Frictions in Mortgage Refinancing: Evidence from Chile

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There is substantial inertia in consumer decision-making over financial products: in particular, individuals seldom refinance their mortgages, even when interest rates fall substantially. This has prompted regulatory interest in interventions to address these frictions, with the hope that they will lead to significant savings for consumers.[1] However, any intervention that increases the probability of refinancing also increases the risks banks face at origination, changing their pricing incentives. Thus, the full equilibrium effect of policies that make refinancing easier depends on not just the direct impact of the intervention on consumer behavior but also the indirect one of how banks will respond to these changing incentives. We address this question by combining a large-scale field experiment with a structural model of the mortgage market. The field experiment will allow us to explore the effects of different approaches geared at promoting refinancing, while the structural model will allow us to study how banks' incentives at origination change.

This project studies the failure of Chilean households to refinance mortgages, a particularly costly mistake since interest rates in Chile have fallen drastically. Figure 1 shows that the interest rates for outstanding mortgages in our partner bank that were originated in 2010 are larger than that of almost *any* loan originated in the past two years. The right panel shows that the gains from even modest decreases in rates is substantial: \$4,000–\$8,000 on average over the lifetime of the loan. This inertia could result from a number of frictions: lack of awareness of the possibility of refinancing, financial illiteracy more broadly, incorrect beliefs over the distribution of prevailing rates, search costs, and switching costs. Disentangling these frictions is important for two reasons: (i) it informs the design of policies aimed at increasing refinancing rates and (ii) their relative importance determines how banks would react to a large-scale intervention to encourage refinancing—both in the refinancing market and in that of origination of new loans. To study these sources of inertia, we have partnered with Banco Estado (BE, a major national bank in Chile), the Chilean National Consumer Service (SERNAC, the major consumer protection agency), and the financial regulator (CMF).

This paper falls into a rich literature on financial regulation in the presence of behavioral frictions (Campbell (2016) provides a survey). A smaller literature documents the failure to refinance mortgages in particular (Keys et al., 2016; Agarwal et al., 2016) and studies the effectiveness of various interventions through experiments (Johnson et al., 2019) or through the lens of structural models (Ambokar and Samaee, 2020; Andersen et al., 2020). To complement these studies, we use a variety of methods to disentangle behavioral frictions—and then go one step further and use the model to study the supply-side response from a large-scale policy, like the ones under consideration in Chile.[2]

Model Sketch. We embed behavior frictions into a simple search framework. A consumer i is endowed with a utility function u_i over mortgages, a search cost s_i, a switching cost γ_i, a bias b_i of the interest rates she would receive from searching for a refinancing offer, and observable characteristics X_i. The individual also current possesses a loan from bank j with (multidimensional) financial characteristics r_{ij}: the interest rate, monthly payments, term, etc.

The utility function maps financial characteristics r_{ij} to utilities. This function is a reduced-form way to capture departures from the "rational" rule to minimize the net present value of payments: an individual i may differentially value mortgages with low monthly payments, either due to financial illiteracy or liquidity constraints. This individual can choose to expend s_i to search for a refinancing offer—either at her home bank j or at a different bank. The perceived utility from doing so depends on the distribution of true prevailing interest rates of the market $F(\cdot; X_i)$ for someone with her characteristics as well as directly on the bias b_i: an individual with positive bias b_i may indicate an individual who expects markets rates to be larger than the true ones, leading to a reluctance to refinance.[3] Thus, the individual searches if the perceived marginal utility from a new draw exceeds s_i. Once the individual no longer finds it optimal to search, she chooses the offer that maximizes her utility. When computing these utilities, the individual downweights utilities from banks other than the home bank j by an amount parameterized by the switching cost γ_i.

[1]Our setting of interest, Chile, has implemented policies that reduce refinancing and switching costs as a means to benefit consumers and encourage competition among banks. It is certainly not the only country to do so: Australia, Brazil, España, India and the UK have implemented similar policies. The results from this study may thus inform the design of these policies in other settings.

[2]The structural model of loan origination has similarities to empirical work on the design of contracts with one-sided commitment (Hendel and Lizzeri, 2003), used in the context of insurance. Allen and Li (2020) propose a model of such competition in the context of Canadian mortgages (with search and switching costs) and estimates it with administrative data; while our goal is similar, our survey and experimental variation allow us to study a wider variety of behavioral frictions. Agarwal et al. (2020) study the interplay between refinancing inertia and competition, but only using cross-sectional variation in concentration and do not consider the origination market.

[3]We incorporate unawareness by saying that some fraction of individuals in the population have a bias b_i equal to a very large number.

Banks j observe an individual's characteristics X_i and form beliefs over their types $(u_i, s_i, b_i, \gamma_i)$. Based on these beliefs, the banks can compute an expected profit function from each individual—taking into account both the fact that a utility of the fact that an especially low search or switching cost individual will be more likely to refinance in the future. The bank then offers a mortgage $r_j(X_i)$ to maximize its own profits. Disentangling the different sources of frictions is important for understanding the nature of market power. We discuss this in detail below.

Data and Experiment. We have administrative data from CMF on all outstanding mortgages in Chile (term, date originated, client information, refinancing, etc.). We also anticipate access to all mortgage offers provided by banks.

We partnered with BE to conduct surveys of and field experiments on the clients who hold mortgages with them—about 350,000 clients in total.[4] First, we distributed a survey to all clients eliciting beliefs and information about refinancing: whether they have refinanced their mortgage, why they have not, beliefs over refinancing (how likely it is they would be approved, how much time it would take, and how much they think they can reduce their monthly payments), beliefs over current interest rates, and how they value various features of a mortgage (e.g., the interest rate vs. the reputation of the bank). We also also questions about their current mortgage to check for awareness of their own financial situation. We distributed this survey in November 2020.

Next, we worked with SERNAC to design various forms of a letter to be sent to all BE mortgage holders. Each version of the letter had basic information about the client's mortgage, followed by some additional information designed to target a particular behavioral friction:

1. *Awareness*. This letter contains a short paragraph telling clients that refinancing is a possibility and encourages them to get in touch with BE or different financial institutions.
2. *Beliefs*. This letter includes information about the mean rate a client with similar characteristics could get in the market along with information about annual and total savings on the mortgage if the client were to refinance and get this mean rate. We present this information as a "thermometer" (Figure 2) followed by a short explanation.
3. *Search Costs*. Part of the search costs comes from lack of understanding of how to shop across banks, which could slow down each visit. This treatment provides instructions for how to approach banks and solicit offers.
4. *Switching Costs*. Finally, porting information across banks used to be difficult. This letter details a new consumer protection law that went into effect in late 2020 that allows for "portability" between banks. This may overcome a large fraction of the switching cost.

We also include a pure control (who do not receive any special letter from BE) and a full treatment with all information above. The letter will be sent in an email from BE, with SERNAC's letterhead, in late April 2021.

Each letter contains a personalized link to a short midline survey that asks individuals about whether they are likely to refinance. Finally, we plan on collecting an endline survey about 4–6 months after the start of the survey to elicit beliefs about interest rates as well as additional information about search. For instance, we plan on asking clients how many banks they solicited offers from and how many rejected them to supplement the CMF data on offers. This survey will help understand the importance of "soft offers" that may not be reflected in CMF data. We will also ask a series of questions about trust in institutions: whether consumers were suspicious of the information in the letter, whether getting this information improved their opinion of the home bank, and whether they are likely to try to refinance in the future (especially if they were unsuccessful).[5]

Analysis of Survey and Experiment. We received approximately 10,000 responses to our initial survey. About 60% of respondents have never tried to refinance. Figure 3 shows common reasons why: about 1/3 of respondents cite some level of unawareness about the process itself, about 20% cite reasons related to the costliness of the process (indicative of search costs), and another 20% indicate satisfaction with the current offer (perhaps indicative of switching costs from the current bank). Thus, the posited behavioral frictions all play a role, and the model will help disentangle them. A concern may be the survey may be untrustworthy: however, the right panel of the figure shows that on average the reported characteristics of the respondents' mortgages line up strikingly well with the true characteristics (from BE administrative data), which suggests that individuals are answering this online survey seriously.

To analyze the experimental results, we will follow standard regression methods to understand the treatment effects of each letter (partially addressing one behavioral friction at a time) on outcomes such as the incidence of refinancing, incidence of switching banks, and various loan terms (e.g., interest rate). From the endline survey, we can compute

[4] This study was approved by the IRB at Universidad de Chile.

[5] This allows us to explore frictions that are difficult to capture in an experiment. For example, that refinancing seems "too good to be true" (Johnson et al., 2019). Through the lens of the model, such frictions are isomorphic to especially pessimistic beliefs that refinancing is impossible, but they have different economic interpretations.

effects on beliefs as well. We plan on studying heterogeneity by loan characteristics (e.g., outstanding amount)—as well as education and income to study distributional effects.

Demand Estimation. Identification of the demand system, and thus the behavioral frictions, is tied to the experimental variation. From the CMF data on offers, we observe the choice set of an individual. Choice conditional on this set would normally inform the utility, helping us understand how individuals trade off various aspects of the loan (rates and monthly payments, say). Importantly, however, is that the choice set is a result of the search process, so it is endogenous to the utility function. Thus, to identify the utility function, we use variation that affects choice sets without adjusting utility functions: the experimental treatments of beliefs and search would be ideal sources of variation. Within these choice sets, any differential propensity to choose the home bank would be interpreted as switching costs.[6]

Since both the baseline and endline surveys ask about beliefs, biases are identified directly from the survey. To identify search costs, we exploit the richness of the covariates available to us: we can condition on very fine bins of X_i and observe the distribution of offers from banks. With this information (and the utility and biases identified from before), we can compute the perceived additional benefit of one more search, which informs the search cost itself.

Decomposing the effect through the lens of the model has three benefits. First, we can compute "partial equilibrium" counterfactuals: once we estimate the parameters of the search process, we can quantify the benefits of ideal policy that could target each of the behavioral frictions (by eliminating switching costs entirely, say). Second, a full-fledged demand system allows us to quantify the welfare of the policy by taking into account frictions that may be "real" costs (such as search). Third, uncovering and quantifying biases will let us correlate them with observables of interest—such as income and education—and comment on the distributional incidence of the frictions in the market.

Predicting Supply-Side Effects of Lowering Barriers to Refinancing. We use the demand estimates to analyze a main question of the paper: what is the equilibrium effect of lowering barriers to refinancing on the entire mortgage market? To do so, we feed the demand estimates into a model of mortgage pricing—both at origination and at refinancing.

The equilibrium effect on prices depends on the particular behavioral friction that led to inertia. For instance, if the only source of frictions were switching costs γ, then no bank has a special advantage in the origination market, but a bank who wins a particular customer would have significant market power over him in the future. If the only source were search costs s, then the origination and refinancing markets would be "equally" competitive, so eliminating behavioral frictions would expand choice sets both at origination and refinancing. Financial illiteracy embedded in u in the form of unresponsiveness to interest rates (placing a premium on monthly payments without taking into account the term, say) would directly affect the elasticity of demand and thus the markups that can be charged on either market. Significant unawareness of market rates (biases b) would act like switching costs but may further dampen the responsiveness of refinancing to interest rate changes. Policies that encourage refinancing could affect any of these frictions, but each friction affects residual demand elasticity—and thus pricing incentives—in a different manner.

This framework allows us to study distributional effects. While the policy directly affects the refinancing market, increased refinancing risk will affect outcomes in the origination segment. Thus, while current borrowers may benefit from lowering their rates by refinancing, new borrowers may receive higher rates at origination. This differential impact on the two markets is informative by itself, but we can go further and map the distributional impact to observables: to the extent that lower-income individuals are less likely to refinance even with these policies, say, large-scale interventions that encourage refinancing may lead to lower-income individuals cross-subsidizing higher-income ones.

Next Steps and the Role of the Grant. The endline survey is an important part of the design. It provides information about post-treatment beliefs, which identify one of the main behavioral frictions. It also provides some information about other frictions (such as trust) not captured in the experiment. Most importantly, it supplements the administrative data by providing more details of the search process, including "soft offers" and visits to financial institutions that led to rejected mortgage applications. The extent of these soft offers in a lending market is interesting by itself, but they also affect the estimates of the search process. Thus, we want to both incentivize participation in this survey and also exert effort to follow-up with individuals to make sure our endline survey is representative of the population.

The grant from the NBER will help us conduct a representative endline survey. In addition to posting a survey online and incentivizing participation through a prize (as we did the baseline survey), we will work with J-PAL Latin America to use their call center to contact BE clients (see attached letter). Moreover, the grant will allow researchers in the US to travel to Chile to engage and work directly with counterparts at CMF, and to present results to them.

[6]This section assumes that in the experiment, the fact that search and switching costs are possibly affected is not observable to the banks. If banks can learn that a treated individual does in fact have have lower-than-normal switching costs, say, then they could at least partially respond to this through their rates even within the experiment. This is testable: we can look for a direct effect of treatment on the *offered* rates—not just chosen ones. When estimating the model, we will allow banks to get a noisy signal of the search cost, and use this responsiveness to estimate the noise.

Exhibits

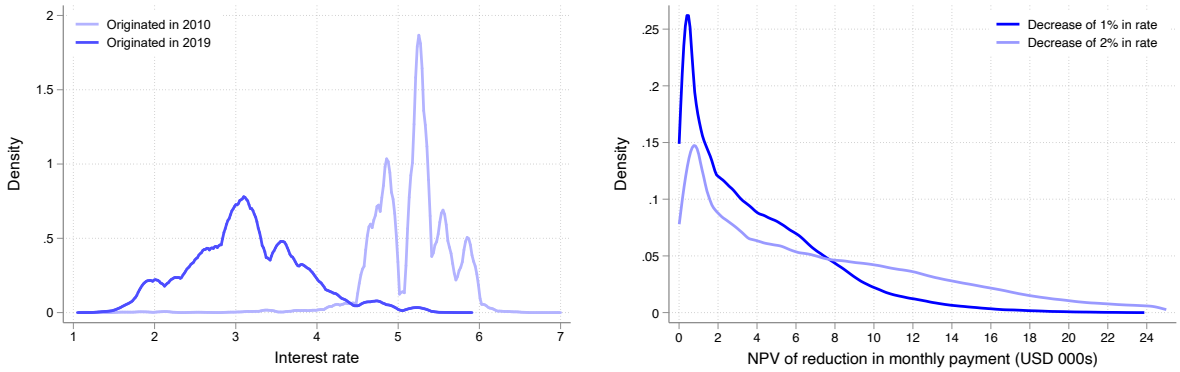


Figure 1: Distribution of outstanding interest rates, by date of origination (left) and reduction in monthly payments for different reductions in rates (right)

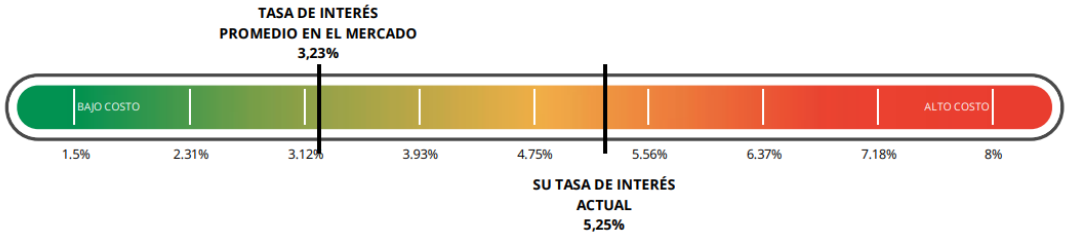


Figure 2: Sample thermometer in the beliefs treatment. The mark to the left is labeled "Average Interest Rate in the Market" and the line to the right is "Your Actual Interest Rate."

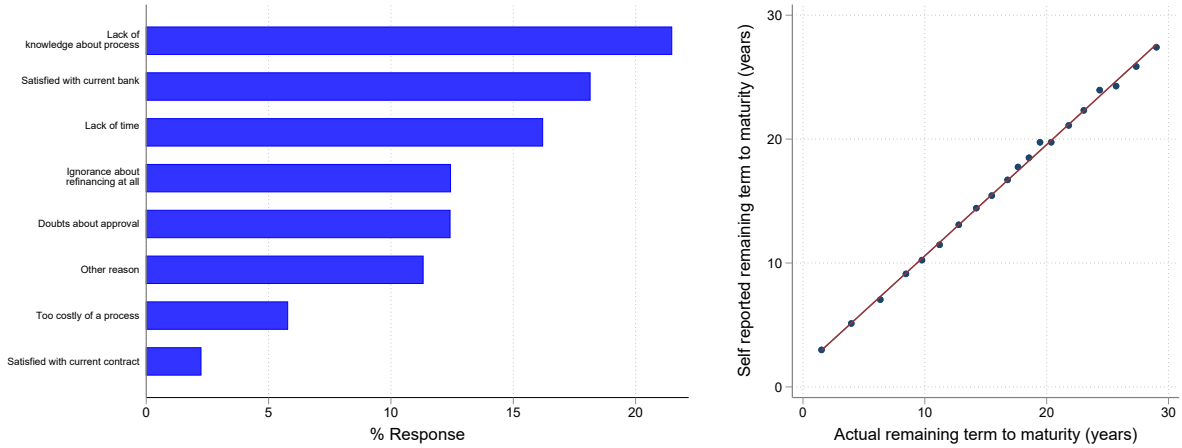


Figure 3: Reasons for lack of refinancing (left) and comparison of self-reported and actual information about loan (right), from survey.

References

AGARWAL, S., G. AMROMIN, S. CHOMSISENGPHET, T. LANDVOIGT, T. PISKORSKI, A. SERU, AND V. YAO (2020): "Mortgage Refinancing, Consumer Spending, and Competition: Evidence from the Home Affordable Refinancing Program," *Review of Economic Studies*, Forthcoming.

AGARWAL, S., R. J. ROSEN, AND V. YAO (2016): "Why Do Borrowers Make Mortgage Refinancing Mistakes?" *Management Science*, 62, 3494–3509.

ALLEN, J. AND S. LI (2020): "Dynamic Competition in Mortgage Markets," Tech. rep., Queens.

AMBOKAR, S. AND K. SAMAEE (2020): "Inaction, Search Costs, and Market Power in the US Mortgage Market," Tech. rep., University of Pennsylvania.

ANDERSEN, S., J. Y. CAMPBELL, K. M. NIELSEN, AND T. RAMADORAI (2020): "Sources of Inaction in Household Finance: Evidence from the Danish Mortgage Market," *American Economic Review*, 110, 3184–3230.

CAMPBELL, J. Y. (2016): "Restoring Rational Choice: The Challenge of Consumer Financial Regulation," *American Economic Review*, 106, 1–30.

HENDEL, I. AND A. LIZZERI (2003): "The Role of Commitment in Dynamic Contracts: Evidence from Life Insurance," *Quarterly Journal of Economics*, 118, 299–328.

JOHNSON, E. J., S. MEIER, AND O. TOUBIA (2019): "What's the Catch? Suspicion of Bank Motives and Sluggish Refinancing," *Review of Financial Studies*, 32, 467–495.

KEYS, B. J., D. G. POPE, AND J. C. POPE (2016): "Failure to Refinance," *Journal of Financial Economics*, 122, 482–499.

Budget

We are requesting money for an extensive endline phone survey, an incentive for the online endline survey, and travel for US-based researchers to Chile.

Survey Expenses	**$10,277**
Cost of Calling	$4,593
Wage of Callers	$5,009
Incentive for Online Survey	$676
Travel	**$2,473**
(Two trips to Chile)	
Overhead	**$2,250**
(Computed at the 15% to the Catholic University of Chile)	
TOTAL	**$15,000**

- The calling costs are estimated based on rates and estimates provided by J-PAL, given their experience conducting phone interviews in Chile. We anticipate making approximately 8,500 calls and expect a 55% effectiveness. Each successful call is estimated to take 8 minutes, and the call charge is $0.0545/minute. We will hire 6 interviewers, ask them to work 4 hours/day, and pay the monthly fixed costs for 2 lines ($420 total). We also anticipate 2.5 hours of training per interviewer. All costs quoted to us by J-PAL in Chilean pesos are converted to US dollars at the rate 740 CLP = 1 USD.
- We incentivized the baseline survey by raffling off an iPhone 12. We plan on raffling off a similar electronic device for the endline survey. The quoted price is for an iPad.
- We are including estimates for travel for two researchers to Chile.
- Note that we can adjust the budget if certain items are not permissible expenses for the grant.

J-PAL
ABDUL LATIF JAMEEL POVERTY ACTION LAB
LATIN AMERICA & CARIBBEAN

J-PAL Regional office for Latin America and the Caribbean (LAC)
Pontificia Universidad Católica de Chile (UC), Campus San Joaquin
Av. Vicuña Mackenna 4860,
Macul, Región Metropolitana, Chile

J-PAL Support on NBER Proposal

To Whom it May Concern,

On behalf of J-PAL's office for Latin America and the Caribbean, I am writing this letter to express the support for Vivek Bhattacharya, José Ignacio Cuesta, Gastón Illanes, Ana María Montoya and Raimundo Undurraga, on their research project "Frictions in Mortgage Refinancing: Evidence from Chile".

From November 2020, J-PAL and the investigators partnered with the Chilean Consumers National Service (SERNAC) to identify the reasons behind the low rate of mortgage refinancing in the Chilean mortgage market.

In this project J-PAL has provided support in the financial administration and the implementation of mortgage clients' data collection. In reference to this proposal, J-PAL commits to continue with these tasks and to facilitate the use of its facilities, such as call center, depending on the conditions of the pandemic and corresponding protocols. We will also support the academics to continue with the data collection in future survey rounds.

Sincerely,



Paula Pedro
Executive Director
J-PAL Latin America and the Caribbean.
April 7, 2021

Vivek Bhattacharya April 2021

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Academic Positions

2017– Northwestern University, Department of Economics
Assistant Professor of Economics

2020– National Bureau of Economic Research
Faculty Research Fellow

Education

2017 Ph.D. in Economics, Massachusetts Institute of Technology
Committee: Glenn Ellison, Nikhil Agarwal, Michael Whinston

2012 B.S. in Economics and Physics, Duke University
Summa Cum Laude, with High Honors

Working Papers

1. "Bidding and Drilling Under Uncertainty: An Empirical Analysis of Contingent Payment Auctions." With Andrey Ordin and James W. Roberts. October 2020. *Revised and Resubmitted, Journal of Political Economy.*

2. "Fiduciary Duty and the Market for Financial Advice." With Gastón Illanes and Manisha Padi. August 2020. *Revision Requested, Econometrica.*

Works in Progress

1. "The Design of Defined Contribution Plans." With Gastón Illanes.

2. "A Large-Scale Analysis of Merger Simulations." With Gastón Illanes and David Stillerman.

Publications and Forthcoming Papers

1. "An Empirical Model of R&D Procurement Contests: An Analysis of the DOD SBIR Program." *Econometrica*, Forthcoming, 2021.

2. "Rational Inattention in the Infield." With Greg Howard. *AEJ: Microeconomics*, Forthcoming, 2020.

3. "Imperfect Public Monitoring with a Fear of Signal Distortion." With Lucas Manuelli and Ludwig Straub. *Journal of Economic Theory*, 175, 2018.

4. "Selective Entry and Auction Design." With Andrew Sweeting. *International Journal of Industrial Organization*, 43, 2015.

5. "Regulating Bidder Participation in Auctions." With James W. Roberts and Andrew Sweeting. *RAND Journal of Economics*, 45(4), 2014.

Teaching Experience

Northwestern ECON 450: Graduate Industrial Organization (2018–Present, Winter and Spring)
ECON 381-2: Undergraduate Econometrics (2018–Present, Spring)

MIT	14.271: Graduate Industrial Organization I (TA to Glenn Ellison, Fall 2015)
Duke	ECON 201FS: Honors Seminar in Financial Econometrics (TA to George Tauchen, Spring 2012) ECON 105: Intermediate Microeconomics (TA to Curtis Taylor, Fall 2009–Fall 2011)

Grants

2020	*Washington Center for Equitable Growth* $75,000. Co-PI with Gastón Illanes. "A Large-Scale Analysis of Merger Simulations."
2018	*National Science Foundation* (SES-1824463) $396,922. Co-PI with Gastón Illanes. "Fiduciary Duty, Financial Regulation, and the Market for Retirement Products." *Naval Postgraduate School, Acquisition Research Program* (HQ00341810012). $120,000. "Understanding The Incentives For Small Businesses To Participate In The Acquisition Process For R&D-Intensive Products"

Fellowships, Awards, and Honors

2017	Robert M. Solow Prize for Excellence in Graduate Research and Teaching, MIT *Review of Economic Studies* Tour
2014–17	NSF Graduate Research Fellowship
2012–13	MIT Charles M. Vest Presidential Fellowship
2012	Faculty Scholar, Duke University Julia Dale Prize for Mathematics, Duke University Daphne Y. Chang Award for Best Thesis in Physics, Duke University
2011	Chief Student Marshal, Duke University Barry Goldwater Scholarship
2010	Phi Beta Kappa
2008–12	Angier B. Duke Memorial Scholarship, Duke University

Presentations and Seminars (Including Scheduled)

2020	AEA Annual Meetings (San Diego), Princeton, NBER Summer Institute (IO), Econometric Society World Congress, Johns Hopkins
2019	AEA Annual Meetings (Atlanta), Michigan State, Boston College, International Industrial Organization Conference (Boston), Michigan, Conference on Financial Market Regulation (Securities and Exchange Commission), CSIO/IDEI Conference (Northwestern), Summer Institute in Competitive Strategy (Berkeley Haas), Barcelona GSE Summer Forum (Applied IO), Columbia Junior Workshop on New Empirical Finance, Carnegie Mellon, Bates White
2018	CEMFI, Universidad Carlos III de Madrid, Cornell, Chicago Booth, Triangle Microeconomics Conference (UNC), International Industrial Organization Conference (Indianapolis), American Law and Economics Conferences (Boston), CSIO/IDEI Conference (Toulouse), EIEF Summer Conference (Rome), Penn State, Yale, Queen's, UPenn/Wharton, University of Tokyo, Nagoya University, Kyoto University
2017	Northwestern, Indiana Kelley (BEPP), Princeton, Duke Fuqua (Strategy), Yale, Columbia (Economics and GSB), International Industrial Organization Conference (Boston), UMass Amherst, Bonn, Bologna, Southampton, UCLA, UT-Austin, Minnesota, UW-Milwaukee, Brown, NYU Stern, FTC Microeconomics Conference, Chicago IO Fest, Maryland, Department of Justice, UW-Madison, Stanford Econ/GSB Applied Micro
2016	UC Berkeley Haas (Marketing)

Professional Activities

Referee	*AEJ: Economic Policy*, *AEJ: Microeconomics*, *American Economic Review*, *Canadian Journal of Economics*, *Econometrica*, *Journal of Economic Theory*, *Journal of Industrial Economics*, *Journal of Political Economy*, *Journal of the European Economic Association*, *Management Science*, *Quantitative Economics*, *Quarterly Journal of Economics*, *RAND Journal of Economics*, *Review of Economic Studies*
Conferences	Program Committee for Annual Congress of the European Economic Association (Summer 2021) Organizer for Interactive Online Industrial Organization Seminar (Summer 2020, Spring 2021) Organizer for Chicago IO Fest (Fall 2017)

Graduate Students

2019	Matias Escudero (Compass Lexecon) Sibo Wang (Capital University of Economics and Business, Beijing)

JOSÉ IGNACIO CUESTA

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EMPLOYMENT

2020–	Assistant Professor, Department of Economics, Stanford University
2019–2020	Postdoctoral Fellow, Stanford Institute for Economic Policy Research (SIEPR)

EDUCATION

2013–2019	Ph.D in Economics, University of Chicago *Advisors:* Ali Hortaçsu, Michael Greenstone, Neale Mahoney, Pietro Tebaldi
2009–2010	M.A. Economics (Honors), Pontificia Universidad Católica de Chile
2009–2010	International Exchange Student, New York University
2004–2009	B.A. Business and Economics (Honors), Pontificia Universidad Católica de Chile

AFFILIATIONS

Faculty Fellow, Stanford Institute for Economic Policy Research (SIEPR)

PUBLICATIONS

1. Distorted quality signals in school markets
   Journal of Development Economics, 2020, with Felipe González and Cristián Larroulet.

2. Identification of Average Marginal Effects Under Misspecification when Covariates are Normal
   Econometric Reviews, 2019, with Jonathan Davis, Andrew Gianou and Alejandro Hoyos.

WORKING PAPERS

1. Price Regulation in Credit Markets: A Trade-off between Consumer Protection and Credit Access
   with Alberto Sepúlveda.

2. Vertical Integration between Hospitals and Insurers
   with Carlos Noton and Benjamín Vatter.

3. Quality Regulation and Competition: Evidence from Pharmaceutical Markets
   with Juan Pablo Atal and Morten Sæthre.

4. The Economics of the Public Option: Evidence from Local Pharmaceutical Markets
   with Juan Pablo Atal, Felipe González and Cristóbal Otero.

Awards and Honors

2019.	Review of Economic Studies Tour
2018–2019	William Rainey Harper/Provost Fellowship, University of Chicago
2013–2018	Arnold Harberger Fellowship, University of Chicago
2010	Raúl Yver Oxley Prize, PUC-Chile
2004	Price Waterhouse Fellowship, PUC-Chile
2004	Matrícula de Honor UC Fellowship, PUC-Chile

Research Grants

2020.	Center for Equitable Growth Grant, with Federico Huneeus and Thomas Wollmann
2017–2018	BFI Research Grant
2017–2018	BFI IO Initiative Research Grant
2017	Fama-Miller Center Research Grant
2017	CAF Health for Social Inclusion in Latin America, with Juan Pablo Atal and Morten Sæthre
2016–2017	CEGA Development Economics Grant, with Juan Pablo Atal and Felipe González

Presentations

2021	*Scheduled:* Carnegie Mellon University Tepper, Royal Economic Society Conference* (x2), NYU Stern, North American Summer Econometric Society Meetings, Western Economic Association International Conference, CEMFI, PUC-Chile
2020	AFA Meetings, UC Berkeley, Central Bank of Chile, NEUDC*

2019	University of Chicago Booth, Columbia GSB, MIT, Northwestern University, Princeton University, Stanford University, UCLA, UC Berkeley Haas, University of Michigan, University of Pennsylvania, University of Texas Austin McCombs, University of Pennsylvania Wharton, Yale University, NYU Stern Conference on Household Finance, Review of Economic Studies Tour (London School of Economics, KU Leuven, Sciences-Po), RIDGE-LACEA Impact Evaluation Network Meeting*, Barcelona GSE Summer Forum Applied IO*, ASHEcon*, WEAI*, NBER Summer Institute (HF, IO*), EARIE*, ITAM, LACEA Health Economics Network Meeting*, SIEPR Postdoctoral Fellows Conference, Latin American Workshop on Structural IO, Brown University, Harvard University, FTC Microeconomics Conference (discussant), University of Wisconsin-Madison, PUC-Chile
2018	University of Chicago, IIOC (x3), ASHEcon*, North American Summer Econometric Society Meetings*, EMCON Northwestern*, Workshop in Economic Development a PUC-Chile*, TOI Workshop at U. Chile*
2017	University of Chicago, WEAI*, IHEA*, Conference on Banking Development Stability and Sustainability, APPAM Fall Conference*, LACEA*

*conference presentation by coauthor

Teaching Experience

2019–	Graduate Industrial Organization I; Undergraduate Imperfect Competition, at Stanford University
2016	Elements of Economic Analysis I Honors, at University of Chicago
2009–2010	Introductory Microeconomics, at PUC-Chile

Professional Activities

Referee for *American Economic Journal: Economic Policy, American Economic Review, American Economic Review: Insights, Econometrica, Estudios Públicos, Journal of Banking and Finance, Journal of Development Economics, Journal of Political Economy, Latin American Journal of Economics, RAND Journal of Economics, Review of Economic Studies*

Reviewer for 3ie Impact, Fondecyt Chile, Innovations for Poverty Action

Past Positions

2010–2013	Abdul Latif Jameel Poverty Action Lab (J-PAL)

Last updated: April, 2021

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ACADEMIC POSITIONS	Assistant Professor of Economics	Northwestern University	July 2017-
	Visiting Scholar	Becker Friedman Institute	June 2020 – June 2021
	Faculty Research Fellow	National Bureau of Economic Research	May 2019-
	College Fellow	Northwestern University	July 2016 – July 2017
EDUCATION	Ph.D., Economics	Massachusetts Institute of Technology	2016
	M.A. Economics	Pontificia Universidad Católica de Chile	2009
	B.A. Business and Economics	Pontificia Universidad Católica de Chile	2009

FELLOWSHIPS, GRANTS, HONORS, AND AWARDS

Washington Center for Equitable Growth Grant for "A Large-Scale Evaluation of Merger Simulations"

Public Utility Research Center Prize for Best Paper in Regulatory Economics, 17th Annual IIOC, April 2019 – for "Deregulation Through Direct Democracy: Lessons from Liquor Markets"

National Science Foundation Grant #1824463 – Fiduciary Duty, Financial Regulation, and the Market for Retirement Products

Steven H. Sandell Grant from the Boston College Center for Retirement Research and the Social Security Administration, 2017

Graduate Fellowship from the Lynde and Harry Bradley Foundation, 2014 and 2015

George P. and Obie B. Shultz Dissertation Grant, 2012 and 2015

Award for Best Graduate of M.A. in Economics, 2009. Pontificia Universidad Católica de Chile

Raúl Yver O. Award to the Best Graduate in Business and Economics, Concentration Economics, 2009. Pontificia Universidad Católica de Chile

WORKING PAPERS

"Switching Costs in Pension Plan Choice"

"Market Structure and Competition: Evidence from a Natural Experiment in Liquor Licensure" (with Sarah Moshary)

"Retirement Policy and Annuity Market Equilibria: Evidence from Chile" (with Manisha Padi)

"Deregulation Through Direct Democracy: Lessons from Liquor Markets" (with Sarah Moshary)

"Fiduciary Duty and the Market for Financial Products" (with Vivek Bhattacharya and Manisha Padi) – Revision requested at Econometrica

"The Design of Defined Contribution Plans" (with Vivek Bhattacharya)

"A Large Scale Evaluation of Merger Simulations" (with Vivek Bhattacharya)

"Moment Inequalities – A Practitioner's Guide" (with Ivan Canay and Amilcar Velez-Salamanca)

PRESENTATIONS (INCLUDES SCHEDULED)

2020: AEA/ASSA Meetings*, Duke Econ – UNC – Fuqua, Johns Hopkins, ITAM, NBER Summer Institute (HF, IO)*

2019: 4th Rome Junior Conference on Applied Microeconomics, AEA/ASSA Meetings, Banff Empirical Microeconomics Conference, Barcelona GSE Summer Forum*, Berkeley Haas, NBER Winter Meetings (IO/INS), Pennsylvania State University, Pontificia Universidad Católica de Chile, Rice University, SEC Conference on Financial Regulation*, Summer Institute on Competitive Strategy*, SITE (Financial Regulation), UCLA Anderson, Universidad Diego Portales, University of Chicago, University of Washington

2018: 11th Workshop on Industrial Organization & Economic Theory – Chile, AEA/ASSA Meetings, Banco Central de Chile, CEPR/JIE Conference on Applied Industrial Organization*, Columbia University, Comisión para el Mercado Financiero (Chile), CSIO-IDEI Conference, FGV – Rio de Janeiro, FTC Microeconomics Conference, Fiscalía Nacional Económica (Chile), Harvard University, IIOC, Ministerio del Trabajo (Chile), Northwestern University Clinical and Translational Sciences Institute, Pontifical Catholic University of Rio de Janeiro, Pontificia Universidad Católica de Chile, Superintendencia de Pensiones (Chile), Universidad de Chile – Centro de Economía Aplicada, Universidad de los Andes (Chile), University of Chicago Harris School of Public Policy, Universidad Carlos III, Workshop on Structural Industrial Organization – Bogotá

PRESENTATIONS (INCLUDES SCHEDULED)

2016: Boston College, Chicago IO Fest, London School of Economics, Northwestern University, New York University - Economics, New York University - Stern School of Business, University of California - Berkeley, University of Minnesota, University of Texas - Austin

2015: Centro de Economía Aplicada - Universidad de Chile, Massachusetts Institute of Technology, Universidad de Santiago de Chile

* Denotes co-author presentation

REFEREE ACTIVITY

American Economic Journal: Economic Policy, American Economic Journal: Microeconomics, American Economic Review, Econometrica, Fondecyt, International Economic Review, International Journal of Industrial Organization, Journal of Econometrics, Journal of Industrial Economics, Journal of Political Economy, Journal of Public Economic Theory, Journal of the European Economic Association, Journal of Pension Economics and Finance, The RAND Journal of Economics

ADVISING

2017 – Germán Bet (University of Florida)

2018 – David Benson (Federal Reserve Bank Board of Governors), Mariano Irace (Cornerstone Research)

2019 – Matias Escudero (Compass Lexecon), Nicholas Vreugdenhil (Arizona State University)

2020 – Matthew Leisten (Federal Trade Commission), Victoria Marone (University of Texas - Austin)

2021 – Dmitry Sedov (Uber)

SERVICE

2021 – Co-Organizer, NBER Summer Institute Industrial Organization Workshop

2020 – Co-Organizer, PUC Chile Alumni Conference

2019 – Co-Organizer, PUC Chile Alumni Conference

2017 – Co-Organizer, Chicago IO Fest

ANA MARÍA MONTOYA SQUIF

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EDUCATION

July 2014 - July 2017

UNIVERSIDAD DE BARCELONA

ECONOMICS DEPARTMENT

Phd in Economics

Dissertation: *"Essays on Empirical Industrial Organization: Financial Market and Public Policies".*

Sept. 2010 - Oct. 2012

UNIVERSIDAD CARLOS III DE MADRID

ECONOMICS DEPARTMENT

Master in Industrial Economy

Dissertation: *"Competition in the Latin American Banking System and effects of foreign participation: Estimation using Boone indicator."*

Sept. 2006 - Dec. 2008

UNIVERSIDAD DE CHILE

SCHOOL OF ECONOMIC AND BUSINESS

Master in Public Policy, Regulation and Impact Assessment.

Dissertation: *"Television Market: Industrial Organization and Regulatory Dilemmas"*

1999-2003

UNIVERSIDAD DE CHILE

SCHOOL OF ECONOMICS AND BUSINESS

Commercial Engineer, Economist.

Dissertation: Contreras, D., Larenas, J. P. and Montoya, A.M. 2004, *"Assessment of the Microcredit Program*: *Un Techo Para Chile".*

PUBLICATIONS AND WORKING PAPERS

- Bad Taste: Gender Discrimination in Consumer Credit Markets with Eric Parrado and Raimundo Undurraga (field researcher) [Research Grant from CAF and MIPP] (2019)
- Joining the Men's Club: Effects of pursuing high-earnings male-dominated fields for women, with Josefa Aguirre and Juan Matta). (2019)
- *The Returns to College Choice: Loans, Scholarships and Labor Outcomes,* with Carlos Noton and Alex Solís. Submitted, (2018)
- *Evaluating New Regulation on the Information Frame in the Credit Markets*, with Carlos Noton and Alex Solis (2016).
- *Evaluating the Effect of the Chilean Tissue Cartel*, with M. Olivares (2016).
- *Evaluating the Effect of Banking Regulation Basel II in the Real Economy in Latin America*, with A. Gonzalez and R. Alvarez (2015-2016).
- *Dollarization, Foreign Ownership and Competition in the Banking Industry in Latin America*, with González and Micco. Journal Emerging Market Finance and Trade (2014).
- *Quality of education. Keys for the Debate*, with Brunner, Elacqua, González and Salazar. Universidad Adolfo Ibáñez and RIL Editors, Santiago de Chile (2006).

AWARDS AND DISTINCTIONS

- Ranked first in the 1999 Commercial Engineers/Economists promotion, Universidad de Chile.
- Best Student of the Promotion Award, by the Association of Alumni of Commercial Engineers, Universidad de Chile.
- Degree exam approved with maximum distinction, Commercial Engineer/Economist Degree, Universidad de Chile.
- Honor Award years 2000-2003-2004, for having the best GPA of the 1999 promotion.
- Beca Chile, scholarship awarded by CONICYT, Ministry of Education (2010-2012).
- Participation in the Amsterdam 2012 Econometric Game representing the Department of Economy of Universidad Carlos III.
- Recognized as Future Leader – Economist (2019) and Expert Competition Economist (2018) by Who's Who Legal.

EXPERIENCE

July 2017 to date — **Universidad de Chile**
- Junior Researcher, Market Imperfections and Public Policy Institute (MIPP), Department of Industrial Engineering, Universidad de Chile

Dec. 2015 to date — **Butelmann Consultores**
- Partner and economic consultant: M&A, regulation and damages estimations for clients in the private sector and government entities.

Oct. 2012 - Nov. 2015 **Fiscalía Nacional Económica (National Economic Prosecutor's Office), FNE**

Chief Economist, Anti-Cartels Unit

- Lead the economic strategy for the investigation of cases involving agreements among competitors.
- Lead and supervised a team of economists and lawyers in the detection of cartel conducts.

June 2009- Sept. 2010 **Tribunal de la Libre Competencia (Competition Tribunal) , TDLC**

Economic Advisor

- Advised members of the Tribunal in the economic analysis of the competition cases trialed before it.

March 2008 - June 2009 **Ministerio de Hacienda, Dirección de Presupuestos, DIPRES**

Programs Assessment Analyst

- Evaluated and assessed government entities and programs presented by the Direction of Budget to Congress.

Oct. 2006 - Oct. 2007 **Comisión Nacional de Ciencia y Tecnología, CONICYT**

Studies and Strategic Planning Analyst.

- Prepared statistics, strategies and studies regarding education policies.
- Coordinated the implementation of advanced human capital policies.

July 2005- Dic. 2006 **Universidad Adolfo Ibáñez, School of Government**

Studies Analyst

- Analyzed educational policies implemented in Chile.
- Developed economic and econometric analysis of the studies prepared by the education policies team.

2004 **Fundación Un Techo para Chile**

Director of Social Reaserch

- Led and supervised the investigation carried out by the non-profit organization.

Evaluated and assessed the impact of the social programs implemented by the organization.

ECONOMIC ADVICE AND ACADEMIC ACTIVITIES

- Economic advice to the Fiscalía Nacional Económica, 2016.
- Consultancy to FK Consultores, projection of macroeconomic variables of the Antofagasta Region, 2012.
- Consultancy for Universidad de los Lagos 2012: *Supply Model Projection of academics for the years 2010-2020*.
- Consultancy for the Ministry of Education: *Update of the Supply Model Projection of academics for the years 2010-2020*, 2010
- Consultancy for CEPAL: *Estimation of the Effect of Malnutrition in Central American Countries*, 2006.
- Consultancy for the Ministry of Education: *Estimation and Projection of the Supply of Teachers 2005-2012*, 2005.
- *Advanced Human Capital Report: Towards and Integral Scholarship Policy*. Gonzalez, Javier; Montoya S., Ana; Gonzalez F., Paula, (2007)

- Professor, Competition and Regulation Course, at the Master of Economics and Public Policy Program, Universidad Adolfo Ibañez, 2016- 2020
- Professor, Industrial Organization Course, School of Economics and Business, Universidad de Chile, 2010.
- Professor, Economics of Education, School of Economics and Business, Universidad de Chile, 2007 and 2008.
- Professor, Economy and Shortage, Universidad Adolfo Ibáñez, 2006.

Raimundo Undurraga

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Employment

Assistant Professor of Economics, Universidad de Chile, Department of Industrial Engineering and Center for Applied Economics, 2017–

Affiliations

Junior Researcher, Market Imperfections and Public Policy Institute (MIPP), Department of Industrial Engineering, Universidad de Chile, 2017–

Research Associate, Center for Public Systems (CSP), Department of Industrial Engineering, Universidad de Chile, 2017–

Special Invitee, JPAL LAC, 2019 –

Co-Director, Fondef Project # ID16I20122, "Platform Design for the Implementation of Competitive Framework Agreements in Public Procurement", 2020 –

Education

Ph.D. Public Administration, Wagner School, New York University, 2017.

M.A. Public Policy, Universidad de Chile, 2011 (High Honors).

B.A. Economics, Universidad de Chile, 2008 (Honors).

Research

Publications

Shelter from the Storm: Upgrading Housing Infrastructure in Latin American Slums, *Journal of Urban Economics* Vol. 98, March 2017, pp 187-213. (with Sebastian Galiani, Paul J. Gertler, Ryan Cooper, Sebastian Martinez, and Adam Ross)

The Half Life of Happiness: Hedonic Adaptation in the Subjective Well-being of Poor Slum Dwellers to a Large Improvement in Housing, *Journal of the European Economic Association*. Vol. 16, August 2018, pp 1189-1233 (with Sebastian Galiani and Paul J. Gertler)

"Aspiration Adaptation in Resource-Constrained Environments", *Journal of Urban Economics, Volume 123, May 2021* (with Sebastian Galiani and Paul J. Gertler)

Working Papers

"Bad Taste: Gender Discrimination in Consumer Credit Markets" (with Anita Montoya and Eric Parrado)

"Immigration, Crime, and Crime (Mis)Perceptions" (with Nicolás Ajzenman and Patricio Domínguez)

"Location Preferences and Slums Formation: Evidence from a Panel of Residence Histories" (with Pablo Celhay)

"Housing Externalities and Children Health: Experimental Evidence from a Residual Housing Program in Mexican Slums" (*Job Market Paper*)

Work in Progress

"Inequality, Mobility, and Polarization" joint with Joan Esteban, Debraj Ray, and Eugenio Rojas

"Nudging Public Spending: Online and Offline Information Experiments" (**in the field**) with Pablo Celhay, Paul J. Gertler, and Marcelo Olivares

"Neighborhood Integration" (**in the field**)

"Aspirations, Social Norms, and Within-Group Inequality" with Piero Zanocco

"Economic and Financial Impacts of COVID-19 and Stimulus Packages on Small and Medium Enterprises (SMEs) in Latin America" (**in the field**) with Paul J. Gertler, Sean Higgins, Anita Montoya and Eric Parrado

"De-populating slums: Experimental evidence on the effects of migrating out of slums to formal neighborhoods" (**in the field**) (with Marco Gonzalez-Navarro and Paul J. Gertler)

"Mortgage Refinancing" (with Vivek Bhattacharya, Ignacio Cuesta, Gastón Illanes, and Anita Montoya) (**in the field**)

Books

"Happiness Economics and Public Policy: a contemporary introduction" with Cristian Larroulet Philippi (contract signed with Springer, writing in progress)

Referee Service

Journal of Economic Behavior & Organization; *World Development*; *The Economics of Transitions*; *Regional Science and Urban Economics*; *Economic Development and Cultural Change*; *Fondecyt*; *Journal of Urban Economics*; *Journal of Development Economics*.

Research Grants

2021: PI – MIPP Grant: "Immigration and Crime Perceptions" (with Nico Ajzenman and Patricio Dominguez); Total: USD $8,000

2021: PI – MINVU Grant: "Slums" (with Marco Gonzalez-Navarro and Paul J. Gertler); Total: USD $80,000

2020: Researcher – SERNAC Grant from Behavioral Economics Unit: "Mortgage Refinancing" (with Vivek Bhattacharya, Ignacio Cuesta, Gastón Illanes, and Anita Montoya); Total: USD $10,000

2020 – 2021: Researcher – JPAL JOI Grant on COVID-19: "Economic and Financial Impacts of COVID-19 and Stimulus Packages on Small and Medium Enterprises (SMEs) in LAC" (with Paul J. Gertler, Sean Higgins, Anita Montoya and Eric Parrado); Total: USD $50,000

2020: Researcher – IADB Grant on COVID-19: "Economic and Financial Impacts of COVID-19 and Stimulus Packages on Small and Medium Enterprises (SMEs) in LAC" (with Paul J. Gertler, Sean Higgins, Anita Montoya and Eric Parrado); Total: USD $100,000

2019 – 2020: PI – IADB Grant on Understanding the Impacts of Migration in LAC: "Immigration and Crime" (with Nico Ajzenman); Total: USD $14,500

2019 – 2021: Researcher – DIPRES Impact Evaluation Grant: "Incentivizing Savings in Chilean Public Procurement System: Two Experiments" (with Pablo Celhay, Paul Gertler, and Marcelo Olivares); Total: USD $70,000

2018 – 2021: PI – Fondecyt de Iniciación (Conicyt): "Housing and Social Integration" Total: USD $100,000

2018 – 2019: Co-PI – Development Bank of Latin America (CAF): "Gender Discrimination in the Chilean credit market" (with Ana María Montoya and Eric Parrado); Total: USD $31,400

2017 – 2018: PI – DII-U.Chile Grant: "Social Housing and Social Integration"; Total: USD $12,720

2017 – 2018: PI – Market Imperfections and Public Policy Institute (MIPP) Grant: "Social Housing and Social Integration"; Total: USD $10,000

2009 – 2012: Researcher – 3ie International Initiative for Impact Evaluation Grant: "Building a Brighter Future: A Randomized Experiment of Slum-Housing Upgrading in Mexico" with Sebastian Galiani, Paul J. Gertler, Ryan Cooper, Sebastian Martinez and Adam Ross; Total: USD $576,000

2008 – 2010: Researcher – Economic and Social Research Council (ESRC) Grant: "Building a Brighter Future: A Randomized Evaluation of Slum-Housing Upgrading in El Salvador and Uruguay" with Sebastian Galiani, Paul J. Gertler, Ryan Cooper, Sebastian Martinez, and Adam Ross; Total: USD $517,000

Presentations

2021: ASSA Meeting (Chicago), Vrije Universiteit, NBER Inequality, Discrimination, and the Financial System (scheduled), Royal Economic Society (Queen's University Belfast, scheduled)

2020: NBER Summer Institute (Household Finance), NBER Summer Institute (Gender in the Economy), Econometric Society World Congress (Bocconi), IDB Migration Conference, Universidad de Montevideo

2019: ASSA Meeting (Atlanta), Advances in Field Experiments (Chicago); LACEA (Puebla); Sao Paulo School of Economics; Universidad de la Republica; PUC Chile; MIPP Conference (U. of Brunel, UK); IDB Behavioral Economics Conference (DC); MIPP Annual Workshop

2018: NBER Summer Institute (Urban Economics Group); EEA-ESEM Annual Conference (Cologne University); FEN U. Chile; MIPP Annual Workshop

2017: U. of Florida; Fordham University; INSEAD; Sciences Po; DII-U.Chile; LACEA (Bs Aires)

2016: NEUDC (MIT); NYU; PUC Chile; UAH; UDP; USACH; FEN U. Chile; SECHI (UAI); COES Annual Conference

2015: NYU; PUC Chile (Development Conference)

Honors, Fellowships, Scholarships, and Awards

2018: Nominated to the *LACEA 2018 Juan Luis Londoño Prize* to the best paper on social issues by a young researcher.

2017: NYU Wagner Fellowship

2012 − 2016: National Commission for Scientific Research PhD. Scholarship, Chile

2010: Top 100 Youth Leaders Awards, El Mercurio and Universidad Adolfo Ibáñez, Chile.

2009 − 2011: MPP Scholarship, Department of Economics, University of Chile.

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https://sites.google.com/site/raimundoundurragar/home