

Transparency and Gender: The Impact of Electronic Purchasing on Access to Public Bidding by Women-led Small and Medium-sized Enterprises

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Transparency and Gender: The Impact of Electronic Purchasing on Access to Public Bidding by Women-led Small and Medium-sized Enterprises

Gastón Pierri * Maria José Jarquín** Roberto de Michele***

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Abstract

In recent years, initiatives to use digital government in public bidding have become increasingly popular among public policy officials, given the gains it produces in efficiency and transparency. However, these initiatives can also have indirect effects on other variables. This document presents evidence on the impact of the COMPR.AR electronic purchasing platform on the participation of women entrepreneurs in public bidding in Argentina. The results show that, depending on the estimation model used, COMPR.AR increased the probability that a bid will be awarded to a woman-led business by between 2.48 and 4.22 percent. This study contributes to the literature specialized in generating causal evidence on how digital government reforms can have a considerable effect in promoting the participation of women in public purchasing ¹

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Introduction

In recent years, the increasing access to data and statistics differentiated by gender has shown that gender gaps persist in many areas. Although women represent nearly half the world's working-age population, only 50 percent of them participate in the labor force, compared to 80 percent of men. The participation of women in the labor force is not only very low, but women are also employed disproportionately in the informal sector, especially in developing economies. This is because employers there are subject to less regulation, which contributes to workers receiving lower salaries and being more vulnerable to the loss of employment (FMI, 2019). In addition, few women head businesses, and when they do, their businesses are small and they have less access to large public contracts. (Banco Mundial, 2010).

In this context, the design of appropriate public policies can contribute to overcoming the limitations originating in conformity with the gender role and with personal preferences shaped by those limitations, all of which affects the participation of women in the labor force. For its part, public contracting is a fundamental element of the activities of the State and represents a significant market. Public purchases constitute a large opportunity for governments to promote labor participation of women, in this way reducing the gender gap.

Public contracting can promote equality in different ways (Sarter, 2019). In the context of persistent segregation of the labor market, public officials can include stipulations about the inclusion of women in the labor force in sectors dominated by men with the aim of creating employment and training opportunities for women (Conley & Wright, 2015; Wright, 2015; Wright & Conley, 2018). In addition, public contracting can address these inequalities by integrating a gender perspective in service delivery itself (Callerstig, 2014).

In 2014, expenditure on public contracting in Latin America and the Caribbean reached 7.7 of world GDP. This means that, in terms of total public expenditure, this contracting represents a range from 16.7 percent in countries such as Jamaica up to 50.2 percent in Peru. The barriers to the participation of women in the economy - lack of financial capital, deficiencies in human capital, difficulties in the development of social capital, and greater caregiving and family responsibilities - result in the current participation of women in public purchasing being very low. In Chile, for example, women-owned businesses represent only 3 of every 10 providers to the State. In addition, they are smaller, have fewer years of experience, and have lower turnover levels (Comunidad Mujer, 2019).

Within this framework, over the past decade many Latin American countries have promoted institutional reforms aimed at strengthening and digitizing their public contracting processes. These reforms have generated many improvements in terms of reducing the times associated with public contracting processes, facilitating transparent access to information about those processes, simplifying the processes of presenting offers, and allowing for those offer to be presented digitally, among other changes. Likewise, the democratization of access to public offerings has had an indirect positive effect: the participation of a large number of firms led by women in public procurement.

Considering the constraints faced by women, it is hoped that these platforms have a differential impact on women-led businesses and promote their participation in public purchasing. Most of these reforms allow bidders to easily enter into purchasing processes and prepare their offers in less time. These reforms have succeeded in significantly reducing two of the most notorious constraints: time available and access to information.

Based on this hypothesis, the analysis of the introduction of COMPR.AR, an electronic platform for public purchasing in Argentina, is undertaken with the aim of evaluating its impact on the gender gap in that specific sector. COMPR.AR was implemented in 2015 to improve the efficiency and transparency of public contracting, moving from a paper-based format to one that allows for managing the process from the call until the purchase order digitally.

This study estimates the impact of the COMPR.AR platform on the probability that a business whose legal status has at least one woman as a representative wins a public bidding process in Argentina. In addition to this variable, a more rigorous substitute gender variable will be considered: only those firms in which half or more of representatives are women will be considered. It is hoped that the study constitutes an important contribution to the literature by generating causal evidence on the effect of digital government and transparency reforms on the participation of women in public contracting.

This document is divided into six sections in addition to this Introduction. The first section reviews the literature on the importance of including a gender perspective in public purchasing. The second provides context and describes the introduction of the COMPR.AR electronic purchasing platform in Argentina. The third section describes the sources and data used, while the fourth presents the methodology and identification strategy for the analysis. The fifth section presents the results, and the sixth and final section puts forth the conclusions from the study.

1 Literature Review

1.1 Importance of Gender in Public Purchases

Public contracting is an important dimension of international trade. The size of the procurement market, which represents at least between 10 and 15 percent of GDP in developed countries and could represent between 30 and 40 percent of GDP in developing countries, is thus an important factor of economic activity (FMI, 2019). Given the size of government expenditure, public contracting has the potential to be a useful public policy tool for the socioeconomic growth and transformation of a country. Therefore, public purchasing is increasingly recognized as a vehicle to help governments reach social objectives and sustainable economic development.

For example, in member countries of the Organization for Economic Co-operation and Development (OECD), public contracting policy has been used to empower populations previously deprived of their rights and in that way advance towards the objective of sustainable and equitable development. In this way, public contracting programs impose additional conditions on government contractors in order to raise environment and/or social standards.

Along these lines of research, Twizeyimana and Andersson (2019) review the literature on the impact of digital government initiatives on inclusion and conclude that they have positive effects, mainly in the following areas: capacity for open government (public participation, good information, exchange of databases, skills, and resources), ethical and professional behavior, confidence in the public sector, and social value and well-being.

To the previous list is added the strengthening of women's rights, given that unblocking public contracting for women-owned businesses constitutes an optimal path to use trade as a vehicle to improve the benefits of their economic development (Banco Mundial, 2019).

Taking gender into account is an important part of public contracting policy, given that it can

guarantee equitable access and provide benefits by diversifying the supply chain in a way that includes women. Increasing opportunities for more women to participate as economic agents in the supply of goods and services – particularly in the small and medium-sized enterprise (SME) sector, where a disproportionate number of women-owned businesses operate [Kirton \(2012\)](#)– can lead to obtaining better results in alleviating poverty and increasing gender equality.

Although countries are increasingly making greater efforts to include gender policies in public contracting, little evidence exists regarding its causal effects. This report aims to close that gap in the literature by providing causal evidences of the effects of an electronic public purchasing platform on the participation of women entrepreneurs

This study is related to several others that document the benefits of the participation of women in public purchasing and in trade more generally. An initial branch of research on these topics focuses on the potential of public contracting to promote learning about gender policies among the businesses themselves. Through an exploratory study, [Sarter and Thomson \(2020\)](#) examine the impact of including equality considerations in public contracting on the behavior of the businesses. The authors show that the businesses involved in these transactions had greater probability of adopting equality measures. Likewise, [Callerstig \(2014\)](#) affirms that public contracting serves as an instrument for learning about public policies with a gender perspective.

Another branch of the literature addresses how the use of technology in public purchasing can have positive effects on the participation of women. According to this line of research, a common complaint among women-owned businesses is that they do not know about or do not know how to access opportunities for public purchasing. To deal with this problem, many countries have established web portals or electronic platforms where they publish their public requests or bids. According to [ITC \(2014\)](#), by expanding the availability of the information, the electronic platforms increase transparency and reduce the probability that there will be conflicts of interest and corruption, a phenomenon that negatively affects all women-owned businesses. This coincides with the new international best practices recommended by organization such as the World Trade Organization (WTO). The WTO and related institutions promote the use of electronic media in public contracting and urge government entities to carry it out transparently and impartially in order to avoid conflicts of interest and prevent corrupt practices.

This is very important in the case of women-led businesses, given that they usually have limited access to networks of contacts – family, friends, and community institutions – that are important to develop a business ([BID, 2014](#)), such as by winning bids under the status quo arrangement. Taking into account that most government and business leadership positions are held by men, women’s connections with the business culture are often limited, which can limit the development of their businesses.

Consistent with the discussion above, there is evidence that women are less tolerant of corruption in a democratic context. For example, [Swamy, Knack, Lee, and Azfar \(2001\)](#) show that women disapprove more of corruption than men where democratic institutions condemn it, although the same gender gaps exist where corruption is accepted as a social norm.

This is relevant because women face significant difficulties in accessing the formal financial system and financing due primarily to lacking guarantees, the wage gap, and restrictions on land ownership. According to data from the [\(2017\)](#), men are between 3 and 6 percent more likely than women to seek loans and to save for business purposes. Likewise, in emerging markets across the world, only 7 percent of private capital and risk capital funds are directed to women ([IFC, 2019](#)). To these facts are added the gender biases that permeate the practices and products of financial institutions which are generally not adapted to the needs and char-

acteristics of women entrepreneurs (Azar, Lara, & Mejia, 2018; ONU Mujeres, UN, & CEPAL, 2020; Roa & Carvallo, 2018).

Most of the evidence on the participation of women in public purchasing is not of a causal nature. The most critical challenge is the absence of programs based on rigorous gender analysis. In many cases, there are data to conduct follow-up on who is using digital government platforms, but no analysis is conducted to track the differences by gender. To understand the usage patterns, it would help to reallocate resources more equitably. Toward this end, the present study provides robust evidence about the effect of public purchasing policies, especially electronic platforms, on the participation of women-led businesses in government bidding and services.

2 Context and Data on the COMPR.AR Platform

2.1 Context

Until 2015, the public purchasing system in Argentina had major inefficiencies. Rather than being an exception, this situation represented the reality in many countries in Latin America and the Caribbean. For example, in 2015 only four countries in the region had a platform that allowed for electronic management after the contract was in place, that is, that included among its functions contract management, payment orders, and payments (OECD-IDB, 2015). In the case of Argentina, this could be explained mainly by two factors: (i) inefficiencies in the public purchasing process, and (ii) lack of public information and transparency.

With regard to the inefficiencies in Argentina's public purchasing system, one indicator is the average time between the opening and the awarding of the bid ([Sindicatura General de la Nación, 2016](#)). Likewise, prior to the modernization of the system, public purchasing was managed through a paper-based system, while the presentation of offers and the opening of bids were done in person. These more complicated processes can not only cause delays in service delivery, they can also have financial costs. The duration of the steps involved in public purchasing take on particular relevance, especially in countries with high inflation and high financing costs, as is the case of Argentina. Specifically, between 2016 and 2019, relevant interest rates in Argentina fluctuated between 26 and 68 percent, while the inflation rate often rose above 50 percent inter-annually. Therefore, processes with delays of more than 90 days imposed financial costs higher than 12 percent on providers. These costs put upward pressure on the prices that the State paid for the goods purchased, causing possible losses in the procurement process.

With regard to the lack of information and transparency, up until 2015 less than 50 percent of the purchases of the National Public Administration (*Administración Pública Nacional - APN*) were published on the web ([Sindicatura General de la Nación, 2016](#)). Thus, both the high costs faced by businesses in public purchasing processes, as well as the lack of information about them, resulted in a low turnout of businesses for bidding processes and constituted a barrier to the participation of women-led businesses in public purchasing.

Because of these inefficiencies, and with the aim of improving the efficiency and transparency of public purchasing, in 2016 the Government of Argentina, through Regulation 65/2016 and with the support of the IDB, developed and implemented an electronic purchasing platform called COMPR.AR. The platform was established as the means to electronically carry out all of the procedures proscribed in the regulation of the contracting regimen of the National Administration. Implementation was gradual and based on a timetable, which facilitated the causal

study of the platform.

[De Michele and Pierri \(2020\)](#) evaluated the causal effects of implementation of COMPR.AR on the transparency and efficiency of public purchasing processes. The authors found that COMPR.AR increased transparency by increasing the number of offerors in public contracting events, and that it produced improvements in internal efficiency, in particular by reducing the public purchasing process by 11 days and reducing the price for similar products by 4 percent.².

According to the findings of [De Michele and Pierri \(2020\)](#), the COMPR.AR platform also facilitated more equal access to bidding on public purchasing, which became more transparent by limiting the discretionality of officials when they introduced changes in the selection mechanism for providers and in the contracting modalities. The portal has forms that homogenize the evaluation of bids, without jeopardizing the prerogatives vested in the commission in charge of the bids in order to solicit complementary information, provided that this does not affect the principle of equality. In this way, COMPR.AR reduces the possibility of discrimination against women-led businesses in public purchasing. Therefore, greater transparency of the processes can be related to the probability that women-led businesses participate in a greater number of bidding processes and win more contracts.

2.2 Data

In order to conduct the study, four databases were used. First, details on contracts conducted by the different APN entities before and after implementation of COMPR.AR were examined. This involved using data from the National Budget Office of the Ministry of Finance and the National Contracting Office. The database developed has information on more than 120,000 contract awards carried out by the Central Administration for the procurement of goods for use and consumption from 2015 until August 2019. In this way, it was possible to obtain information about prices paid, items acquired, quantities, and awarded businesses for each one of the contracts carried out.

Second, a database was used that was created by the General Inspection of Justice (*Inspección General de Justicia* - IGJ). This are records all of the companies (+200,000) registered in the City of Buenos Aires. Although it only has information for one district, it should be noted that the companies registered with the IGJ account for 60 percent of all companies awarded national contracts during the period analyzed. Therefore, it constitutes a representative sample for the purposes of this study.

The database contains the name, sex, and addresses of the authorities of all the registered companies. Here, the term “authority” refers to the representatives of the legal entity, that is, the president or managing partner (according to the type of company) selected by the Board and determined by the company’s statutes. This person in practice is usually the owner of the business or an appropriately representative person, not the legal representative. Therefore, this element can be considered as a good substitute variable to determine whether the business is led by a man or a woman.

Finally, the SME registry of Argentina’s Ministry of Production was used. More than 500,000 SMEs from across the country are listed in this registry. The condition of the SME is verified both by the ministry – based on information presented by the company – as well as by the

²For more information on the impact of the COMPR.AR platform on the efficiency and transparency of public purchasing, see [De Michele and Pierri \(2020\)](#) and their corresponding blog Evidence-based Procurement in the Times of a Pandemic: Lessons from Argentina

Federal Public Revenue Administration (*Administración Federal de Ingresos Públicos - AFIP*). In this way it was possible to identify not only the gender of the persons leading the company but also the size of the company.

3 Descriptive Analysis

This section provides a detailed descriptive analysis of the information and variables of interest for this study. The information comes from the different administrative databases mentioned previously.

Figure 1 shows the quantity of public purchases by year in the sample. It can be seen that most of the purchases are concentrated in recent years. Starting in 2017, COMPR.AR was gradually introduced in public entities, which is why a notable increase in the quantity of annual purchases can be observed in 2018.

Figure 1. Purchases by Year

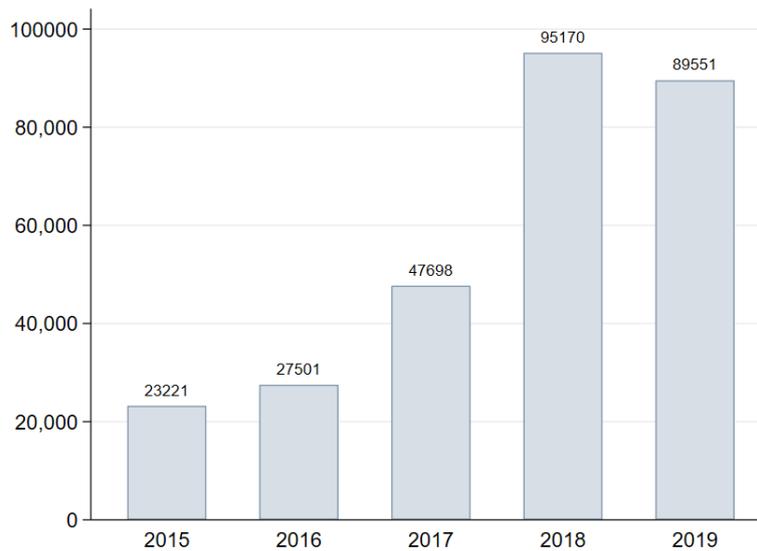
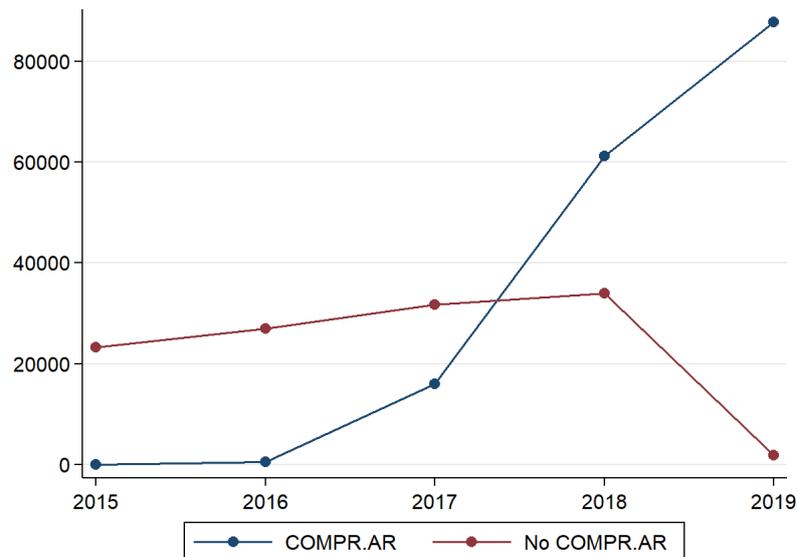


Figure 2 shows public purchases depending on whether or not they were carried out on the COMPR.AR platform. The gradual implementation of COMPR.AR is observed, which provides the analysis with an important temporal variability. Starting in 2017, a greater predominance of public purchases through COMPR.AR can be observed.

Figure 2. Purchases by Year and With and Without COMPR.AR



With respect to the gender of the representatives of the businesses winning awards during the period analyzed, Table 1 shows the distribution of the representatives according to that variable. In this study, the analysis is conducted using two definitions of gender. The first (general definition) considers businesses with at least one woman as a main authority (Table 1), while the second (rigorous definition) considers those businesses where 50 percent or more of the main authorities are women (Table 2).

Table 1. Distribution of Awards by Gender (At Least One Woman)

Business	Total Number	Percentage
With at least one woman authority	74,609	59.77%
Without any women authorities	50,223	40.23%
Total	124,832	100.00%

Source: Prepared by the authors.

When the primary definition is considered, the sample is much larger, as 59.77 percent of the awards correspond to businesses where at least one of the authorities is a woman. However, when the second definition is considered, the sample is much smaller: only 20.28 percent of the awards involved businesses with 50 percent or more women in positions of authority, as observed in Table 2.

Table 2. Distribution of Awards by Gender (50 Percent or More Women)

Business	Total Number	Percentage
Without any women authorities	50,223	40.23%
With less than 50 percent women authorities	49,298	39.49%
With 50 percent or more women authorities	25,311	20.28%
Total	124,832	100.00%

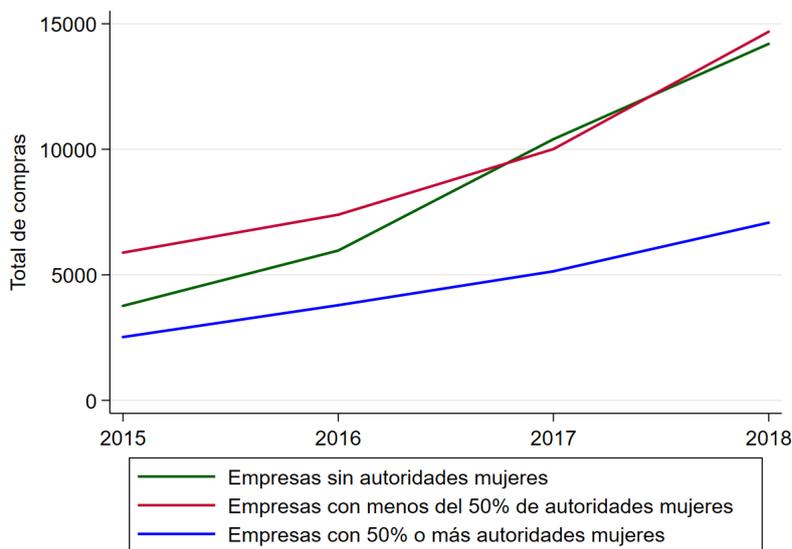
Source: Prepared by the authors.

In quantifying these descriptive data, it is observed that there is a participation gap for businesses mainly led by women of 79.72 percent in public awards. This indicates that the dimension of the problem is worrisome and therefore must be addressed.

Figure 3 shows trends in purchases by year and according to the gender variables used in this study, which are disaggregated by businesses with less or more than 50 percent of authorities being women authorities (or without women). It is observed that, during the period of analysis, a larger number of purchases were awarded to women-led businesses, according to the more general definition. The figure shows the parallel trends prior to implementation of the COMPR.AR.

If the more rigorous definition of gender is employed, it is observed that businesses with more than 50 percent of authorities being women received fewer awards. Businesses with less than 50 percent of authorities being women exhibited behavior similar to that of businesses **without** women in positions of authority. However, in all cases a positive trend is observed in the increase in annual public purchases.

Figure 3. Purchases by Year and Gender



Given that the three previous figures contain total award statistics with and without COMPR.AR, Tables 3 and 4 present the analysis separated by condition.

Table 3 shows the distribution of awards by gender without using COMPR.AR, that is, with nondigital methods. It is observed that in 2015, the largest number of awards went to businesses without women in positions of authority. It also shows that this trend has continued

throughout the entire period, and has even increased slightly year after year. Thus, it shows a reduction in awards to businesses with 50 percent or more women in positions of authority through traditional modalities (without COMPR.AR). This analysis highlights that these modalities can generate gender gaps, since they largely foster the participation of businesses with a majority of women in positions of authority.

Table 3. Percentage of Awards by Gender Without COMPR.AR (percent)

Year	With 50 percent or More Women in Positions of Authority	The Rest
2015	20.72%	79.28%
2016	22.10%	77.90%
2017	20.04%	79.96%
2018	19.74%	80.26%
2019	19.29%	80.71%
Total	20.28%	79.72%

Source: Prepared by the authors.

Table 4 shows the distribution of awards by gender through COMPR.AR. Given that it deals with a shorter period of analysis, no clear trends are observed. However, in comparing that distribution with the awards not made through COMPR.AR (Table 3), it is observed that the percentage of businesses with a majority of authorities who are women is higher with COMPR.AR starting when it was introduced. For example, in 2017, 23.45 percent of the awards made through COMPR.AR corresponded to businesses with more than 50 percent of women in positions of authority, while awards made without this digital mechanism accounted for only 20.04 percent, that is, a gap of 3.41 percent. In 2018, awards with COMPR.AR to businesses with a majority of women being authorities represented 19.57 percent versus 19.74 percent made using traditional methods, a minimal difference. For 2019, a gap is again observed, this time a gap of 1.42 percent between awards made through COMPR.AR and awards made through traditional methods.

On average, between 2017 and 2019, 20.28 percent of awards through COMPR.AR corresponded to businesses with a majority of women in positions of authority, while that figure for awards not using that mechanism was 19.69 percent. Although the differences are not particularly large, they do suggest that awards made through COMPR.AR favor a larger number of women-led businesses.

Table 4. Percentage of Awards by Gender with COMPR.AR (percent)

Year	With 50 percent or More Women in Positions of Authority	The Rest
2017	23.45%	76.55%
2018	19.57%	80.43%
2019	20.71%	79.29%
Total	20.28%	79.72%

Source: Prepared by the authors.

On the other hand, it is interesting to observe the distribution by gender and by size of the businesses that won at least one public bidding process. To measure the size of the business,

the SME category based on its billing is used.³ Table 5 shows this distribution using the rigorous definition of gender (businesses with 50 percent or more women in positions of authority). It can be seen that women-led businesses that win bids usually are smaller on average than men-led businesses. Men-led businesses have greater participation in larger billing categories (Track 1, Track 2, and large businesses), which coincides with the findings at the national and international levels indicating that women-led businesses are usually smaller (Banco Mundial, 2010).

Table 5. Size of Winning Businesses by Gender(Rigorous Definition)(percent)

Category	With 50 percent or More Women Leaders	The Rest
Micro	23.04%	16.72%
Small	47.49%	30.36%
Track 1	17.51%	21.54%
Track 2	0.04%	0.88%
Large/Not Registered	11.93%	30.50%
Total	100.00%	100.00%

Source: Prepared by the authors.

In this context, it is interesting to see how the percentage of awards is distributed among SMEs with and without COMPR.AR (Table 6). The analysis shows that 67.08 percent of awards made without COMPR.AR correspond to SMEs, while this share increases to 71.46 percent for awards made with COMPR.AR. This result shows that through COMPR.AR, more smaller firms are included, as they end up winning a larger number of bids.

Table 6. Awards to Small and Medium-sized Enterprises with and Without COMPR.AR (percent)

Category	Without COMPR.AR	With COMPR.AR	Total
SMEs	32.92%	28.54%	31.92%
Not SMEs	67.08%	71.46%	68.08%
Total	100.00%	100.00%	100,00%

Source: Prepared by the authors

Note: SMEs: small and medium-sized enterprises.

Figure 4 shows the most common products procured through public purchasing processes. It can be seen that the most predominant products are parts and accessories, office supplies, electronic supplies and materials, and pharmaceutical and medical products, among others.

³For more information, see <https://www.argentina.gob.ar/noticias/nuevas-categorias-para-ser-pyme>

Figure 4. Purchases by Product

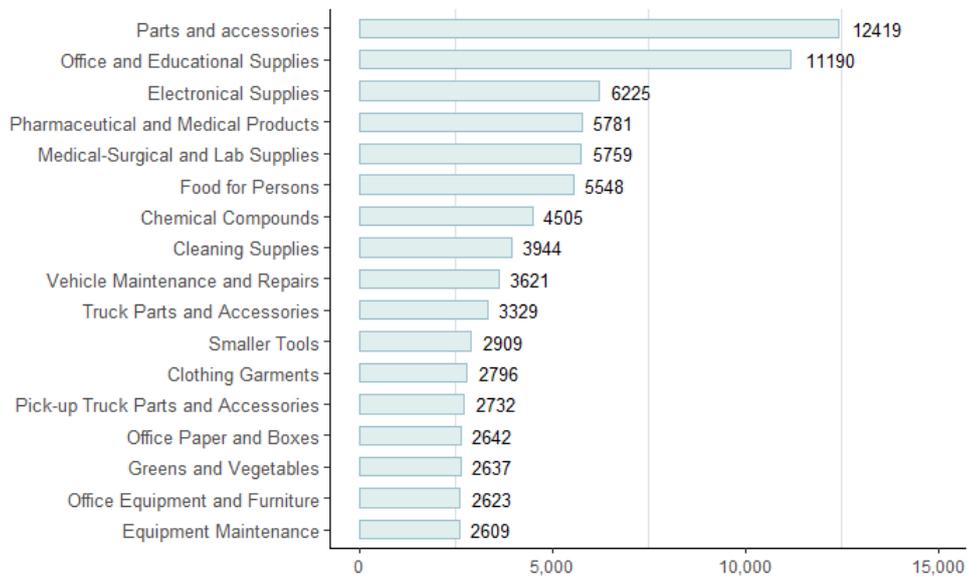


Table 7 shows the distribution of sectors where firms win, by gender (rigorous definition). It can be seen that the categories where women-led businesses win are different than those won by men-led businesses. The former usually have greater participation in the sale of bookstore products, cleaning services, and certain food products. In contrast, men-led businesses have greater participation in more masculine sectors such as automobile repairs, technical assistance services, and the sale and repair of machinery equipment, among others.

However, these differences do not have an impact on the results of the study. For them to have an impact, it would be necessary for the structure of public purchasing to have changed (for example, that bookstore purchases would have increased as a share of total purchases) at the same time as when the platform was implemented in each entity.

Table 7. Categories of Products Most Sold according to Heads of Businesses, by Gender

Position	Headed by Women	Headed by Men
1	Markers	Automobile repairs
2	Cleaning of buildings	Technical assistance
3	Reagents p/Equipment	Printing services
4	Folders	Books
5	Highlighters	Reagents p/Equipment
6	Sodas	Tires
7	Ball bearings	Lodging services
8	Papers envelopes	Printer cartridges
9	Books	Truck repairs and accessories
10	Alcoholic drinks	Greens and vegetables
11	Automobile repairs and accessories	Construction equipment repairs and accessories
12	Paper binding	Grader repairs and accessories
13	Pens	Paint
14	Potable water	Telephone service framework agreement
15	Clips p/staplers	Reagents p/laboratory technical manual
16	Services to recharge fire extinguishers	Automobile insurance
17	Meats	Cleaners
18	Adhesive tapes	Filters
19	Textile cleaning services	S. de ceremonial
20	Reagents p/laboratory technical manual	Color cartridges
21	Cheeses	Machine tool repairs and accessories

Source: Prepared by the authors.

4 Methodology

In order to make a causal estimate of the effect of the COMPR.AR platform on the variables of interest, the event study methodology was used, a variant of the difference-in-differences estimator. Implementation of the COMPR.AR platform was carried out gradually, which allows for observing important spatial and temporal variability. The first entities started to use COMPR.AR in July 2016. By the middle of 2019, almost all of the National Public Administration was using it for their purchases.

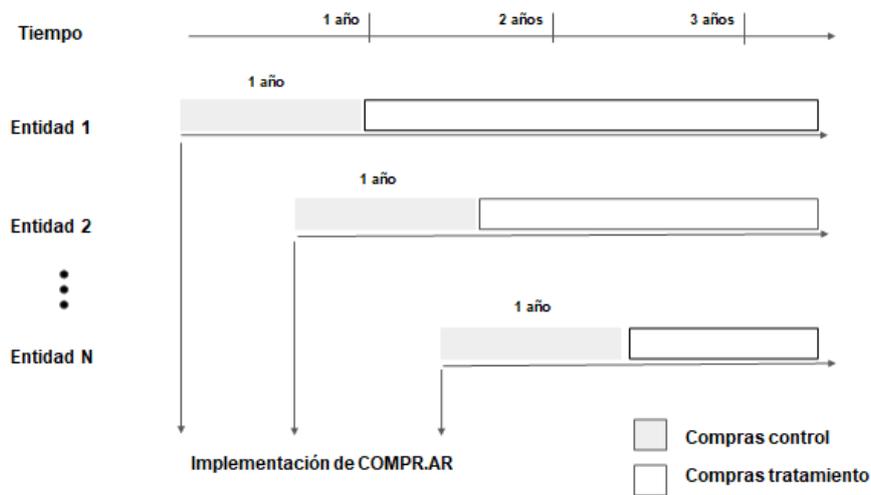
The validity of the approach employed requires that the dates when the platform was implemented in each entity be exogenous to other trends that can affect the treatment and control groups in different ways. Complying with this assumption means controlling for the idiosyncratic differences of the organizations that do not vary over time and for events that have affected both the treatment as well as the control groups.

First, the portal was implemented in the ministries where the largest proportion of public expenditure is concentrated. Up until the second semester of 2018 only the most complex entities were incorporated, that is, institutions each having more than 20 Operational Contracting Units (*Unidades Operativas de Contrataciones* - UOCs) because of their decentralized nature. As of November 2019, the system had already been implemented in 123 entities of the APN that

group together more than 360 executing agencies. This represents 92 percent of the entities of the Administración Pública Nacional.

As shown in Figure 5, the treatment group is comprised of all public purchasing lines carried out through the COMPR.AR platform. For its part, the control group is made up of the purchases carried out by those entities that, on a given date, were not using the platform but rather using paper-based systems accompanied by the SLU payment system. The groups will be modified over time as the entities are required to become part of COMPR.AR and have been using the platform for one year. At the start of the period analyzed, all of the purchases are part of the control group. At the end, all of the purchases carried out by the entities are part of the treatment group.

Figure 5. Control Group and Treatment Group



Given that this involves a probability, the estimation will be carried out both by a linear probability model as well as with a probit model. Taking into account the aspects mentioned above, the following equations are estimated:

$$Pr \left(Genero_{ijt} = \frac{1}{Z} \right) = \omega + \beta \times COMPR.AR_{ijt} + \varphi MiPyMe_{ijt} + \lambda X_{ijt} + v_t + \epsilon_{ijt} \quad (1)$$

$$Pr \left(Genero_{ijt} = \frac{1}{Z} \right) = \Phi(\omega + \beta \times COMPR.AR_i + \varphi MiPyMe_j + \lambda X_i + v_t + \epsilon_{ijt}), \quad (2)$$

where *Género* is a fictitious variable or dummy that takes a value of 1 if at least one of the company authorities is a woman; *COMPR.AR* is a fictitious variable that takes a value of 1 if the purchase was made through COMPR.AR; *MiPyMe* is a fictitious variable that takes a value of 1 if the business was registered as a micro, small or medium-sized enterprise; *X* is a vector with control variables of each purchase; v_t is a control fixed by time effects; ϵ is the error term; and Φ is the normal accumulated density function. Meanwhile, the subindex *i* denotes the different lines of public purchases. The errors are calculated in a robust manner.

In order to more rigorously evaluate the analysis, a more limited definition of the *Género* variable

is considered, where it is a fictitious variable that takes a value of 1 if 50 percent or more of the company authorities are women. Here this additional definition is considered because this variable could reflect better that the management of the business is determined by the decisions of the female representation.

5 Results

As seen in Table 8, the COMPR.AR platform had a significant effect in increasing the probability that public contracting was awarded to a company with at least one woman authority.

The estimation was carried out by MCO, probit, and logit models, with robust and similar results obtained with the three methodologies. The MCO estimation was that the platform increased the probability that a purchase be awarded to a woman-owned business by 2.48 percent. In the case of the probit and logit models, given that the marginal effects are not constant, the effects were estimated using the sample means. With these two estimations it could be concluded that the platform increased the probability that an average purchase be awarded to a business with at least one woman as an authority by 4.22 percent and 4.12 percent, respectively.

In turn, the importance of the SME variable is observed in the probability that a business is led by a woman. This coincides with a study carried out in the country by the ILO and UN Women (2019), which shows a trend indicating that the larger the firm, the less likely it is to be headed by a woman. In this sense, one hypothesis of the transmission effect of the COMPR.AR platform on the participation of women is through the increase in the participation of SMEs – usually headed by women – in bidding. This hypothesis will be tested later. Regardless of that, the importance of the electronic platform for public purchases is twofold: it promotes the participation of women-led businesses and of smaller businesses, which has positive effects on diversity and inclusion in public purchasing.

Table 8: The Effects of COMPR.AR on Women Entrepreneurs

Variables	(1) MCO	(2) Probit	(3) Logit
Price (Log)	-0.0256*** (0.000586)	-0.00193 (0.00281)	-0.000803 (0.00464)
COMPR.AR	0.0248*** (0.00261)	0.118*** (0.0129)	0.189*** (0.0211)
Quantity	-2.72e-09*** (6.99e-10)	-5.68e-10 (3.89e-09)	-1.31e-10 (6.38e-09)
SME	0.120*** (0.00169)	0.346*** (0.00866)	0.573*** (0.0142)
2015	0.0235*** (0.00334)	0.404*** (0.0191)	0.662*** (0.0315)
2016	-	0.189*** (0.0174)	0.308*** (0.0286)
2017	-0.0164*** (0.00275)	0.0752*** (0.0155)	0.117*** (0.0252)
2018	-0.0286*** (0.00290)	0.0648*** (0.0120)	0.100*** (0.0196)
2019	-0.0258*** (0.00342)		
Constant	0.262*** (0.0523)	0.213 (0.349)	0.319 (0.574)
Observations	124,317	124,281	124,281
R^2	0.101	0.0735	0.0737

Note: Robust standard error is parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Note: SME: small and medium-sized enterprise.

The analysis is repeated below, this time defining the variable Género as businesses with at least 50 percent of authorities being women. This allows for seeing the robustness of the analysis. The estimation also was carried out by MCO, probit, and logit, obtaining robust and similar results with the three methodologies. The results of the estimation show that the platform increased by 6.8 percent the probability that a line is awarded to a women-led business, more than for the complete sample. By contrast, in the case of the probit and logit models, the marginal effects are reduced and it is observed that the platform increased the probability of a line being awarded to a business with 50 percent or more women authorities by 2.75 percent and 2.58 percent, respectively.

Table 9. Effects of COMPR.AR on Women Entrepreneurs (Businesses with 50 Percent or More Women Authorities)

Variables	(1) MCO	(2) Probit	(3) Logit
Price (Log)	-0.031*** (0.0015491)	-0.1184*** (0.0034)	-0.2208*** (0.00621)
COMPR.AR	0.068*** (0.007093)	0.107*** (0.015)	0.17584*** (0.02659)
Quantity	-3.89e-09** (1.84e-09)	2.84e-08 (1.80e-08)	-9.88e-08 (9.11e-08)
SME	0.269*** (0.0044396)	0.644*** (0.0114)	1.173*** (0.0221)
2015	-	0.1128*** (0.0217)	0.1656*** (0.0385)
2016	-0.0784*** (0.0091061)	0.0963*** (0.0198)	0.1504*** (0.0351)
2017	-0.13745*** (0.0085158)	0.0319* (0.0179)	0.0273 (0.0318)
2018	-0.1434*** (0.0090039)	0.0143 (0.0139)	0.02088*** (0.02465)
2019	-0.1682*** (0.0102792)	-	-
Constant	0.7141*** (0.118)	-5.467*** (0.1944)	-15.05 (0.8299)
Observations	124,317	124,253	124,253
R^2	0.0871	0.0872	0.0878

Note: Robust standard errors in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Note: SME: small and medium-sized enterprise.

In expanding the analysis to possible mechanisms through which COMPR.AR increases the participation of women-led businesses, it is also observed whether the probability of SMEs winning bids increases. The estimation was carried out using MCO, probit, and logit models, obtaining robust and similar results with the three methodologies. According to the MCO estimation, the platform increased by 2.48 percent the probability that a purchase is awarded to an SME. In the case of the probit and logit models, given that the marginal effects are not constant, sample means were used to estimate the effects. In this manner, it was possible to conclude that, with the probit and logit estimations, the platform increased the probability that an average purchase be awarded to an SME by 5.29 percent and 5.18 percent, respectively. In this case a significant effect of the SME variable on gender is also observed.

Table 10. Effects of COMPR.AR on Small and Medium-sized Enterprises

Variables	(1) MCO	(2) Probit	(3) Logit
Price (Log)	-0.0198*** (0.000754)	-0.0751*** (0.00258)	-0.0745*** (0.00258)
COMPR.AR	0.0285*** (0.00376)	0.182*** (0.0118)	0.0937*** (0.0130)
Quantity	-7.55e-09*** (1.84e-09)	-2.67e-08*** (7.64e-09)	-2.65e-08*** (7.75e-09)
2015	0.0130** (0.00573)	0.0768*** (0.0178)	0.0309 (0.0200)
2016	0.00698 (0.00543)	0.0589*** (0.0166)	0.0127 (0.0187)
2017	0.0304*** (0.00410)	0.170*** (0.0142)	0.0986*** (0.0141)
2018	0.0208*** (0.00295)	0.113*** (0.0106)	0.0685*** (0.0101)
2019	- -	- -	- -
Constante	0.536*** (0.101)	0.189 (0.373)	0.133 (0.372)
EF provincia	Yes	Yes	Yes
Observaciones	187,221	187,192	187,192
R^2	0.09	0.0831	0.0826

Note: Robust standard errors in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Finally, to understand whether the effect of COMPR.AR on the participation of women-led firms occurs only due to the SME effect or is independent of it, an additional analysis is carried out limiting the sample exclusively to firms that are not SMEs. If effects are found in this subsample, it would verify that the effect on gender is not produced only because it promotes the participation of SMEs. Table 11 shows that the effects of COMPR.AR on the probability of participation by large businesses led by women (not SMEs) continue to be significant. This verifies that the transmission channel is not only through an increase in the participation of small and medium-sized firms, given that COMPR.AR also has effects on large firms led by women.

Table 11. Effects of COMPR.AR on the Participation of Large Businesses (Not Small and Medium-sized Enterprises) Headed by Women

Variables	(1) MCO	(2) Probit	(3) Logit
Price (Log)	-0.0023235* (0.0009041)	0.0681553*** (0.0061228)	0.1185488*** (0.0106264)
COMPR.AR	0.0881968*** (0.0044442)	0.4047302*** (0.0272672)	0.6752912*** (0.0478928)
Quantity	-1.34e-09*** (4.28e-10)	-2.87e-10 (5.56e-09)	-7.86e-10 (1.00e-08)
2015	-	0.7092591*** (0.0413428)	1.190397*** (0.0710395)
2016	-0.0270976*** (0.0055249)	0.4649555*** (0.0365626)	0.7861479*** (0.0622165)
2017	-0.0432001*** (0.0052394)	0.4425469*** (0.0322728)	0.7425947*** (0.0550625)
2018	-0.0731983*** (0.0054055)	0.3163657*** (0.0248554)	0.5112488*** (0.0425889)
2019	-0.1077947*** (0.0056881)	-	-
Constant	0.0812051*** (0.0066094)	-5.04029*** (0.1953388)	-12.97191*** (1.120942)
EF province	Yes	Yes	Yes
Observations	33,009	32,981	32,981
R^2	0.21684	0.2271	0.2268

Note: Robust standard error in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The results of this section show that COMPR.AR increases the participation of SMEs in contracting and that, given that SMEs have a high representation of women leaders, through this increase the platform ends up also increasing the participation of women-led businesses. In addition, it shows that this effect is not limited only to SMEs, because when the analysis is limited to a subsample of only large firms, this also increases the participation of women.

5.1 Possible Mechanisms

This section discusses the possible mechanisms that can explain the findings described above. In a study conducted by FEPEPESNA for UN Women, it was determined that, of the total number of natural person providers in the City of Buenos Aires, only 22.2 percent were women, and that of those, only 10.4 percent made final transactions. Among legal entities, only 10 percent were women-owned businesses. It was also found that the gender gap widens depending on the economic sector and the type of contract.

Although there are currently no surveys conducted among women entrepreneurs who participate in public purchasing in Argentina, there is significant consensus in the literature regarding the main constraints at present that affect the participation of women in public bidding.

The implementation of COMPR.AR allowed for mitigating or eliminating some of these obstacles, as is discussed below.

COMPR.AR produced improvements in terms of financing and guarantees. As is known, there is a clear gender gap in access to these types of goods and services, given the initial disparity that is observed between capital or risk held by men and women. In Argentina, among the proportion of adults that accesses some product of this nature, there is a gap in access to credit products of 5.8 percentage points to the detriment of women. This gender gap is observed not only in the quantity of men and women who obtain credit, but also in the balance of financing by sex. According to [Rozenwurcel and Drewes \(2012\)](#), lack of financing and delays in contractual payments are two barriers that affects SMEs, whose limited financial capacity reduces their probability of participating in public purchasing. Prior to the existence of COMPR.AR, the time periods between the presentation of the offer and the receipt of the sale were very prolonged – up to more than 180 days in some cases. These delays excluded a large quantity of businesses that, lacking the financial support to weather the delays in the payment of invoices, did not participate. The platform considerably reduced the evaluation and analysis times associated with public purchases, and thus the payment times. This reduces the need for financing resources in order to participate in public purchasing.

Access to information advanced thanks to democratization in the dissemination of bids for public purchasing. According to different studies, women do not obtain public information with the same facility, proportion, and frequency as men ([OEA, 2018](#)). Less access to information can translate into reduced participation of women-led businesses in sectors such as public purchasing. In this context, policies that combine transparency and gender equality in public contracting processes can be mutually reinforcing and translate into both the inclusion of women as well as a reduction in costs for the State ([BID, 2018](#)). The reduction in bureaucracy, as well as the incorporation of technology and reduce opportunities for corruption and facilitate the participation of women.

Advances were recorded related to access to social capital. Business activities generally require interaction with public entities and with distribution and marketing networks, among other things. However, women often have limited access to networks of contacts. Most of the management positions that make up these networks are held by men, which means that women's contact with the business and State culture is often limited. Different analyses suggest that businesses led by men are more likely to identify clients through networks of contacts, while women-owned businesses have to resort to other means to get new clients ([World Bank and WTO 2015](#)). In this context, the platform implies a drastic change by publishing all processes on a single web page, which increases the visibility of different opportunities for all interested parties.

6 Conclusion

Public contracting is an important part of State activities and constitutes a large market. As the potential for public purchasing to promote gender equality becomes more and more significant, public policies offer an opportunity to increase the representation of women in the labor force. The advance of digitization and the modernization of State processes through the adoption of digital government represent an important way to close gender gaps.

For many women, the entrepreneurial spirit offers a path towards economic empowerment. It is up to the global community, and especially governments, to help create the conditions that facilitate it. Today, there is a gender gap in the level of business activity all over the world, due in large part to unequal treatment of men and women, although there are other entry barriers as well. In addition, in both developed and developing economies, women have not even

reached equality with men in terms of levels of education, salaries, political empowerment, and economic participation.

Like most businesses in Latin America, those owned and operated by women are generally micro and small enterprises. But in contrast to their male counterparts, women entrepreneurs must face a set of wide-ranging and unique challenges in addition to those often faced by any small business. These challenges dissuade some women from starting businesses and prevent others from developing businesses they already have. In other words, these challenges directly contribute to the gender gap (United Nations 2017). Promoting an entrepreneurial spirit among women through State purchases is one way to close, or at least reduce, the gender gap. In this way, governments play a role in encouraging the participation of women-led businesses in public contracting.

This study presented one of the first robust estimations of the indirect effects of electronic public purchasing systems in Latin America on female participation, represented by women-led businesses. The results show that the COMPR.AR platform increased by 2.48 percent the probability that an offer be awarded to a woman-led businesses using an MCO estimation, and by 4.2 percent and 4.12 percent, respectively, using probit and logit models.

In conclusion, it can be seen that in addition to the benefits that it generates in terms of increasing the efficiency and transparency of public purchasing, COMPR.AR also contributes to reducing the gender gap by encouraging greater participation of women-led businesses. For this reason, it is important that governments continue to support digital government initiatives, given that they can be useful not only in improving the efficiency of administrative processes but also in helping to address one of the most significant problems in the world today: labor inequality between men and women.

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