MiPP
Millennium Institute
Market Imperfections and Public Policy

GAZETTE

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In Focus: Chilean Pensions- No More AFPs?

An academic analysis of the AFPs investment mechanisms

Collusion: Detection and Sanctions

Trump Rhetoric: Words or Actions?

Can we get back to business now?

Inclusion and Financial Education:

The Promise of MIPP

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Publications List

Gazette Staff:

Juan Escobar – *Director*
Henrieta Isufllari – *Editor-in-Chief*
Marta Apablaza – *News Editor*
Martin Alite – *Layout and Design*
Maria Eugenia González – *Picture Editor*
Matty Kryemadhi (Aledia) – *Web Developer*
Juna Lilaj – *Translation Services*

Editor's Note

The idea to put together a MIPP Gazette was inspired by the ongoing interest in previous opinion pieces written by the Institute's academics for various Chilean media outlets, and the regular Insight columns featured on our website. Expanding contribution beyond academic circles is one of MIPP's main objectives. We hope that the Gazette will be a valued addition to the existing outreach platforms the Institute constantly uses to provide information, awareness, and education over economic issues at the center of Chile's current public policy debate. From AFP contribution analysis, to collusion among firms and its repercussions, we bring you the latest our researchers have to say through interviews, theoretical analysis, and opinion pieces, trusting that they will contribute to forging a transparent and constructive dialogue between citizens and their public institutions.

In the end we view our job as a conduit between academic research and the public interest. We believe that well-informed citizens are indispensable for a well functioning democracy, and intend to work tirelessly through the Gazette to clarify, inform, and debate issues that are very essential to Chile. Many of the hotly contested issues our country faces today are often quite nuanced and subtle. A discussion that goes beyond the usual headlines, exposes competing schools of thought, and explores different sides of important issues is necessary and essential. We hope the Gazette will be a lively forum for debate and information dissemination.

We welcome any feedback regarding the values of the Gazette or other relevant topics you would like our researchers to talk about in the future. Special attention is also dedicated to documenting and summarizing the several Outreach activities organized by MIPP and other important partners during 2016. The activities' highlights we have provided can be an incentive for more participation in the new Outreach programs available through 2017.

I also want to express my personal gratitude for the tireless efforts of the Institute's staff that made the Gazette project possible.

Henrieta Isufllari
Editor-in-Chief

Trumpian Rhetoric: Words or Actions?

Why a contractionary Foreign Trade policy with Latin America is an unlikely scenario.

Matteo Triossi
Industrial Engineering, University of Chile

From the beginning of his Presidency, Donald Trump´s isolationist policies have been spreading anxiety throughout Latin America. Two episodes in particular have drawn worldwide attention: the constant verbal attacks and threats made against Mexico, and the withdrawal from the Trans-Pacific Partnership (TPP). Both instances seem in line with two important threads from Trump´s electoral campaign: the xenophobia towards Latino (and Arabic) immigrants, and this idea that free trade agreements have resulted in jobs "being stolen away" from Americans.

From this spectrum, the first steps of Donald Trump's presidency seem perfectly coherent, which makes it necessary to consider the repercussions his policies will have on South American countries, and Chile in particular.

While it is true that, when the United States withdrew from the TPP, the treaty lost an important ally (perhaps the most important one), I do not think that the trading terms between the region and the global superpower would significantly worsen beyond this point. This is primarily due to the growing interdependency between the countries of the Americas. As it stands, the U.S. imports over 30% of its petroleum from Latin America. At the same time, Latin America is not only a mayor importer of U.S. natural gas, but it also represents the primary market for petroleum refined products, such as gasoline. U.S. companies are powerful and growing investors in the region´s extractive and energy industries. All of these examples make the U.S. one of the most important allies for many Latin American countries.

Trumpian rhetoric seems to jeopardize this interdependency. The Commander in Chief has promised to actively push American companies to reduce foreign investment by offering fewer regulations (in particular environmental ones) and promising to raise tariffs on imports. The ultimate goal is to "bring jobs back to the U.S.".

This strategy is difficult to implement for three reasons. First, the economy would suffer. *A tariff war between the U.S. and the Region would be equally damaging for all the countries involved.* Contrary to what is believed, the terms of Free Trade Agreements between the U.S. and Latin America are extremely favorable to the U.S.- in 2014 alone, the commercial surplus in goods and services stood at almost $15 billion USD. Also, U.S. exports to Chile are double the ones to Russia. Similarly, the exports to Mexico from the U.S. are twice as large as those to China.

As a matter of fact, the United States would benefit much more from an economic expansion in the region with Trump as a president than it did with Obama: the latest political changes in Brazil and Argentina have brought to power governments more open to free trade. And even without taking the TPP into account, many countries in the region would be willing to renegotiate the current treaties with the U.S. to mutual benefits.

The second reason is purely bureaucratic: Unilaterally pulling out of numerous FTAs with the countries in the region can get quite complicated. The issues would have to be brought to Congress, where they would probably not garner enough support. If Trump decides to issue "executive orders" instead, the court would probably intervene to annul them.

The third and last reason is strategic. *If the U.S. suddenly withdrew from Latin America, China would get the chance of a lifetime to strengthen its presence in the region.* China`s presence has already been growing to the point where in many countries it has replaced U.S.A. as the number one business partner. Having first entered the market as importers of raw material, the Chinese have since launched an expansion in the energy and financial sectors. Even with its recent economic downturn, the Asian giant continues to be an extremely attractive market for South America.

In other words, strengthening cooperation with the region would appear to be an important component to U.S. security, regardless of Trump's rhetoric. The arguments hereby presented imply that *changes in U.S. commercial strategy would not be as drastic, or as literal as one would perceive them to be, although the risk still exists.*

The withdrawal of the United States from the TPP makes it necessary to promote economic integration in the region, given a favorable political climate. This would eventually lead to negotiations towards a new Free Trade Agreement between the countries that signed the TPP, save for the United States (and maybe Japan). The Pacific Alliance could serve as a platform for this new treaty, considering the great interest shown by this organization. Finally, Chile, as one of the most developed countries in the region, could well undertake a leading role in the future, drawing from its past experiences with Free Trade Agreements. ■

SPOTLIGHT

OUTREACH

Leaders in Research and Public Outreach

Cutting-edge research is not the only priority for MIPP; the Institute is equally committed to building ties with the community and providing outreach on its topics of expertize, such as finance and political economy.
Since its creation, the Institute has organized and promoted several successful events aimed at disseminating and broadening the knowledge of students, academics and researchers.

Patricio Valenzuela is elected Deputy President of SBIF´s Civil Society Council

The Civil Society Council of the Superintendency of Banks and Financial Institutions (SBIF) elected Patricio Valenzuela, MIPP Researcher and Universidad de Chile academic as its Deputy President.

The council is an advisory body focused on drawing insights from the development and results of public policies managed by the Superintendency.

Bitcoin: a History of Anonimity

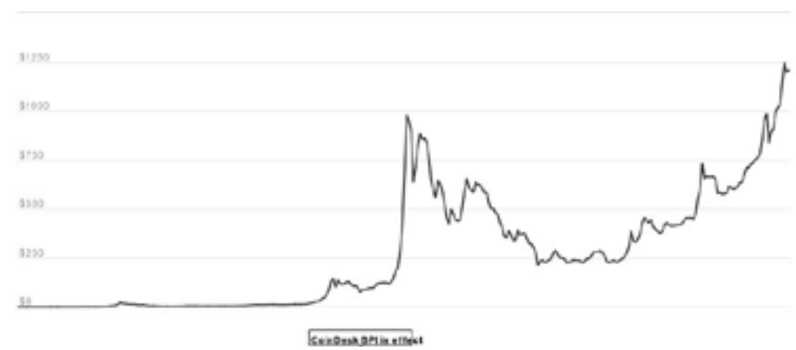
Elton Dusha
Industrial Engineering, University of Chile

A currency that exists outside of the control of government bureaucrats, and whose supply cannot be artificially "manipulated" by unelected officials has been a long-term dream of libertarians and anarchists since the advent of the modern central banking system. For the longest time, the idea was relegated to science fiction novels and meetings of obscure techno-futurists. This hypothetical currency was as anonymous as cash, and as easily transferable as a conversation across phone lines. The biggest issue that seemingly prevented the arrival of the desired currency was trust. How could one verify ownership and authenticity in a network whose very reason for existence was anonymity? If someone owned a currency, and was willing to transact it for goods or services, wouldn't the system need a central authority to verify said transaction?

The arrival of crypto-currencies, the most popular of which is Bitcoin, solved these problems ingeniously: the currency itself would carry the history of each transaction in which it was used, making the transfer of funds transparent while protecting the identity of those behind the transactions. Known as the Blockchain method, the process creates a log for every transaction that occurs by adding a block to the chain of identification, thus giving each coin its unique DNA-like identifier.

However, part of the central problem still persists: who verifies that the transaction has taken place and whether the transfer has been completed? This is where the system calls on the network to do the work. To verify a transaction, a program starts solving a series of computational puzzles that take time and machine power to crack. In order to give incentives to others to perform such a task, the program rewards the first successful computer by granting it bitcoins for the work. This is what users refer to as mining. Thus the loop is closed; once a transaction is announced, a swarm of operating systems around the world are called on to verify it and once they have done so, the new bitcoins are released and the process begins anew.

At the beginning of Bitcoin, when the program was unknown, the amount of bitcoins issued was miniscule and users only accepted it as a means to test the software's viability. The creator of Bitcoin, a man whose *nome de plume* is Satoshi Nakamoto, but whose real identity has yet to be determined, wanted the total supply of bitcoins to be fixed in the long run. In order to attract users, in its infancy, bitcoin mining consumed little processing power because there was very little competition and few users. As the number of bitcoins grew and the currency became a favourite means of transaction in illegal markets, its value increased significantly and many people outside of the initial group of techno-libertarians started to take notice. Because transactions could preserve the identity of traders, the initial use of bitcoins was primarily in illegal transactions. When the website that facilitated these transactions was eventually shut down by American authorities, other uses for bitcoins were quickly found. As the graph on Bitcoin prices illustrates, the technology for facilitating anonymous transactions was something that the world was truly clamoring for.



Bitcoin price from July 2010 to March 2017 (Source: CoinDesk.com)

Whether it was Chinese investors trying to overcome quotas on transfers of foreign currency outside of China, or other less benign actors, demand for Bitcoin spurred the need for faster computing power and the creation of mining farms - large warehouses that specialize in putting all resources towards mining bitcoins. As a result, an entire industry has arisen around making advances in processing power that makes mining easier. There appears to be a caveat in all of this however; it seems that mining is becoming prohibitively expensive in terms of energy consumed.

As the number of bitcoins still available increases, it approaches the fixed amount set by its creator, increasing in return the difficulty of mining them, and therefore the resources used to introduce new bitcoins in the world. The programming algorithm used to verify transactions often rewards the "farm" with the fastest verification process. Therefore a sort of arms race has been ratcheting up in the mining business, where companies have built entire warehouses dedicated solely to mining bitcoins. According to some calculations, mining consumes about 350 megawatts, roughly equivalent to the consumption of around 280,000 American households (source: Motherboard). Some controversy exists as to how this value is calculated (see for example Medium), but there is a general agreement as to the trend in the energy consumption of mining (as a very informative graph in Digiconomist illustrates.)

Since the current value of Bitcoin is well above US $1,000, the natural question that a typical economist would ask is: Does the current value of Bitcoin reflect market fundamentals, i.e. is the price of Bitcoin equal to its marginal cost? Adam Hayes, a researcher at the New Economic School in New York has published a short paper suggesting that the break-even point for Bitcoin is around US $250 (source: Economic Policy Research). This accounts for around a fifth of the current valuation of the currency, which suggests that at this point small miners are shut out of the market. However the price itself is relatively volatile and seems to reflect Chinese government policy fairly closely, signaling that a large portion of the demand for the Bitcoin as currency hinges on Chinese buyers and their need to hide transfers from government bureaucrats. Nonetheless, even if the Chinese market dries up, crypto-currencies seem to have filled a real need for anonymity and will not be going away anytime soon.

Financial Education and Inclusion: Millennium Institute´s Ongoing Commitment

Outreach activities aimed at different audiences, organized by the joined support from public and private institutions was a recurrent theme throughout the year for MIPP, whose continued commitment is financial education and inclusion in Chile.

Financial Education and Inclusion Award

The first Financial Education and Inclusion contest, an event that seeks to recognize organizations, journalists, and primary and secondary students that promote financial education and inclusion issues in the community, was organized together with the Superintendence of Banks and Financial Institutions ("SBIF"). The President of the Republic, Michelle Bachelet, was one of the honoured guests that attended the ceremony.

Patricio Valenzuela (MIPP researcher) and Eric Parrado (Superintendent of Banks and Financial Institutions) delivered the awards for "Journalistic Contribution in Financial Literacy" to journalists Emilia Benitez (Pulso TV), Jaime Quezada (TVN), and Francisco Franulic (Channel 13).

Financial Education Day for Women in the Cooperative Sector

Over one hundred men and women belonging to the cooperative sector learned how to better manage their home economy, and business affairs by attending the First Conference on Financial Education for Women in Cooperatives, organized by the joined efforts of MIPP, the Superintendence of Banks and Financial Institutions (SBIF), and the Chilean Federation of Savings and Credit Cooperatives (FECRECOOP). The event took place at the Faculty of Physical and Mathematical Sciences (FCFM).

The 2016 UNICEF Calendar

UNICEF Chile, in collaboration with SBIF and MIPP, created the 2016 issue of the Calendar that includes, in addition to the advocacy for children's rights, the importance of financial education.

The 2006 Calendar was delivered during a special Financial Education class attended by children of the 4th and 5th elementary grades at the Republic of Colombia school in Santiago.

Visit to the Santiago Stock Exchange

Around thirty Finance students from the University of Chile visited the Santiago Stock Exchange, accompanied by Patricio Valenzuela, MIPP researcher and professor at the Department of Industrial Engineering, University of Chile.

Alejandra Cooper, Financial Education Analyst at the Santiago Stock Exchange, was in charge of the visit and the lecture that followed. During the day, the students had the opportunity to visit the building, which has been declared a Cultural Heritage site, with the end goal of observing how theoretical models studied in class play out in real life, and to better understand the way the Stock Exchange operates.

Financial Education and Inclusion Agreement

The Millennium Institute and the Superintendence of Banks and Financial Institutions (SBIF) signed a collaboration agreement on research, and generation and dissemination of content on the topic of Financial Education and Inclusion.

Based on this agreement, both institutions are committed to developing a joint work plan on topics that help to promote the country's financial education, such as responsible debt management, commercial and banking product management, and personal and family budgeting.

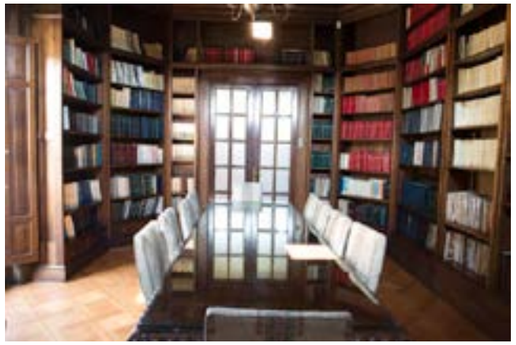
Collaboration Agreement with Explora Valparaiso

The MIPP Institute signed a collaboration agreement with Explora Valparaíso, a regional science and technology dissemination program created by CONICYT. The project aims to transfer knowledge from the area of Economics for contribution to the cultural and educational formation of the community.

MIPP Researcher to Participate in Online Financial Education Course

Delivering concepts and tools on the economic world in order to generate a critical, responsible and efficient consumption, is the objective of the online course "Citizen Financial Education", in which Patricio Valenzuela, MIPP Researcher will be participating.

The long-distance course will be delivered entirely through the Internet. Participation is free and open to the public, with quotas for all interested parties, and without any previous education requirements.



Yuliy Sannikov's Visit

Ukrainian economist Yuliy Sannikov, known for his contribution in mathematics, game theory and corporate finance, visited Chile in the framework of CEA - MIPP Seminar Series events.
The Stanford Graduate School of Business professor - who has received financial awards and also the John Bates Clark medal from the American Economic Association - gave a seminar to researchers and students at the MIPP Millennium Institute.

Macroprudential Policies in the U.S.

One of the leading economists of the US Federal Reserve System, José Berrospide, gave a lecture on the policies implemented in recent years for the economy of the United States, as part of the CEA - MIPP seminar series.
The lecture was attended not only by researchers, academics and students of the Millennium Institute MIPP, but also by professionals and consultants from financial institutions, primarily the Central Bank.

Mini Course on Machine Learning

The Center for Applied Economics (CEA) and the MIPP Millennium Institute invited Christian Hansen, from the Booth School of Business at the University of Chicago, for a course on a discipline that has been at the center of recent economic discourse: Machine Learning, which provided students and academics with the latest trends within the discipline.

OUTREACH

Chilean Pensions- No more AFPs?

An academic analysis on the mechanisms sustaining the Chilean pension system and ways to improve it

The Pension Problem

Juan Escobar

Macroeconomic Effects of Changes in the Pension System

Benjamín Villena R.

Why Would the AFP Investments of Chilean Pensions Not Perform Well?

Alejandro Bernales

The Pension Problem

Juan Escobar

Industrial Engineering, University of Chile

The issue of low pensions has dominated both the political and economic agendas of the past year. Massive demonstrations organized by the No + AFPs (No More AFPs) movement, coupled with diverse reactions from the government, associations, and trade unions, have resulted in the creation of several proposals intended at increasing the current pensions, which have been at the center of discussion and debate. The validity of these proposals and the intensity of the debate make it a very opportune time to talk about the country's pension system.

Why is a pension plan needed? Is it necessary to be forced to pay contributions and save for old age (be it our own in the future, or the elderly of the present)? The answer is `yes` and the reason is, in part, self-evident: at some point in our lives we will be less able to produce, and will need additional income to make up for what we no longer will have the capacity to earn ourselves.

The other part of the reason is that as human beings, we often find it difficult to plan and achieve our long-term financial goals. We agree that it makes sense to save for a rainy day, but when it comes to making the decision to save, we tend to postpone. In short, where saving for retirement is concerned, human beings have a self-control problem (Laibson, 1997). It is precisely this self-control problem of individuals which legitimizes the necessity of government intervention in planning a pension system capable of satisfying the demands of numerous and diverse workers.

"In short, where saving for retirement is concerned, human beings have a self-control problem"

The pension problem is multi-faceted; Alejandro Bernales and Benjamín Villena discuss the topic from the financial, labor, and macroeconomic perspectives. Neither argument entails a radical change to the system. They do, however, propose much needed important adjustments regarding the role of the State and the structure and regulation of the AFPs. The main role of the AFPs is to invest and grow our pension funds. How well they achieve this, is a fundamental question when defining the changes needed for the pension system. We should first evaluate how well the AFPs are investing our funds. Unfortunately, deciding how to evaluate the performance of the AFPs is complicated. Alejandro Bernales offers a systematic method of evaluation and shows that there is indeed room for improving the investment decisions of AFPs.

One of the problems faced by the current system is the lack of savings. Many workers have low wages and significant pension contribution gaps. In his article, Benjamin Villena discusses the costs of increasing the contribution rate. The same issue of self-control would cause workers to react to an increase in the percentage of the contribution rate the same way they would react to a labour tax. Yet, if we are thinking of taxes to finance better pensions, then we should also think about having taxes that are unrelated to labour. It is the government then, that must largely resolve the problem of low pensions through its tax and labour policies.

"It is the government then, that must largely resolve the problem of low pensions through its tax and labour policies."

It is necessary to consider other measures as well. For instance, competition between AFPs is imperfect because contributors find it difficult to decide which one to choose (Illanes, 2016). An interesting solution to this problem has been the auctions of new contributors, which have brought about significant decreases in administrative fees. These auctions should be expanded to include existing contributors as well. Contrary to what has been said, auctioning all contributing members would not create temporary monopolies. Quite the opposite, just as the current theoretical and applied literature on the subject shows (Milgrom, 2004), a well-designed auction could help separate the funds into categories and bring substantive decreases in the administrative fees, while allowing the AFPs to keep their existing members.

Finally, it seems important to legitimize the system in the public sphere. A way of achieving this is by allowing those members (retired or retiring), whose funds exceed the necessary minimum required for a satisfactory annual living, to have access to their funds. ■

Why Would the AFP Investments of Chilean Pensions not Perform Well?

Alejandro Bernales

Industrial Engineering, University of Chile

As we all know, Chileans are beginning to worry more about a subject that for many years was considered something 'distant' and 'complex' to understand: our retirement funds that are managed by the Pension Fund Administrators (AFPs in Spanish) . In fact, in the last few months there has been a great debate surrounding this issue, especially about the insufficient pensions received by many Chileans after a lifetime of labour. In this article we address a subject that has received little discussion, probably because it still sounds 'distant' and 'complex'; but which is not of lesser importance as it directly affects the pension we will receive at the time of our retirement. That is, whether the AFPs invest our pensions in an optimal way (which in financial terms is known as the "profitability" of pension plans). The objective of this article is to explain the encountered results in simple terms; therefore this article is intended for an audience that is not necessarily familiar with the financial language.

"Do AFPs invest Chilean pensions in an optimal way? In the following paragraphs we show some evidence that they are not doing so, and furthermore that there is room for improvement."

Do AFPs invest Chilean pensions in an optimal way? In the following paragraphs we show some evidence that they are not doing so, and furthermore that there is room for improvement. Potential improvements in terms of pension fund returns could solve many of the current problems, including the problem of low pensions that many Chileans could receive in the future. To do this, we first explain 'why' the AFPs may be making sub-optimal investments. As a first step, we analyse the mechanisms that the present Chilean regulation uses to incentivize AFPs to generate good investments. In particular, we discuss how these incentives (established by regulation, and which at first sight appear reasonable), can generate behaviours in AFPs that could reduce the profitability of pension funds.

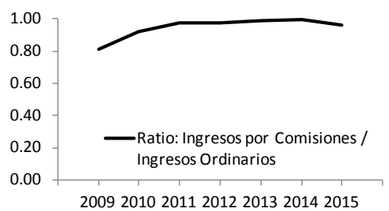
"...the current 'business' model of AFPs could lead them to focus more on the 'marketing-sales' part of the business (to capture more members), rather than on the 'financial' side, (meaning: to invest the Chilean pensions in an optimal way). "

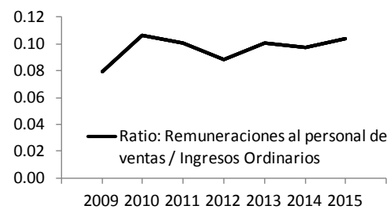
The first mechanism that the regulation considers is articulated in Article 40 of Law Decree 3500. This regulation stipulates that AFPs have to invest from their own 'pocket' in the same pension funds that they administer, an amount equivalent to 1% of each fund they manage. This seems to be a reasonable incentive for AFPs to optimally invest the pensions of Chileans, since it directly affects their money. However, to understand the effect of this regulation on the behaviour of the AFPs, we must first understand what the 'business' of the AFPs consists of. To do this, it is important to ask ourselves some questions: Where does the majority of AFPs' income come from? Does the vast majority of the AFPs' income come from their own money they invest in the same funds they administer (according to Article 40 of Law Decree 3500)?

Today, much of the AFPs' business is not to invest their own money in pension funds, but to "lock in" larger numbers of contributors who pay "commissions" for the administration of funds. Between 2009 and 2015, the average of the ratio: (Commissions Revenue per Administration) / (Total Ordinary Revenue) was 0.95. This means that 95% of the AFPs' income comes from the administrative fees, making it clear that the income generated by the money that AFPS invest in the same pension funds they administer does not represent an important share of their business. In fact, as shown in Figure 1 (left side) this very same ratio experienced an increase between 2009 and 2015.

Why is it important to point out that most of the income of the AFPs does not come from investing in the same pension funds that they offer to Chileans, but from the administration fees that Chileans have to pay on a monthly basis? The answer is that the current 'business' model of AFPs could lead them to focus more on the 'marketing-sales' part of the business (to capture more members), rather than on the 'financial' side, (meaning: to invest the Chilean pensions in an optimal way). For example, in Figure 1 (left side) we see that there has been an increase in the ratio: (Remuneration to Sales Personnel) / (Total Ordinary Revenue), which is a result of the commercial incentive that the AFPs have in

Figure 1





relation to seeking and competing for new members.

It is important to emphasize here that the 'business' of the AFPs has generated very high returns for these firms. The income generated by the monthly administrative fees paid by contributors have lead AFPs to having high returns for their owners compared to other types of industries. Table 1 illustrates the average financial return (ROE) of AFPs between 2009 and 2015, compared to the average ROE of different industries in the world. Data for ROE levels for other industries was obtained from the webpage of Aswath Damodaran, Professor at New York University (the data is from 2015).

The 'administration' of pension funds is the 'means' by which the AFPs obtain management fees, which represent the major part of their revenues. This business is tremendously lucrative, since the commissions are mandatorily paid, as required by law, by the majority of working age Chileans. In addition, these 'fund management' fees are not affected by the quality of portfolio management, in terms of such funds generating 'optimal' returns.

Optimally investing the pension funds of Chileans becomes a secondary concern (although AFPs also invest their own money in the same funds to comply with regulation). Thus, it is only natural that AFPs have more incentives to focus on a marketing-sales approach, where they are 'competing' with other AFPs for new contributors, rather than channelling their focus towards optimally investing the funds they manage. As a result, although Article 40 of Law Decree 3500 provides a mechanism that seems reasonable at first sight, its implementation (given the 'business' of the AFPs) does not seem to generate enough incentives in terms of optimally administering the pension funds that they handle.

"The 'administration' of pension funds is the 'means' by which the AFPs obtain management fees, which represent the major part of their revenues. ..In addition, these 'fund management' fees are not affected by the quality of portfolio management, in terms of such funds generating 'optimal' returns."

One could argue that incentives do exist, since if an AFP has funds with bad returns, its members would switch to another. While this is a valid argument, it does not happen for a simple reason: AFPs ´copy´ each-others´ investment strategies so all generate similar profitability. Why do they do this? The answer is clear: the law encourages the copying, which is related to the second mechanism proposed by the current regulation to improve the profitability of pension funds, explained below.

Table 1

Industrias	Rentabilidad Financiera: Ganacias / Patrimonio (ROE, por sus iniciales en Ingles)
Promedio del ROE de industrial alrededor del mundo para el año 2015	
Servicios de Información	22.44%
Servicios Computacionales	19.29%
Entretenimiento	18.39%
Farmacéutica	16.40%
Semiconductores	15.73%
Bebidas Alcohólicas	12.87%
Inversiones y Manejo de Activos Financieros	12.37%
Energías Renovables	7.94%
Seguros	7.82%
Agricultura	5.85%
Servicios de basura y ambientales	2.98%
Total del Mercado	**8.89%**
Promedio del ROE del sistema de AFPs entre 2009-2015	
AFPs (Promedio entre 2009-2015)	21.33%

The second mechanism considered by the regulation to improve the profitability of pension funds is described in Article 37 of Law Decree 3500, which stipulates the use of a mechanism able to compare the returns of the funds managed by the AFPs. This mechanism uses the 'average' of the profitability of all the similar funds of other AFPs in the last 36 months. For example, if the profitability of fund A for AFP X is above the average of all the A funds of the other AFPs, it complies with the regulations. But if the profitability of fund A for the same AFP X is below the average of all the A funds of the other AFPs, a penalty has to be paid. Obviously, when an 'average' is calculated, there will be AFPs that are above the calculated average, while others that are below that average. The regulation takes these cases into account and indicates that there will be 'no' punishment for the AFPs that are below the average, but within a certain limit or range (in the case of Fund A, this limit is the lowest of the average profitability less four percentage points and average profitability less 50% of its value).

"The first problem that Article 37 of Law Decree 3500 generates is that it produces an incentive for AFPs to be copied"

What Article 37 of Law Decree 3500 contemplates seems like a reasonable mechanism for improving the profitability of pension funds, as it establishes a point of comparison for evaluating the returns of the funds. However, this mechanism can create several problems. *The first problem that Article 37 of Law Decree 350*0 generates is that it produces an incentive for AFPs to be copied (as explained above). This is convenient for AFPs for at least three reasons. First, if the AFPs were being copied (being within the 'limits' of lower profitability relative to the other AFPS' average), in accordance with regulation no AFP would have to pay penalties. Second, it is easier and 'cheaper' to copy the strategies of others (in this case the strategy(s) of the larger AFP(s)) than to have a better investment team searching for opportunities in different market types. This is important, since this way AFPs can allocate more resources to the 'marketing-sales' side, and focus on finding more contributors who pay administration fees (as explained in the analysis of Article 40 of Law Decree 3500). Thirdly, contributors lose the bargaining power of applying pressure through potentially switching affiliation if the profitability of their current AFP is lower than that of the competition, since on 'average' they all yield similar returns.

"...what happens if the AFPs are copying the investment strategies, but these strategies are not optimal? This would generate sub-optimal returns for the pension funds, without any penalties to the AFPs."

One might ask: how can AFPs copy investment strategies if they are supposed to be confidential? This is possible thanks to Article 26 of Law Decree 3500 which states that: "[The AFPs] *must keep in their offices, in a place easily accessible to the public, an available extract containing the following information: ...The investment portfolio composition of every Pension Fund.*" The current version of Article 26 of Law Decree 3500 states that the publication of the portfolio (regarding how much and in what assets each AFP invests the different funds) must be published with a time lag of four months, making it is possible to see the detailed investments history of the AFPs in the preceding four months of any current time period. Additionally, the aggregate composition (by investment type) of the portfolio is published after one month of time delay (Bulletin 1521). This collection of lagged information is useful for generating a copy of the investment strategies, since AFPs cannot change all of their investments month-to-month due to domestic and international transaction costs. Thus, with this lagged information (and the historical trend in the behaviour of AFP and in conjunction with how the current market moves), it is possible to develop algorithms or methodologies that provide an approximate replication of the behaviour of the competition.

Someone might find it a good thing that the AFPs can be copied, since this will generate 'equality' in the future pensions of the Chileans. However, such line of thinking is dangerously flawed in several respects. First, what happens if the AFPs are copying the investment strategies, but these strategies are not optimal? This would generate sub-optimal returns for the pension funds, without any penalties to the AFPs. Second, one of the keys to healthy investments in finance is related to the concept of diversification (which colloquially means "do not put all your eggs in one basket"). Imagine the case of an investment strategy that generates massive losses in the pension funds. Is it better if only one AFP is wrong, or all of them? Obviously it is better to have different pension funds, since it reduces the risk of investment mistakes affecting the pensions of all Chileans.

As a result, the mechanisms stipulated by the regulation intended to improve the profitability of pension funds, contemplated in Articles 37 and 40 of Law Decree 3500, may generate no effects (or even a negative effect) on how the AFPs develop their investment strategies. To analyse these aspects, we performed an analysis on the profitability of AFPs. We used the daily data of 15 indices that reflect the behaviour of different markets at a national and international level. Table 2 shows the indices used.

Table 2

Zona Geográfica	Identificador	Descripción
Mundial	NDDUWI	MSCI World Daily Total Return Net
Emergentes	NDUEEGF	MSCI Daily TR Net Emerging Markets
Asia Pacifico	NDUEACAP	MSCI AC Daily TR Net Asia Pacific USD
Europa	MSDEE15N	MSCI Daily Net TR Europe Euro
EEUU	NDDUUS	MSCI USA Total Return Net Index
China	NDELCHF	MSCI China Total Return Net
Mexico	NDEUMXF	MSCI Mexico Total Return Net
Brasil	NDLEBRAF	MSCI Brazil Total Return Net
Chile	IPSA	Índice de Precio Selectivo de Acciones
EEUU	LD08TRUU	US Aggregate: Government-Related
Europa	LEGVTREU	Euro-Aggregate Government-Related
Emergentes	BSSUTRUU	Emerging Markets Sovereign
Asia Pascifico	LJGRTRJU	Asia Pacific Aggregate Government-Related
Chile	RENTA.FIJA.GLOBAL	Bonos Renta Fija (Indice - RiskAmerica)
Chile	IF.GLOBAL	Intermediación Financiera (Indice - RiskAmerica)

The daily data between 2009 and 2015 was used to calculate the average returns of each index and their standard deviations. It is important not only to calculate the average returns, but also their standard deviations, since the latter give us a signal of the 'risk' associated with each market.

The average returns and their standard deviations were used to determine the so-called 'investment efficiency frontier'. The *investment efficiency frontier* is a relationship that reflects the 'optimal' return of an investment given a particular risk level, where risk is measured by the standard deviation. This optimal return is obtained through a maximization process, which searches for investment combinations in indices that reflect the conditions of each market.

The concept of *investment efficiency frontier* is important because it shows the optimal level of investment for a given level of risk. This means that an optimal investment should be close to the *investment efficiency frontier*. What 'close' means is that the difference between the *investment efficiency frontier* and profitability (for example, of the pension funds) should not be statistically significant. This is crucial, since the

"The use of the 'investment efficiency frontier' is also important because it establishes an 'external' comparison point that can be used for evaluating the profitability of pension funds."

AFPs collect monthly commissions for the administration of pension funds (which have generated large

returns for the "business" of AFP, as seen from Figure 1 and Table 1), so it would only be normal to expect that they invest these retirement funds optimally. Otherwise, a better alternative would be to simply invest in the indices using some automatic algorithm, which could calculate the efficiency frontier on a daily basis, and make optimal invests given a risk level. With this algorithm, investments in the indices can be made through assets called 'exchange-traded funds' (ETF), which allow for taking investment positions over a given index. The use of an automatic algorithm would result in a reduction of the market experts' teams of the AFPs, and consequently, a substantial decrease in the monthly 'administration' fees paid by Chileans.

The use of the 'investment efficiency frontier' is also important because it establishes an 'external' comparison point that can be used for evaluating the profitability of pension funds. Therefore, the investment efficiency frontier is a better point of reference than the 'average' of the profitability of the same funds (as put forth in Article 37 of Law Decree 3500, described above). In addition, the *investment efficiency frontier* is one of the basic concepts of finance (taught in the first finance course of any postsecondary institution) and is known by all finance professionals. Finally, the *investment efficiency frontier* allows for investing in multiple markets, similarly to what the AFPs currently do.

However, it is important to consider that different pension funds have restrictions with respect to the proportions that can be invested in different types of financial assets, in both the domestic and international market (as established in the "Investment Regime of the Pension Funds " document of the Superintendence of Pensions). For example, regulation contemplates the possibility of investing a greater proportion of risky assets for Fund A compared with Fund E (obviously, Fund A should have a higher profitability than Fund E, since the market automatically grants the returns a premium for the undertaken risk, if optimally invested). Therefore, the efficient frontier of investment in this article (calculated by maximizing returns given a level of risk) considers investment restrictions by pension fund in terms of proportions of financial assets in the domestic and international market, fixed income instruments and equity related securities, and lending operations.

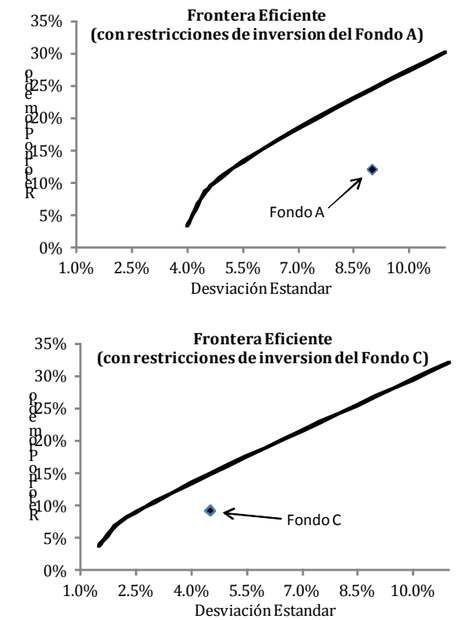
"What Table 3 shows is evidence that indicates that the AFPs are not investing the pension funds of Chileans in an optimal way, and furthermore, that there exists room for improvement. This result is not unexpected, since the current regulation is not generating the right incentives for AFPs to produce optimal returns, as discussed at the start of this article."

Together with the above, we determine the return for each of the funds of all the different AFPs, based on data obtained from the Superintendence of Pensions. With these daily returns from each AFP, we calculate the returns of the system for each of the pension funds (Funds A, B, C, D, E). It should be noted that the return per fund of the 'system' is calculated by weighing the profitability of each AFP against the value of the assets in the respective pension fund, also obtained from the Superintendence of Pensions. With this information, for each fund we calculate the average return of the system, as well as its standard deviation.

For example, Figure 2 shows the efficiency frontier for Fund A and Fund C, together with the average returns of the system for the same funds and their standard deviations (using daily data between 2009 and 2015).

In this way, it was possible to obtain the *investment efficiency frontier* of the different funds and the average returns of the system together with their corresponding standard deviations (similar to what was done for

Figure 2



Funds A and C in Figure 2). With this information we calculate whether each fund is equal or close to the efficiency frontier. Table 3 shows the difference in the average return of the system for each fund in relation to its respective *investment efficiency frontier*.

Table 3 shows that the funds administered by the AFPs are significantly below the efficiency frontier (in statistical terms). It is important to clarify that different results could have been obtained using a different period, using other market indices and / or additional investment restrictions. What Table 3 shows is evidence that indicates that the AFPs are not investing the pension funds of Chileans in an optimal way, and furthermore, that there exists room for

Table 3

	Fondos				
	A	B	C	D	E
Diferencia entre la rentabilidad promedio del fondo y la frontera eficiente	-15.74%	-10.13%	-5.48%	-2.48%	-2.84%
Test-t para evaluar la significancia entre la rentabilidad promedio del fondo y la frontera eficiente	-44.13***	-41.76***	-35.14***	-27.92***	-46.81***

***: Indica si la diferencia es significativa con un test que evalúa la diferencia entre promedios (lo que quiere decir que con un 99% de seguridad la diferencia es estadísticamente significativa).

improvement. This result is not unexpected, since the current regulation is not generating the right incentives for AFPs to produce optimal returns, as discussed at the start of this article.

One might argue that the efficiency frontier does not include transaction costs, so a comparison of this kind might be unfair. However, it should be recalled that each member pays the 'administrative fees' so that the AFPs invest 'optimally', with modern investment techniques (such as algorithmic trading, HFT, multi-market arbitrage opportunities along with other techniques currently used in developed countries, whose description in this article is not needed). As explained, given that members pay contributions for the administration of funds, the AFPs should have a large team of professional finance experts in charge of searching for new and sophisticated ways of investment. If this were not the case, as it has already been signalled, the use of automatic algorithms would be more efficient and much less burdensome in terms of commissions for 'managing' such funds. As a consequence, the effect of the not considered transaction costs should be offset by an optimal administration of the pension funds, since it is a service for which members pay month by month, precisely through these commissions.

"...it should be recalled that each member pays the 'administrative fees' so that the AFPs invest 'optimally', with modern investment techniques "

It is important to clarify that this study does not address whether a pension system in which the retirement funds are administered by AFPs (as in the case of Chile) is good or bad. This study simply refers to an analysis that considers, given that Chile has a system with AFPs, 'how' the current regulation encourages an administration to generate an optimal profitability.

In this context, we hope that a new legislation that contemplates adequate incentives for AFPs to optimally invest the pensions of all Chileans gets implemented in the short (or medium) run. If this happens, it is important that two aspects be considered. First, providing an 'external' and objective profitability comparison point (such as the one shown in Figure 2 and in Table 3). A point of comparison for returns obtained from the average of AFPs with the 'same" behaviour can result in sub-optimal investments, since there is a risk that 'all AFPs are doing it wrong'. But if they are compared to the average of themselves, the poor performance is relativized, which can result in bad practices.

Secondly, it is crucial that when the profitability analysis is performed (with an external comparison point, as described above), the administration 'fees' paid by each member also reflect the performance of the AFPs. The commissions paid for the administration of the funds are the heart of the business for these firms, and the performance of the pension funds should be reflected in such commissions (given that, as noted, contributors pay monthly for an optimal administration). For example, commissions could include a fixed component (lower than current), and a variable one that depends on the performance of each AFP. This would create an additional incentive for AFPs to invest in an optimal way. ■

"...it is crucial that when the profitability analysis is performed (with an external comparison point, as described above), the administration 'fees' paid by each member also reflect the performance of the AFPs."

Macroeconomic Effects of Changes in the Pension System

Benjamín Villena R,

Industrial Engineering, University of Chile

Based, as it currently is, on mandatory individual savings, the pension system has been challenged due to the low retirement income received by contributors. The primary reason is insufficient savings, especially to the extent that the return of the AFP (Private Pension Funds) assets in the long run is at a decline. Shortages in savings originate from long periods without social security contributions, and low wages, especially during the youth years of future retirees. Figure 1 illustrates the pension amounts financed exclusively by retirement savings and it provides the averages of 6.21 UF (163 000 CLP/month) for women and 9.19 UF (242 000 CLP/month) for men, both of which fall below the current minimum wage (at 264 000 CLP/month as of January, 2017). These amounts are close to the average obtained for 15 and 20 years of contributions for women and men, respectively.

Source: Superintendence of Pensions, January 2017

The key to capitalize resources and secure a good pension in the future is to start saving the moment we begin working, or sooner. However, the youth face low salaries, high unemployment rates, and even shorter participation time in the job market compared to previous years, due to spending – on average – a longer time obtaining an education. Low or zero social security contributions happen during the time of our lives in which retirement savings are affected the most.

Parts of a possible solution

As the Bravo commission and the government have proposed, the simplest solution would be to save more. However, a higher contribution rate promotes higher evasion and informality. As a matter of fact, *with a current contribution rate of 10%, many employ*ers are maintaining retirement debts, declaring lower salaries than actual ones to reduce labor costs, or even employing without contracts. The overall impact generated by the proposed 5% increase in contributions should also take into account these inevitable negative effects on savings. This measure would undoubtedly make savings grow by less than the proposed increase. The effect can be substantial; Joubert (2015) estimates that, because of the 5% increase in contribution, the informality rate in Chile would increase to 10%, causing a reduction in tax revenues.

The possibility of using only part of the surplus resources for a solidarity (redistributive) pension fund would only magnify the evasion problem. Under this scenario, workers would have an even smaller interest in demanding the payment of the contribution by the

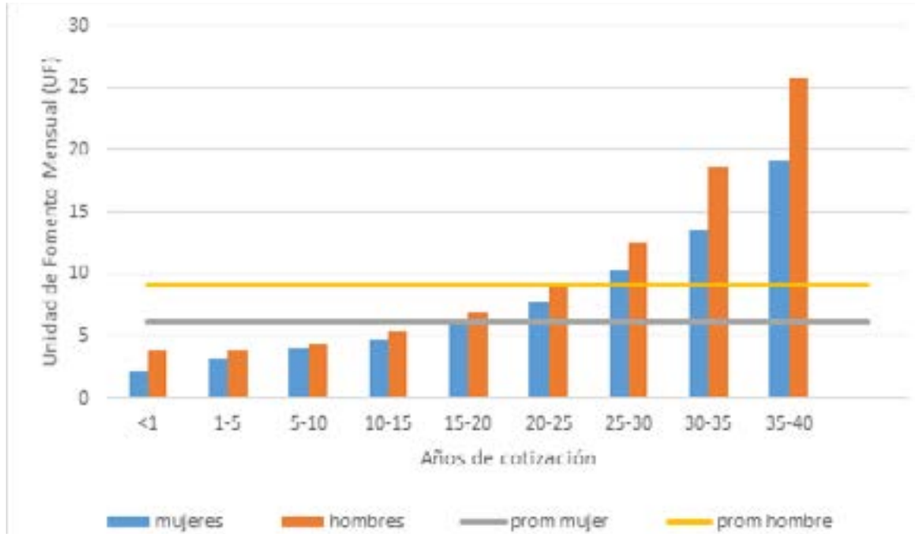


Figure 1: Average monthly self-financed pension (in UF) by years of contribution and gender

employer or in correctly declaring their salaries. On the other hand, the redistributive effect of a solidarity pension fund (and perhaps its only justification) would be quite limited. Earners of high incomes do not usually receive wages but interests, profits, and dividends. Therefore, a change of regulation in the pension system would not affect them much. A solidarity pension fund

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only redistributes from the upper-middle (or middle) income class towards the lower income one, so the impact of redistribution is smaller. Unfortunately, this policy makes social mobility towards good jobs less attractive.

Forcing the employer to be legally responsible for paying the contributions would produce only some of the desired short run effect. For new jobs, wages would be adjusted downward to offset the increase in contribution rates, especially under a low-growth scenario. For existing jobs, the weight may actually be higher for the employer, but as wages get renegotiated they will eventually readjust, making the employees bear the brunt of the cost incurred by the increase in contribution.
In many countries, including pre-1981 Chile, the right to receive money from a solidarity pension fund (in a pay-as-you-go system) requires extended periods of contributions, in order to prevent opportunistic individuals from benefitting unfairly from other people´s pension contributions. Unfortunately, this type of behavior is observed on a daily basis in various settings. *There is no reason to believe that individuals who alr*eady commit fare evasion when using public transportation, or who use false medical licenses, would behave like responsible citizens who understand the negative impact of their wrongdoing on society's welfare when it comes to the pension system. Thus, a solidarity pension fund would be truly beneficial only to taxpayers with very few pension contribution gaps - paradoxically, the category that is less likely to need this fund.
The long-run effects of the solidarity pension fund policy are not very encouraging. Higher contributions, especially if deposited to a solidarity pension fund, imply lower returns to human capital investments in

"There is no reason to believe that individuals who already commit fare evasion when using public transportation, or who use false medical licenses, would behave like responsible citizens who understand the negative impact of their wrongdoing on society's welfare when it comes to the pension"

formal education, training, and work experience. In the long run this situation would undermine economic growth, especially at a time when technological change favors those with higher human capital.
Despite the costs involved, due to low returns on financial assets, a longer life expectancy, and a prolonged education, higher contribution rates and retirement postponement will be inevitable in the future. The goal then is to look for the least expensive way in which they can be implemented.

Some recycled ideas (nothing is 100% new anyway)

There are other measures that can be taken to improve future pensions and guarantee the financial and political sustainability of the system.

1. **Reformulating contributions**: *AFP income should depend, at least to a certain degree, on the size of the funds that they manage (as a consequence, on their profitability) and not on the earnings of the contributors as is the case today.* This approach encourages the fund administrator to prioritize profitability instead of focusing on retaining or poaching clients. The article by Alejandro Bernales, also featured in this issue, shows the inefficiency of investment strategies employed by AFPs, most likely caused by incentives generated by a close link between AFP earnings and contributions.
In addition to boosting efficiency, tying revenue to the size of the fund allows for *an important redistributive effect*. Payments from large individual funds (obtained from high salaries or numerous contributions) would allow young people or people with low income to save a larger proportion of their salaries, or at least to pay smaller administrative fees than at present. Sure enough, this strategy would increase the financial risk of AFPs in the equity market, yet this risk can be substantially attenuated by a sound diversification of their portfolios. On the other hand, this proposal has the advantage of decoupling, to a great degree, the profitability of the AFPs as businesses (not of the actual funds!) from the cyclical fluctuations of the labour market. In other words, both the APF funds and the workers would be better off this way.
2. **Promoting information acquisition:** About 50% of the contributors are unaware that the pension funds belong to them (CADEM, August 2016, and others). In

"Another measure that propels greater acquisition and informed participation is to allow contributors to use a limited portion of their funds to loan themselves a mortgage. By doing this, personal savings would be seen as having an immediate impact, and would provide a powerful incentive for pushing"

large part, the social movement against the AFPs has arisen from a lack of knowledge regarding the pension system and its alternatives, not to mention a large unfamiliarity with basic financial concepts (based on the 2016 Financial Literacy Survey, only 6.2% of the participants had an acceptable grasp of basic finance). Addressing these shortcomings is important for the long-term political and social sustainability of the system. While the multiple efforts of private and public entities to provide financial education for the public are helpful, it is also necessary to understand why people do not acquire or use the information on hand.
One hypothesis is that this kind of information is perceived to have noticeable practical effects only in the very long run. Being the owner of a fund has almost zero immediate practical implications. Making more or better information available does not resolve the issue: incentives are also necessary to motivate the public to

acquire said information. The emergence of *multifondos* (a menu of AFP funds ranging from the riskiest A to the safer E) in the past decade has encouraged a group of contributors to be more informed and get actively involved in the management of their own funds ("Felices y Forrados", a pundit analyst advising fund switching strategies, is a notable example). Another measure that propels greater acquisition and informed participation is to allow contributors to use a limited portion of their funds to loan themselves a mortgage. By doing this, personal savings would be seen as having an immediate impact, and would provide a powerful incentive for pushing contributors towards acquiring information. Since real estate is a physical capital investment, purchasing a house does not distort the long term savings promoted by the pension system.
3. **Government support:** To achieve solidarity and effective redistribution, current retirees with insufficient savings must be financed by general taxes, especially progressive income taxes. This measure can then entirely accomplish intergenerational altruism, in which the younger generation, who is in possession of a larger physical and human capital, transfers their resources to their predecessors. A pure pay-as-you-go system would promote intergenerational transference from the upper-middle class to the poorest ones, leaving intact capital income - the main source of inequality. For the youth of today and the future, the State can allocate resources to promote their employability by either subsidizing their formal employments or contributions associated with them, or by promoting human capital in general.

In summary:

The AFP system stands at an important crossroad. The political pressure requiring changes in the system has emerged from well-organized lobbies that have found a fertile ground in a population that lacks basic general financial knowledge. Overall, the current pension system stands on solid conceptual foundations; in practice however, its implementation requires significant adjustments of its parameters (such as contribution rates, retirement age etc.), which need to be carefully studied.
Other courses of adjustments can also help make the funds profitable and support equality between and within generations. Some of these include: generating adequate economic incentives for AFPs by linking fund` performance with profits; disseminating information to members so that political stability and better decision-making can be achieved at an individual level; and generating tax incentives that foster employment and effective redistribution of resources.

The ´Ratchet Effect´ and How it Influences Firm Productivity

Joaquín Poblete

PUC School of Management

What is the Ratchet effect?

I will illustrate with a personal anecdote. When I was a student I had a gym teacher who, in order to push students to do their best, had developed a particular evaluation tool. In the beginning of the term, we were asked to run as far as possible within a 12-minute timeframe. The same test would then be repeated at the end of the term. The students' grade depended on how much their distance had improved. This approach worked particularly well for us, students. All we had to do was to run slowly in the beginning of the year in order to have a high grade guaranteed by the end of the school year. So, instead of encouraging us to make a real effort to improve, this approach ended up lowering the standard of evaluation. In the incentives literature this is known as the Ratchet effect.

Is there evidence of the Ratcheting impact on firm productivity?

The Ratchet effect has a long tradition within companies. In 1931, sociologist Stanley Mathewson visited and interviewed workers from over 300 plants in the United States to identify the most important constraints on productivity. To his surprise, the Ratchet effect was the main reason behind these constraints. Mathewson visited a tyre plant in which the workers received a commission for every tyre produced. He recorded the comments of a division worker who had doubled his productivity, increasing thus his pay to $12 dollars at that time: "The rate was immediately cut. Now we know that the maximum paid for this work is $7 a day. It would be possible for us to do much more but we are careful not to". The reaction of the workers is reasonable; if they raise productivity, the company increases its demands in the future. Therefore, it is better to keep productivity low. It is not worth getting a higher commission for a month if that means a decrease in the commission for the next two to three years. Unfortunately aggregate statistics on the impact of the Ratchet effect on productivity in different countries do not exist. Nevertheless, its symptoms are visible and easily recognizable in many companies. Sales or production that accumulates in the beginning or at the end of the month are typical symptoms of employees limiting production in order to avoid a rise in targets or measurement standards. Other typical signs of the Ratchet effect are sales and production targets which are met with constant precision, and an emergence of hostility between employees and their most productive peers.

When the employees apply the Ratchet effect, are they taking advantage of their employer?

As the example in the previous question demonstrates, the Ratchet effect is not beneficial to either the employees or to the employers. The employees stop receiving a payment or bonus that would make them happy to receive in exchange for raising productivity, while the employers are plagued by lower productivity for the company. The root cause of the Ratchet effect is not the incentive offered by the employers, but rather their inability to resist raising the targets and their demand when faced with employees who boost productivity. If the company is constantly changing targets and commissions to ensure that employees produce their maximum, the workers will learn soon enough that the employer is taking advantage of them, and just as we did in our gymnastics class, they will perform at their minimum. Taking Mathewson´s example: when the employer takes advantage of their employees, the system of incentives, magnificently planned though it may be, becomes a trap for the unwary. So, employees are inadvertently taught never to do more than the minimum expected.

What are some other problems the Ratchet effect can bring?

Perhaps, even more serious than the reduction in sales and production is the negative impact that the Ratchet effect has on innovation. Innovation means new ways of production, or new ways for carrying out activities that at a future time would translate into lower costs or increased added value for the firm, and furthermore lead to higher worker productivity. However, workers that associate raising productivity with an increase in targets or standards have no incentive to push themselves or to facilitate any implementation of innovation. They feel that while in the short term they share the implementation costs, they do not ultimately reap any long-term benefits for themselves. **Companies that experience the Ratchet effect will have employees who will refuse to participate or contribute to the company´s innovation efforts.** Worse still, employees have all the right incentives to impede or complicate implementing innovation within the company.

How should the system of incentives be designed In order to avoid this problem?

The Ratchet effect clearly shows that setting in place mechanisms for changing and updating production or performance targets is even more important than designing an attractive incentive system. If these mechanisms are arbitrary, or based on past performance, or if the changes introduced aim to maximize performance for every employee, the employees will be careful not to raise productivity nor to consider better approaches to get their job done. For this reason, at the center of every mechanism of incentives, there has to be trust between employer and employees. Generally speaking, even the best incentives system will become useless or counter-productive if employees believe that an increase in productivity, innovation or information will result in higher targets and more duties, or reduced commissions.

In Chile, a country that has had difficulties in improving productivity and advancing innovation, it would be beneficial for a firm's administration to ask themselves a few questions. First, does their incentive system really encourage employees to be more efficient? Does the firm share its productivity increases with its employees in the long run or does it, in an effort to extract maximum return in the short run, encourage employees to reduce productivity and reject innovation? To avoid the Ratchet effect, companies must be willing to commit to steady compensation systems in the long run and additionally, to share productivity gains with their employees. Managers must be willing to allow subordinates to earn as much as double their pay when they are efficient or find better ways of doing things, and company owners should make it clear that increased productivity would benefit everyone across the company. Without such credible commitment, increasing productivity and encouraging innovation become very difficult tasks, and the pressing concern for a good system of incentives becomes almost futile.

Is it possible to measure the impact of the Ratchet effect on a firm?

In order to measure the cost the Ratchet effect has on firms, for example on the sales force, it is necessary to compare the behavior of sales staff who expect that improving performance would be punished by increased targets (or lower commissions), to those who know that increasing their productivity will not impact their firm's targets.

Francisco Brahm and I reached out to one of the largest commercial companies in Chile in order to perform an experiment designed to measure the Ratchet effect. First, we reviewed how managers changed their sales team´s targets. We found that some supervisors reacted immediately by increasing the target when one of the sales staff would exceed it (they were ´Ratcheting´), while others would keep their targets steady, or increase them uniformly to all sales staff.

To measure the effect for the sales staff, we randomly changed commissions paid to the sales force over a two-month period. The results were surprising. The sellers whose managers were constantly altering the targets (those affected by the Ratchet effect) kept their sales constant. On the other hand, those who had not been subjected to the Ratchet effect by their supervisors showed an average

increase of 15% in commissions and 20% in sales. This meant that even though the company´s incentive system accounted for 30% of their total income, almost half of the ´ratcheted´ sales staff was not incentivized to sell more.

Summer School in Economics

The MIPP Millennium Institute, in collaboration with the Doctorate in Engineering Systems (DSI) and the Master in Applied Economics (MAGCEA) programs, has successfully organized two editions of the "Summer School in Economics", through which undergraduate and master´s students, business professionals, and experts from economic and financial institutions could attend classes taught by distinguished professors from different foreign universities, on subjects that deal with the latest topics in economics.

Santiago Finance Workshop

The second edition of the Santiago Finance Workshop (SFW), organized by the Faculty of Economics and Business (FEN), the Finance Center (CF), the Department of Industrial Engineering (DII), and the MIPP Millennium Institute, brought together academics and researchers from Chile and around the world. The conference was noted for the high quality presentations, the highlight of which was the presence of well-known keynote speakers, including Franklin Allen, Eduardo Schwartz and Michael Brennan.

"Development and Banking Stability and Sustainability" Conference

The goal of this conference was to bring together academics, specialists and regulators with a common interest in topics of banking stability and sustainability. The event was attended by the Minister of Finance, Rodrigo Valdes, the Superintendent of Banks and Financial Institutions (SBIF) Eric Parrado, and the Chairman of the Basel Committee on Banking Supervision and Governor of the Central Bank of Sweden, Stefan Ingves.
The Conference was organized by SBIF, the Association of Banking Supervisors of the Americas (ASBA), the MIPP Millennium Institute and the Department of Industrial Engineering (DII) of the University of Chile.

Seminar: "Behind the 2016 Municipal Elections"

On the occasion of the 2016 municipal elections, The MIPP Institute conjoined with the Master in Public Policy program and the Center for Studies on Conflict and Social Cohesion (COES) organized a seminar titled "Behind the 2016 Municipal Elections". The seminar covered three topics: ¨Informal Institutions and multi-level policies in Chile´´, "Determinants of political participation of Chilean youth: quantitative and qualitative evidence"; and "Does the government transfer more resources to municipalities in electoral years?" - led by MIPP researcher Alejandro Corvalán.

Lecture: Political Representation of Indigenous Peoples in Chile

The United Nations Development Program (UNDP), in conjunction with the MIPP Millennium Institute, organized a discussion on "Political Representation of Indigenous Peoples in Chile", with the objective of examining issues related to the political representation of indigenous peoples, based on the results from the UNDP report on Chile "Indigenous Representation in Legislative Powers: Lessons from the International Experience" and the work of the MIPP researcher, Alejandro Corvalán.

Collusion: Detection and Sanctions

Felipe Balmaceda
Department of Economics - Universidad Diego Portales

with the intention of increasing prices in an artificial way for the purpose of obtaining higher than usual profits is a widespread and recurring phenomenon in market economies. This article discusses the tools that authorities in charge have available in order to protect fair competition, and their interaction in achieving the main objective of detecting and punishing cartels.

The authorities entrusted with protecting free competition have at least three powerful tools at their disposition to do so. First of all, a leniency policy, which allows for the reduction of penalties for the companies that cooperate by alerting the authorities and providing useful evidence that satisfies the criminal standards of the corresponding legislation. Secondly, the existence of monetary and legal sanctions for those involved. Prison sentences are undoubtedly the main deterrent to collusion., but sadly, the only country in the world that has resorted to this option is the United States. In Chile, the latest reform to free competition law (Law No. 20,945) introduces jail sentencing and increases monetary sanctions. The new penalties impose a maximum limit of two times the realized profits due to the collusion, or 30% of sales. Internationally, this puts us at the frontier in terms of the severity and availability of tools for combating collusion. The third tool would be the ongoing economic research, which has proved to facilitate the detection and punishment of various cartels.

"Price collusion, or cartel formation, is a profitable strategy when implemented in a sustainable way, but it is not a tactic that can be carried out very easily."

Price collusion, or cartel formation, is a profitable strategy when implemented in a sustainable way, but it is not a tactic that can be carried out very easily. In most cases cartels have to solve three problems: coordination (of prices, quantities, and information), premium sustainability, and effective punishments to discourage cartel members from diverting from the already established agreements.

Successful cartels develop various mechanisms for sharing information, making the right decisions, and applying premiums and punishments befitting each circumstance (Levenstein & Suslow (2006) provide empirical evidence of the main determinants of a cartel's success in the world). These problems are dynamic in essence and require an exhaustive understanding of the cartel's price-fixing process and its implementation. This means that the implementation of these mechanisms is not trivial and that their monitoring has to be permanent and costly.

The agreed-upon strategies used to support a cartel are often not easily observable to the authorities, and quite frequently not even to the members of the cartel themselves. Since actual numbers are essentially unknown, we must often resort to economic models of imperfect competition in order to interpret the range of prices and quantities established by cartel agreements. As an example, Harrington and Chan (2006) show that under imperfect information, a pattern of stable or low inter-temporal variance prices is a signal of the potential existence of a collusive agreement. This result could help conclude that a series of prices with these characteristics has a high probability of coming from companies that adopt a collusive behaviour.

Antitrust Tribunals must prove the following two fundamental points when making a case for the existence of collusion: (i) the companies involved had to have been able to identify a market outcome that assures each cartel member greater profits than what they would have obtained had they not been cartelized; (ii) the companies would have to have been able to design a mechanism –hopefully a simple one, so as to facilitate coordination- that would have allowed them to implement the desired market outcomes. On one hand, this requires that cartel members have the ability to monitor, albeit imperfectly, the actions taken by the other member companies.

On the other hand, the mechanisms designed for the implementation of the collusive agreements ought to provide each member with the sufficient incentives to respect said agreements. The ability to monitor the agreements with some degree of success is necessary for ensuring that the cartel is able to apply sanctions (usually price wars) on those companies that choose to leave the collusion agreement, or that show some deviation from the collusive agreement, beyond the optimal responses of the different companies to demand and supply shocks.

"Since information is imperfect, it is highly probable that the existence of collusive agreements will result in price wars whose intensity and length will be partly determined by the profitability of the cartel, and whose frequency relies on the stochastic process of the different shocks."

Since information is imperfect, it is highly probable that the existence of collusive agreements will result in price wars whose intensity and length will be partly determined by the profitability of the cartel, and whose frequency relies on the stochastic process of the different shocks.

The majority of the dismantled cartels, and thus known to the public, use fixed production quotas or market shares as a fundamental collusion strategy. In this regard, a recent article by Harrington and Skrzypacz (2011) examines the existence of incentives within a cartel for companies to disclose the necessary information that makes it possible to monitor the strategies and price coordination of each cartel member. The authors show that, when quantities and prices are private information, a mechanism that is capable of implementing a collusive agreement, in which firms self-report their information, truthfully requires that the companies that produce more compensate those that produce less.

The intuition is as follows: first, reporting less than what is produced means providing less compensation to the other firms that produce less, and perhaps also receive some compensation from others that produce more. In addition, it also increases the probability of the collusion breaking down and entering a stage of price war. This is because the probability of rupturing the mechanism that keeps collusion in place increases the lower the total sales become. If this were not true, companies would never report their actual sales.

In light of this discussion, the following questions should be asked: Can economic models be used to detect collusion? Is the leniency system, together with monetary and criminal sanctions, capable of stopping collusive practices? Futile as it may sound, the answer to both questions is: it depends. Since providing an adequate answer to each of these questions would take several pages, and even than I am not sure that the answer would be fully satisfactory, I will confine myself to the following observations, and discuss them in the context of Chilean experiences with collusion.

"A leniency policy, although a powerful weapon, can be strategically used by companies to reduce their responsibility without major consequences for the efficiency of the markets."

In general, economic models do not have the ability to distinguish with certainty patterns of prices and quantities exclusive to collusive agreements, so they can only serve as a guide in the process of cartel detection and punishment methods. A leniency policy,

although a powerful weapon, can be strategically used by companies to reduce their responsibility without major consequences for the efficiency of the markets. This leniency system can be used in particular by cartels with "their days numbered" - cartels that would be disappearing in the short run due to their strategies becoming no longer sustainable, or those in the brink of being detected by the authorities.

In both cases, the leniency policy would be misallocating state resources towards cartels that are about to disappear by themselves, instead of using them to detect new cartels and those with long-run, self-sustaining strategies [see Harrington and Chang (2015) for a formal modelling of these incentives].

That being said, a leniency policy and economic research complement each other in the sense that good economic research leaves collusive firms vulnerable when faced with an eventual persecution, which creates incentives to confess. Likewise, a leniency policy favours the disclosure of information that can strengthen the case in court and helps to accurately calculate the damages incurred by the affected consumers. In other words, a leniency policy and the economic research can help each other in some ways, but can be damaging in others.

The Poultry Meat Case: Explicit collusion and the role of economic models

According to the information provided by the Chilean National Economic Prosecutor's Office (FNE in Spanish), the alleged collusion mechanism used by the poultry cartel was that of fixing production quotas (measured in kilograms). This mechanism seems to be simple in terms of what it implies regarding the conduct of each company.

Nevertheless, as mentioned above, this mechanism is difficult to implement unless it is accompanied by a fixing of prices consistent with the quotas that are to be implemented. If different firms fix different prices, the one that sets a lower price will attract a greater demand, which would result in producing more output than the established quota. In order to avoid this, the company in question would have to stop selling its products to the consumers who demand it. Therefore, although collusion is possible with the fixing of production quotas alone, in the absence of price coordination its efficacy is put into question.

Demonstrating the existence of price and compensation coordination is difficult at the very least. Guild associations are the institutions that facilitate the monitoring of collusive agreements. *In the case of the poultry meat in Chile, the Association of Poultry Producers (APA) may have played a fundamental role in setting the guidelines on the coordination of prices.*

In fact, the APA provided price and demand projections, which could have been used as focal points for achieving price coordination, which would have increased the cartel's effectiveness. What is more, the reports prepared by the APA were adding their projections and calculating their averages based on the historical sales data of companies affiliated with APA (as was exactly done in the carton cartel case in Europe, through a "secretarial company" based out of Zurich. The European Commission determined that its role was fundamental, in the judgement of the Court of First Instance, case T-337/94, May 14, 1998.) Using these numbers, in 2012, the APA suggested, through a private email to each of the three associated companies, the quantity of eggs that each company should produce in order to meet the APA's projections.

Given that the market had an obvious leader, Agrosuper, an alternative mechanism of coordination would have been that this company acted as a price leader, and set the prices for Ariztia and Don Pollo to follow, in addition to the production quotas already set in accordance with historical data. The evidence provided in court by the FNE was almost non-existent, perhaps due to the fact that Agrosuper acted through the APA. However, the evidence on the latter was also scarce, and it consisted only of emails that were intended at coordinating prices and quantities at the aggregate level. To complicate matters further, Agrosuper offered bulk discounts that were not made public, and their listed prices used to vary with a high frequency, which is probably what made it difficult to use their price lists as a focal point to achieve the price coordination necessary for an effective collusion.

Leniency was not used in this case; the prosecution was based instead on witness accounts and expert-based economic reports. In this example, the economic theory and corresponding econometric techniques were fully capable of providing sufficient evidence for a successful investigation as per the standards of the Antitrust Tribunal. The investigation concluded in a conviction of all of the poultry meat producers involved.

Pharmacies: Explicit collusion and the role of the leniency policy

The collusion of the Fasa (Ahumada), Cruz Verde, and Salcobrand pharmacies worked due to a coordination mechanism known as the "1-2-3 system". It consisted of an orchestrated increase in medication prices; with one of the companies being assigned the leadership role in initiating the price increases on day 1. The other two companies would do a terrain verification of the price increase, and on day 2, the second one would proceed to set the same prices; while the third company would wait until day 3 to follow suit. The three companies would decide together on how to assign the rotating 1, 2, 3 order within the scheme, as well as which drugs were to be affected.

As is suggested by economic theory, the sanctioning mechanism included price wars and consequent losses. In its document "*Request for indictment against the Ahumada SA, Cruz Verde S.A. And Salcobrand S.A. pharmacies*", the National Economic Prosecutor's office in Chile (Fiscalía Nacional Económica) informs that, during 2007, the three chains found themselves in the midst of a price war, complete with an aggressive advertizing campaign that spread through television and printed press alike. This price war culminated in August 2007, with Cruz Verde launching an advertising campaign, which presented a list that compared the prices between its chain and FASA for 685 high-rotation products. The publicity campaign brought a sharp fall in the profits of FASA, which responded with a legal claim against Cruz Verde on the basis of unfair competition, asking, among other measures, for a US$ 15 million compensation for the damages. In November of the same year, the judge ordered the withdrawal of the advertising campaign.

"...economic theory played a minor role in the pharmaceutical collusion case, not so much because the leniency policy was applied, but because at that point in time the Prosecutor`s Office lacked the technical knowledge to infer that price wars are a clear indication of the existence of collusion..."

Evidence from the National Economic Prosecutor's office shows that the collusion between the three pharmaceutical companies began right after the sanctions against Cruz Verde, with the intention of recuperating the profit losses that all parties involved had suffered during the price war.

The eventual conviction in the collusion case was made possible because FASA took advantage of the right to use the leniency policy; it confessed to participating in the collusive agreement and provided valuable information to establish the guilt of the other two pharmaceutical chains.

From my point of view, economic theory played a minor role in the pharmaceutical collusion case, not so much because the leniency policy was applied, but because at that point in time the Prosecutor`s Office lacked the technical knowledge to infer that price wars are a clear indication of the existence of collusion (for further information, refer to the well-known article of Green and Porter, 1984).

Gasoline Companies: Implicit collusion and its difficulties

The gasoline retail market case in Chile is perhaps the perfect example that displays the importance of the economic models and the leniency policy in detecting collusion. Every week, the National Petroleum Company (ENAP) suggests by how much should consumer prices increase, if companies were to transfer the entire value of cost shocks onto the consumers. Distributors use these weekly suggestions to adjust the gas prices accordingly. Empirical evidence shows that firms do follow this pattern, and their price-adjusting response time to an upward price suggestion is much faster than to a downward price one (see Balmaceda and Soruco, 2008).

An oligopolistic market without collusion would generate a price pattern very similar to the one mentioned above, given that it is still optimal for companies to adjust their prices according to the observed shocks; these adjustments would depend on the corresponding elasticities of demand (see Weyl and Fabinger, 2013). However, when companies decide to collude and use the ENAP announcement to coordinate their prices, the pricing pattern will also be similar to the aforementioned

scenario, although more asymmetrical in principle. Houde and Clark (2014) study the collapse of the collusion of the Quebecois gasoline retail market after an investigation launched by the Competition Bureau. The authors conclude that collusion holds two empirical regularities, namely high margins and asymmetric price adjustment (known as the *rockets and feathers effect*).

After the collapse, margins fell and the asymmetry declined, and the evidence points to asymmetry as an important feature of a collusive strategy. Collusion resulted in margins that were 50% higher than those obtained in regions where no collusion was present. Nonetheless, the observed price pattern alone is not able to guarantee the presence of collusion. A more decisive analysis needs to also include data on demand, costs, and margins. That being said, it is still striking that different companies in various parts of the city closely follow the ENAP suggestions.

The price adjustment recommendations announced by ENAP could indeed facilitate collusion, because for the price increase to be sustainable, a price coordination mechanism is needed, and ENAP provides an external mechanism to achieve price fixing without having the need for an explicit agreement between the gasoline companies. One way to address the detection problem would be to search for other evidence that could point to a possible collusion.

The case in question does include some evidence in favour of the presence of collusion, as the differences in price between the different geographical regions of Santiago cannot be justified by the estimated cost differences. At the same time, a collusion-free, oligopolistic model with price discrimination could also rationalize these price differences, but not the asymmetry in price adjustment. At first glance, the economic evidence and the economic model predictions are not conclusive in this case, but they do suggest the existence of implicit collusion - one that does not necessarily require a tacit agreement, but it is a natural outcome of business incentives.

This would be achievable due to the external mechanism for price coordination provided by ENAP. A leniency policy in chis case would not be helpful, since if collusion did indeed exist, it would be of the implicit form. The only tool left might be a thorough investigation so that conclusive evidence can be compiled. This course of action would be considered unlikely because, given the limited resources, funds for the investigation would need to be diverted from cases with a higher probability of being convicted.

Detecting and dismantling collusion, whether implicit or explicit, is difficult and requires a leniency policy, experts on the topic that are capable of carrying out the required studies, sufficiently hard penalties, and a proactive and energetic attitude from the authorities entrusted in protecting fair competition.

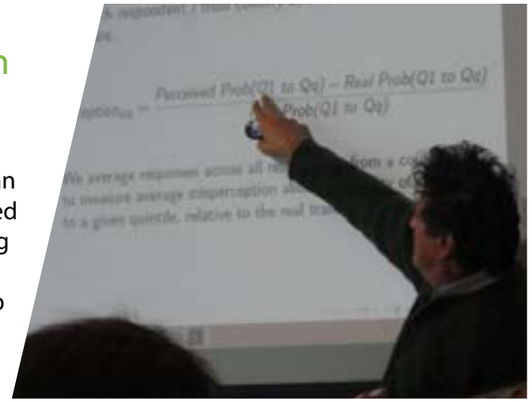
"Given the difficulties with detecting and dismantling implicit collusion, the best way to deal with this type of practice is to encourage antitrust authorities to penetrate existing market structures to detect those favourable to collusion."

Due to the high degree of concentration and the current strong laws that seek to disrupt collusion, domestic markets in Chile are ripe for the occurrence of tacit collusive agreements. Given the difficulties with detecting and dismantling implicit collusion, the best way to deal with this type of practice is to encourage antitrust authorities to penetrate existing market structures to detect those favourable to collusion. This would require a careful examination of the degree of vertical and horizontal market integration, the role of trade associations and professional colleges that fix suggested membership fees and limit one's free exercise of profession, the degree of market concentration when it is not justified by economies of scale or regulations, and the required standardization and information provided by the government..

Ariel Rubinstein Taught "Modeling Bounded Rationality: A First Lecture"

Renowned economist Ariel Rubinstein, an academic at the Faculty of Economics at Tel Aviv University and the University of New York, visited Chile to deliver a course - to a great turnout - entitled "Modelling Bounded Rationality: A First Lecture".
Rubinstein´s visit was achieved by the joined efforts of the Center for Applied Economics at the Department of Industrial Engineering, University of Chile and the Millennium Institute.

Alberto Alesina Presents at the Third Workshop on Political Economy and Political Sciences



Alberto Alesina, a distinguished Italian political economist who has published over 100 books and articles in leading economics journals, visited Chile in the framework of the Third Workshop on Political Economy and Political Science, organized by the MIPP Institute.
This activity brought together academics from all over the world to discuss new empirical and theoretical research on issues of Political Economy and Quantitative Problems of Political Science.

MA Scholarship 2016

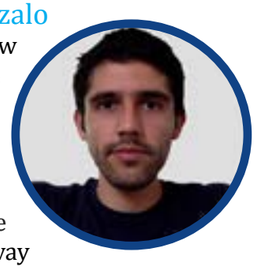
As part of its ongoing mandate, MIPP awards a yearly Master Thesis Scholarship for students who demonstrate a research interest in topics related to the research conducted by the Institute, and also secure the supervision and support of at least one of the scholars of the Institute. In 2016, there were five MIPP scholarships awarded to the following students and their research proposals:

Claudio Anabalón is a student of the Master in Applied Economics program at the Universidad de Chile. His thesis proposal, titled "Topics in Risk and Risk Aversion in the Healthcare Industry – Evidence of Advantageous Selection?" is one of MIPP 2016 Scholarship winners, and is supervised by Carlos Noton - MIPP academic and professor of Economics at U. de Chile. Through his research Anabalón hopes to establish the existence of the Advantageous Selection phenomenon in the Chilean Healthcare market. This would encourage policy makers to develop public policies that would allow for the regulation of one of Chile's most imperfect markets.

Maricel Vargas won this year's MIPP scholarship with her thesis proposal, "News in Dynamics Markets" supervised by Professor Alejandro Bernales, Universidad de Chile and MIPP researcher. Currently a MAGCEA student at the department of Industrial Engineering at the Universidad de Chile, Vargas researches whether the tone of media news affects investors, resulting in a measurable short-term effect on returns and volatility. Her work also aims at methodologically showing that media news messages, which convey a perception of stability, do indeed act as a catalyzer for the market to undertake increased risk transactions.

Pedro Concha and his thesis proposal, "The Effect of a Multi Market on the Liquidity of the Stock Market" is also a recipient of the 2016 MIPP scholarship award, with Professor Marcela Valenzuela (Universidad de Chile and MIPP researcher), acting as research supervisor. Concha aims at identifying and measuring how the consolidated liquidity of stocks is affected by market fragmentation. His research is expected to show that liquidity falls during unexpected market outages could be stronger for those stocks where there is greater evidence of cross-sectional arbitrage.

Martín Castillo, another winner of the 2016 MIPP scholarship, is focusing his research on a very important topic for the country's policy makers: the Education system. His thesis proposal, "Probabilistic School Admissions: Justice, Efficiency, and Incentives" will contribute to the existing theory on school assignment methods by evaluating the degree to which the probabilities assigned by these models are fair. Under the supervision of Professor Juan Escobar, Castillo's research will focus on the incentives parents are presented with, when they perceive that allocation mechanisms give them a lottery ticket over education institutions, instead of providing their children with a placement at one of them.



The most recent recipient of the 2016 MIPP Scholarship, Gonzalo Salazar, was awarded for his thesis proposal, titled "A new concept of Equilibrium in Networks: Stability under Status Quo and its Relationship to Network Efficiency", supervised by Professor Rahmi Ilkiliç - Universidad de Chile and MIPP researcher. Salazar is studying stability in the context of dynamic formation of social and economic networks – where economic agents themselves can evaluate and determine the value of their relationships within a network. This gives way to the status quo, a concept coined to refer to that initial moment in which individuals retain a point of reference when considering all possible improvements resulting from a new network.

Acceptance of proposals for the 2017 MIPP Scholarship awards will commence in May 2017. This year, a total of five Scholarships will go to the best-prepared students who, among other requirements, are in their last year of the Master in Applied Economics program (Universidad de Chile) or a similar Master's program. A summary of the requirements for last year's applications can be found on the institute's website.

Publications 2016

Felipe Balmaceda, Santiago Balseiro, José Correa, Nicolás Stier-Moses. Bounds on the welfare loss from moral hazard with limited liability. *Games and Economic Behavior*. 2016

Carlos Noton, Andrés Elberg. Are supermarkets squeezing small suppliers? Evidence from negotiated wholesale prices. *The Economic Journal.* 2016

Carlos Noton. Structural Estimation of Price Adjustment Costs in the European Car Market. *International Journal of Industrial Organization.* 2016

Marcela Valenzuela, Jon Danielsson, Kevin James and Illknur Zer. Model risk of risk models. *Journal of Financial Stability.* 2016

Jon Danielson, Kevin James, Marcela Valenzuela, Ilknur Zer. Can we prove a bank guilty of creating systemic risk? A minority report. *Journal of Money Credit and Banking*. 2016

Patricio Valenzuela. Rollover Risk and Credit Spreads: Evidence from International Corporate Bonds. *Review of Finance.* 2016

Eugenia Andreasen, Patricio Valenzuela. Financial openness, domestic financial development and credit ratings. *Finance Research Letters.* 2016.

Ethienne Lehmann, Paola Montero Ledezma, Bruno Van der Linden. Workforce location and equilibrium unemployment in a duocentric economy with matching frictions. *Journal of Urban Economics.* 2016

Alejandro Bernales, Thanos Verousis, Nikolaos Voukelatos. Do investors follow the herd in option markets? *Journal of Banking and Finance.* 2016

Patricio Valdivieso. Municipal Governance, Environmental Management and Disaster Risk Reduction in Chile. *Bulletin of Latin American Research.* 2016

Patricio Valdivieso, Gabriel Davidovics M. Enfoques y metodologías para la investigación empírica del capital social. *Colección de Gobierno y Asuntos Públicos, Universidad Central.* 2016

Florencia Torche, Alejandro Corvalan. Estimating Intergenerational Mobility With Grouped Data: A Critique of Clark's the Son Also Rises. *Sociological Methods & Research.* 2016

Andrés Inzunzaa, Rodrigo Morenob, Alejandro Bernales, Hugh Rudnicka. CVaR constrained planning of renewable generation with consideration of system inertial response, reserve services and demand participation. *Energy Economics.* 2016

Franklin Allen, Elena Carletti, Robert Cull, Jun Qian, Lemma Senbet, Patricio Valenzuela. Resolving the African Financial Development Gap: Cross-Country Comparisons and a Within-Country Study of Kenya. *NBER Volume on African Economic Successes.* 2016

Felipe Balmaceda. Optimal task assignments. *Games and Economic Behavior.* 2016

Alejandro Corvalan, Emerson Melo, Robert Sherman, Matt Shum. Bounding Causal Effects in Ecological Inference Problems. *Political Science Research and Methods.* 2016

Publications 2015

Alejandro Bernales, Massimo Guidolin. Learning to Smile: Can Rational Learning Explain Predictable Dynamics in the Implied Volatility Surface? *Journal of Financial Markets.* 2015

Alejandro Corvalán, Miguel Vargas. Segregation and Conflict: An Empirical Analysis. *Journal of Development Economics.* 2015

Elton Dusha. Intermediated Corruption. *International Economic Review*. 2015

Gastón Llanes, Ramón Casadesus-Masanell. Investment Incentives in Open-Source and Proprietary Two-Sided Platforms. *Journal of Economics & Management Strategy.* 2015

Daniel McFadden, Carlos Noton, Pau Olivella. Minimum Coverage Regulation in Insurance Markets. *Journal of the Spanish Economic Association.* 2015

Piotr Fryzlewicz, Marcela Valenzuela, Thorsten Rheinländer, Ilknur Zer. Relative Liquidity and Future Volatility. *Journal of Financial Markets.* 2015

Eugenia Andreasen, Patricio Valenzuela. Financial Openness, Domestic Financial Development and Credit Ratings. *Finance Research Letters.* 2015

Carlos Pérez, Carlos Ponce. Disruption Costs, Learning by Doing, and Technology Adoption. *International Journal of Industrial Organization*. 2015

Joaquín Poblete. Profit Sharing and Market Structure. *International Journal of Industrial Organization.* 2015

Francisco Ganga, Antonio Leal, María Ramos, Patricio Valdivieso. Teoría de agencia (TA): supuestos teóricos aplicables a la gestión universitaria. *Revista Innovar.* 2015

Rahmi ˙Ilkılıc, C¸agatay Kayı. Allocation Rules on Networks. *Social Choice and Welfare.* 2015

Francisco Ganga Contreras, Patricio Valdivieso. Rol del Estado frente al tema de la cárcel y los derechos humanos como construcciones culturales. *POLIS.* 2015

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Source: Department of Industrial Engineering, U of Chile

Millennium Institute for Market Imperfections & Public Policy

Avenida República 779, Santiago - Chile
Department of Industrial Engineering
Faculty of Physical Sciences and Mathematics

+56 2 978 0556
info@mipp.cl
www.mipp.cl
@info_mipp