foregin Trade and Tourism in Peru, were he has been involved in the negations of the different Free Trade Agreements (FTAs) signed by Peru. During the mid 2000s, he started as the Peruvian negotiator of the telecom industry during the Peru-US FTA process. His work has been published at the Review of International Economics. Also, he has presented his research projects at the European Association of Research in Industrial Economics and the Catalan Economic Society Conference. He is currently working on the intersection between firm export performance, the telecom industry, and FTAs.

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## References


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# Appendix: Broadband Expansion Maps

**Figure A1**. Mobile broadband by 'centro poblado'

(a) 2014

(b) 2019

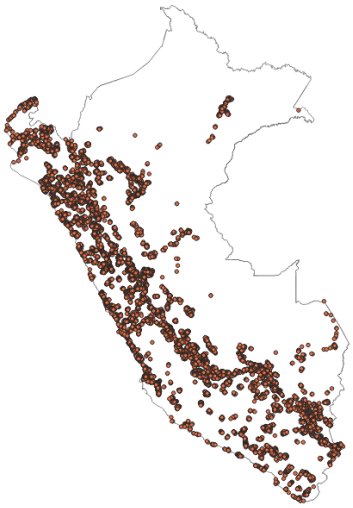
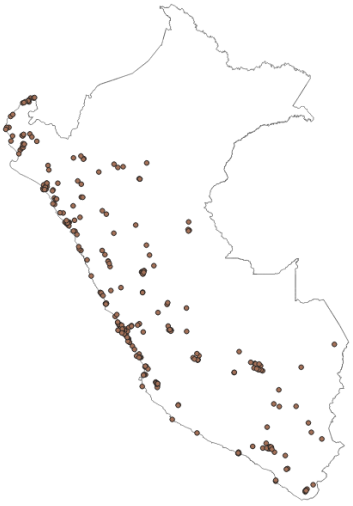


**Figure A2**. Fixed broadband by 'centro poblado'

(a) 2014

(b) 2019



# Appendix: CVs

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## I. Education

**Ph.D. in Economics, Rutgers University**, New Brunswick, NJ — October 2016

Dissertation Committee: Roberto Chang, Todd Keister, Michael D. Bordo, Federico Mandelman

**Master in Economics, Rutgers University**, New Brunswick, NJ — May 2015

**B.A. in Economics, Universidad del Pacífico**, Lima, Perú — July 2003

## II. Professional Experience & Short Term Appointments

**Universidad del Pacífico**, Lima, Perú

Associate Professor, Department of Economics — September 2021 - Present
Assistant Professor, Department of Economics — August 2016 - August 2021

□ Currently leading projects in the following fiscal policy topics: (i) sovereign debt and risk, (ii) public employment, and (iii) public procurement

□ Currently leading projects in the following topics: (i) productivity of firms, (ii) export performance of firms, and (iii) export promotion

**Federal Reserve Bank of Atlanta**, GA

Research Deparment, Summer Dissertation Internship program — June - July 2015

□ Research in the following topics: sovereign debt and default

**Inter-American Development Bank**, Washington, DC

Consultant, Office of Evaluation and Oversight — July 2008 - July 2010

□ Team member of Country Program Evaluations (Uruguay 2005-2009, Colombia 2007-2011), and specific evaluations (review of the IDB's Liquid Investment Portfolio in the context of the 2008 Global Crisis)

□ Participation in meetings with public officials, academics, executing agencies and program beneficiaries of Bank's projects in different countries (Argentina, Brasil, Uruguay, Colombia, Perú, and El Salvador)

**Instituto Peruano de Economía**, Lima, Perú

Economist — July 2003 - July 2008

□ Participation as a team leader or member in different projects and publications related to structural reforms, international trade and government spending in Peru

## III. Distinctions and Awards

Grant - Centro de Estudios sobre China y Asia-Pacífico, 2021

Grant - Consorcio de Investigación Económica y Social, 2017 and 2020

Americas Center Graduate Dissertation Internship - Federal Reserve Bank of Atlanta, 2015

Alfred S. Eichner Prize in Economics - Rutgers University, 2015

## IV. Publications

### Journal Articles

**Sovereign Default, Political Instability and Political Fragmentation**. *Review of International Economics*, Volume 29, Issue 4, September 2021, pages 732-755

**Sovereign Risk, Public Investment and the Fiscal Policy Stance**. Joint with Giancarlo Barcia. *Journal of Macroeconomics*, Volume 67, March 2021, 103263

**Export Subsidies in Emerging Markets During the Great Trade Collapse**. Joint with Jorge F. Chávez and Max Perez Leon. *Economics Bulletin*, Volume 40, Issue 3, July 2020, pages 1879-1892

### Work in Progress

**Government Spending and Active-Passive Waste in Emerging Markets**. Financed by the Grant of the Consorcio de Investigación Económica y Social 2020.

**Firms Export Performance, Productivity and Export Subsidies**.

**Are Free Trade Agreements Really Free? An Estimation of Utilization Costs for Peruvian Firms**. Joint with J.F. Chávez. Financed by the Grant of the Centro de Estudios sobre China y Asia-Pacífico 2021

### Book Chapters & Books

**Effects in Peru**. Author, joint with P. Secada and V. Zapata. Book chapter (in spanish) in Acuña (editor) *Contribution of the Private Pensions System to Economic Development in Latin America. Experiences of Colombia, México, Chile and Perú*. Sura Asset Managment. Santiago de Chile, 2013

**Government Spending Efficiency in Peru**. Author, joint with R. Abusada and C. Pastor. Book chapter (in spanish) in P. Bollin (ed) *Government Spending Efficiency in Latin America*. Published by Konrad Adenauer Stiftung. Rio de Janeiro, Brazil. December 2008

**Growth and Social Progress in Peru: 1970-2006**. Author, joint with R. Abusada. Book chapter (in spanish) in E. Saavedra and P. Bollin (eds) *Growth and Social Progress in Latin America*. Published by Konrad Adenauer Stiftung. Rio de Janeiro, Brazil. April 2008

**Free Trade Agreement with the US: An Opportunity for Sustained Growth**. Joint with E. Morón, M. Bernedo, J. F. Chávez and D. Winkelried (in spanish). Centro de Investigación de la Universidad del Pacífico and Instituto Peruano de Economía. Lima Peru, 2005

### Policy Oriented Evaluation Documents

**Country Program Evaluation for Colombia 2007-2011**. Evaluation Team's Member. Office of Evaluation and Oversight, Inter-American Development Bank. Washington DC, 2011

**Country Program Evaluation for Uruguay 2005-2009**. Evaluation Team's Member. Office of Evaluation and Oversight, Inter-American Development Bank. Washington DC, 2011

**Review of the Bank's Investment Policy: Expert Panel Report**. Evaluation Team's Member. Office of Evaluation and Oversight RE-347. Inter-American Development Bank. Washington DC, 2008

**Evaluation of the Quality of Economic Analysis for Projects Approved 1997-2006**. External Consultant. Office of Evaluation and Oversight RE-346-2. Inter-American Development Bank. Washington DC, 2009

## V. Presentations at Conferences and Seminars

**2021**: 10th Annual Meeting of the Midwest Economics Research Group (virtual)

**2020**: 9th Annual Meeting of the Midwest Economics Research Group (virtual)

**2019**: Midwest International Trade Conference, Indiana University (Bloomington); 5th HenU/INFER Workshop on Applied Macroeconomics (Kaifeng, China)

**2018**: XXIII Annual LACEA Meeting (Guayaquil, Ecuador); Peruvian Economic Association Annual Meeting (Piura); 52nd Annual Conference of the Canadian Economics Association (Montreal, Canada)

**2017**: XXXV Central Bank of Peru's Economists Meeting (Lima); 32nd Annual Meeting for the European Economic Association (Lisboa, Portugal); Peruvian Economic Association Annual Meeting (Lima)

**2016**: Instituto de Economía, Pontificia Universidad Católica de Chile (Santiago, Chile); Centro de Investigación, Universidad del Pacífico (Lima); CIDE (Ciudad de Mexico)

**2015**: XX Annual LACEA Meeting (Santa Cruz, Bolivia); Microeconomic Theory Workshop - Rutgers University (New Brunswick, Estados Unidos); Federal Reserve Bank of Atlanta (Atlanta, Estados Unidos); Georgetown Center for Economic Research Biennial Conference (Washington DC, Estados Unidos); Midwest Macro Meetings - Federal Reserve Bank of St. Louis
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## VI. Referee Service

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## I. Education

**Ph.D. in Economics, Universitat de Barcelona**: 4th year student — September 2018-present

**Master in Economics, Universitat de Barcelona** — 2018

**B.A. in Economics, Universidad del Pacífico**, Lima, Perú — 2004

## II. Professional Experience

**Ministry of Foreign Trade and Tourism of Peru**

Director of Asia and Oceania / Director of Asia, Oceania and Africa — Dec 2013 - Sep 2016

□ Leading the negotiation, implementation and administration of Peru´s international free trade agreements with Asia, Oceania and African countries. Chief negotiator of Peru in the Trans-Pacific Partnership Agreement (TPP), chief negotiator of the Turkey-Peru Free Trade Agreement, and chief of the India-Peru Joint Study Group for analyzing the economic feasibility to begin trade negotiations.

**Ministry of Foreign Trade and Tourism of Peru**

International Negotiator/ Regional Integration Coordinator — Mar 2004 - Nov 2013

□ Chief of the team that negotiated Peru´s international trade in services and investment agreements (2012-2013). Chief of the team that negotiated international trade in services agreements (2011-2012), including financial services, telecommunications and e-commerce. Trade in services negotiator in multilateral and regional integration fora, such as the World Trade Organization and the Andean Community (2004-2010).

## III. Publications

### JOURNAL ARTICLES

**The impact of free trade agreements in national markets: evidence from the telecommunications sector in Latin America**. *Review of International Economics*, Volume 29, Issue 4, December 2020

### WORK IN PROGRESS

**The Effects of Broadband Expasion of Firm's Export Performance in Peru**. Joint with Joan Calzada.

## IV. Presentations at Conferences and Seminars

**2019**: European Association of Research in Industrial Economics (EARIE 2019); Second Catalan Economic Society Conference (CESC)

**2016**: Latin American and Caribbean Economic System (SELA) and Getulio Vargas Foundation; United Nations Economic Comission for Latin America and the Caribbean (ECLAC); Asia-Pacific Economic Cooperation (APEC); PUCP; Ministry of Foreign Trade and Tourism of Peru

**2015**: Ministry of Foreign Trade and Tourism of Peru