JOB CREATION ON THE PUBLIC MARKET

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ABSTRACT. The public market generates many positive externalities. One of these is job creation, in a process that is equitable and labor-intensive, due to the significant participation of smaller businesses. The question is how create jobs by taking advantage of the opportunities available on the public market. In this sense, this study compares different methodologies used to discover the approximate number of jobs created by the State through the online public procurement and contracting system.

1. INTRODUCTION

The public market is a place where the great majority of national or international government buyers (public procurement entities) and private suppliers interact. This market represents approximately 3% of Chile's GDP. In 2009, around USD 6 billion were traded in the public procurement platform, Chilecompra. Clearly, the size of this market creates positive externalities through public contracting, such as the implementation of measures for improving social well-being, the introduction of sustainable procurement criteria in specific business fields, or measures designed to favor suppliers that treat their workers well.

One of the main advantages of a competitive and inclusive market is the possibility of generating opportunities in a context of equal treatment and free participation. Due to the high level of competition, efficiency has increased constantly thanks to the level of savings obtained. For year 2009, over USD 170 million in savings has estimated.

Due to the tremendous amount of resources it manages, the public market is subject to multiple interests. Although it is an efficient market, excessive bias can limit competition and efficiency, and in order to avoid this situation it is important to quantify the implementation of policies *ex ante* and apply them harmonically. In regards to employment, it is acknowledged that this market facilitates the absorption of large quantities of labor, which is why it has performed well in resisting the world economic crisis and its consequences in our country. Nevertheless, and as mentioned in the

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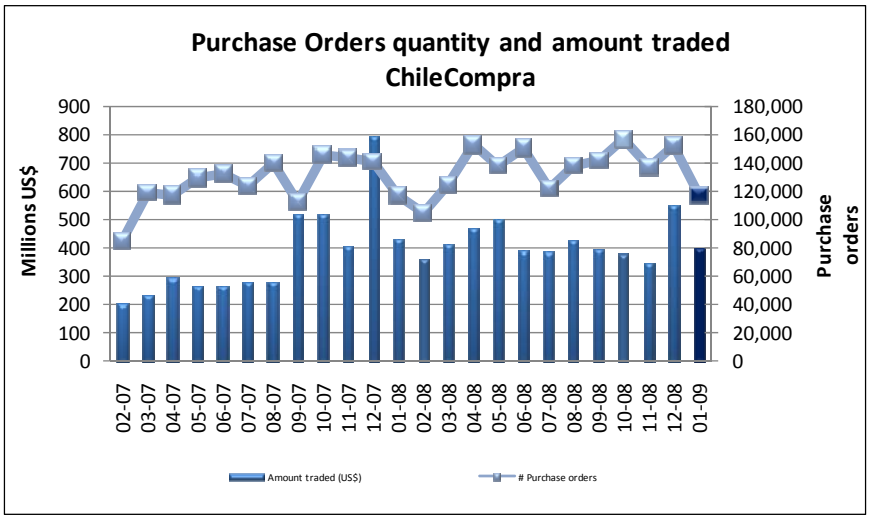
previous paragraphs, measures have been implemented to avoid contracting distortions. The measures that have increased spending and execution of the public budget have been established through the public market in accordance with normal processes. The only series of measures that favors contracting is favorable evaluation of the conditions of liquidity among suppliers.

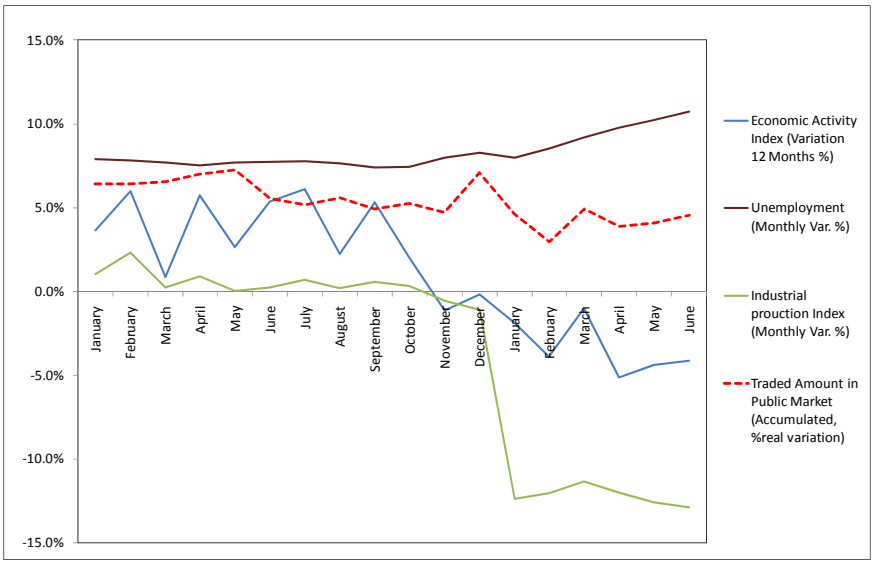
In response to the aforementioned points, a few questions have arisen in relation to the quantification and characterization of the job opportunities produced by the public market. For this purpose, this study shall make several approximations to visualize the actual number of workers required to cover public demand and, on the other hand, to characterize these opportunities, The solution to these questions will include policy measures that consider how these measures will affect the labor market.

2. DESCRIPTIVE STATISTICS

Characterizing the public market is essential for estimating the number of workers it generates. Clearly this will depend on the amount of trade and business opportunities generated. For this reason, the following graphs present the main figures.

Graphs 1 & 2: Purchase orders, amount of trade on ChileCompra and comparison with the national economy





The graph 1 shows the dynamics of this sector and its constant growth, along with the number of purchase orders[1]. The amount of trade has been estimated at approximately USD 500 million each month, with purchase orders for around 160,000.

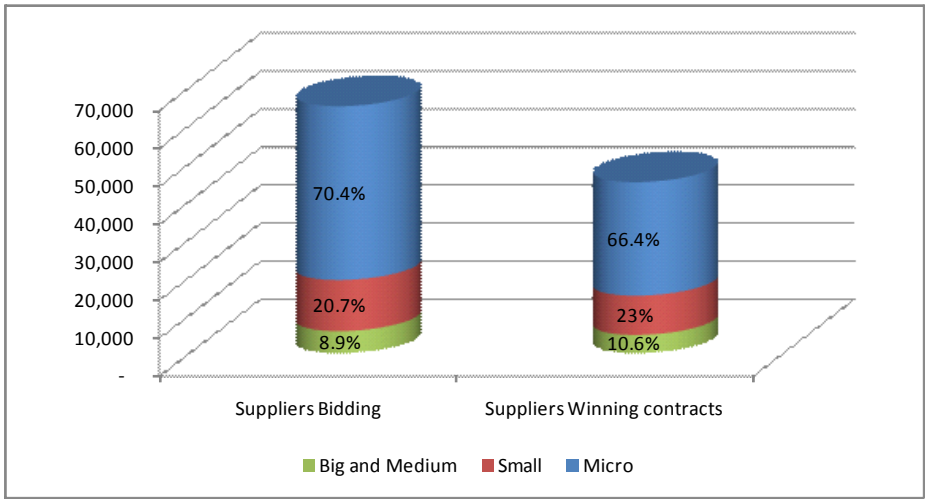
Meanwhile, the graph 2 provides a comparison with the national economy. It shows that even with the international crisis and the naturally lower activity in the public sector at the beginning of the year, the actual amount of trade on the public market has been much greater than the performance of the global economy, which has displayed only negative results (except for the growth of unemployment).

Graph 3 presents de activity of suppliers of different size, in terms of quantity of suppliers bidding and quantity of suppliers winning contracts.

As can be observed, smaller businesses represent an important percentage of supplier activity on the public procurement market. This is due mainly to the inclusive characteristics generated by its transparent contracting process.

[1] Purchase Orders (PO), the documents issued when a tender has been awarded. They contain the details on required goods and services, the corresponding dates of delivery and the exact amount traded.

Graph 3: Supplier activity by size – 2008



3. ALCULATING PUBLIC MARKET EMPLYMENT USING DIFFERENT MEASUREMENTS:

Clearly, since this figure is not reported in public market transactions –due to the complexity it would generate in terms of managing this information– the number of workers absorbed by public market activity must still be estimated. In the economic literature, there are several approximations of micro and macro figures through estimates and surveys; they cite, for example, unemployment, level of activity, production and others. The relevant literature also includes a SERNATUR (tourism promotion public agency) study which has estimated that, given an amount of trade of USD 5 billion, approximately 250,000 workers would be associated to tourism.

This section shall apply a series of methodologies in order to calculate the number of workers generated by public market businesses. It will proceed to show the results obtained in order of difficulty, from the simplest methodology to the most complex.

3.1. Linear comparison with the general economy[2]

The most direct approximation to the public market's participation in the labor market –in other words, the job-absorption capacity of government contracts– is related to the total economic activity of the country and its possible interpolation of this smaller market that represents about 3% of Chile's GDP.

Table 1: Jobs in the national economy versus public market jobs

	National Economy (GDP, 2009, e)	Public Market (2009, e)
Amount of trade in billion USD	169.6	6.05
Employed workers (N°)	6,662,406	237,662

Notes:
(1) GDP estimated based on zero growth during 2009.
(2) The number of employed workers considers the worst unemployment rate in the last 10 years (12.7%).

3.2 Linear estimate based on public market data and size of business

Supposing that job distribution is homogeneous and also proportional to the amount traded for each type of business (size) that participates in the public market, the following reasoning, and then calculation, may be applied. First, we use national economy data on average number of workers and average annual amount traded for each segment (micro, small, medium, big enterprises). Given the previous assumptions, for each segment we calculate the ratios [Amount of trade Public market] / [Average annual amount traded]. The numerator is the total amount traded, for all the enterprises in the segment, in the public procurement market; the denominator is an average value, for a single representative enterprise in the segment, in the national economy. This way, we obtain a quantity that represents the number of enterprises "totally dedicated to public procurement" (by enterprise size). Next, we multiply this quantity by the average number of workers (by enterprise size, national

[2] Through the relationship between total occupation and the country's Gross Internal Product.

economy), obtaining the estimated number of workers in the public procurement market. The data and results are in table 2.

Table 2: Public market jobs by size of business

	Micro	Small	Medium	Large	Total
Amount of trade,public market 2009 USD	966,670,609	1,310,834,648	890,554,142	3,114,075,932	6,282,135,331
Number of purchase orders	410,388	418,128	274,285	737,710	1,840,511
% of share in total amount of trade	15%	21%	14%	50%	100%
% of share of purchase orders	22%	23%	15%	40%	100%
Average number of workers	3	13	52	300	-
Average annual amount traded	45,391	518,215	2,836,944	7,092,361	10,492,912
Number of workers on the public market	63,889	33,137	16,323	131,722	245,072

Notes:

(1) Number of workers (national economy) based on information from Pyme, INE, and Encuesta Anual de las Pequeñas y Medianas Empresas (Santiago, Mayo 2008)

(2) Average amount of trade based on segmentation data, assuming a uniform distribution among segments.

3.3. Non-linear estimates based on information from the general economy

To measure the impact of ChileCompra on job creation, an approximation has been implemented based on the national economy and a non-linear (log-lineal) estimate of the number of jobs, according to a Cobb-Douglas production function. Supposing a Cobb-Douglas production function of the non-linear (log lineal) economy, we must perform the following analysis to achieve an econometric estimate of the number of workers.

$$F_t(K_t, L_t) = Y_t = A\,K_t^{\alpha} L_t^{\beta} \quad (1)$$

$$ln(F(K_t, L_t)) = ln(Y_t) = ln(A\,K_t^{\alpha} L_t^{\beta}) \quad (2)$$

$$ln(Y_t) = ln(A) + ln(K_t^{\alpha}) + ln(L_t^{\beta}) \quad (3)$$

$$ln(Y_t) = ln(A) + \alpha ln(K_t) + \beta ln(L_t) \quad (4)$$

$$y_t = a + \alpha k_t + \beta l_t \quad (5)$$

$$l_t = \gamma + \delta y_t + \theta k_t \quad (6)$$

These last two regressions will be estimated in order to obtain information on the coefficients and the model's coherence with the data. Thus, an *in sample* (IS) estimate shall be obtained for the number of workers in the general Chilean economy. Subsequently, model calibration has been used to come up with an *out of sample* (OOS) estimate, using the data on the amount of trade on the public market.

3.3.1. Empirical estimate

A database has been set up with information on national accounts of the Chilean Central Bank and INE (National Statistics Agency). This database contains the following descriptive statistics:

Table 3: Descriptive statistics

(1996-2009, quarterly)	Total GDP	Employed workers	Labor cost index	Formation of gross fixed capital	FBCF percentage
Median	12,846,474	5,777	87	2,403,660	20%
Standard Deviation	1,962,992	491	17	144,394	1%
Maximum	16,822,494	6,740	121	2,867,476	25%
Minimum	9,870,357	5,090	58	1,997,640	18%
No. Obs.	53	53	53	53	53
Units	Pesos ($)	Millions of persons	Index	Pesos ($)	Percentage (%)
Source	Banco Central	INE	INE	Banco Central	Own production

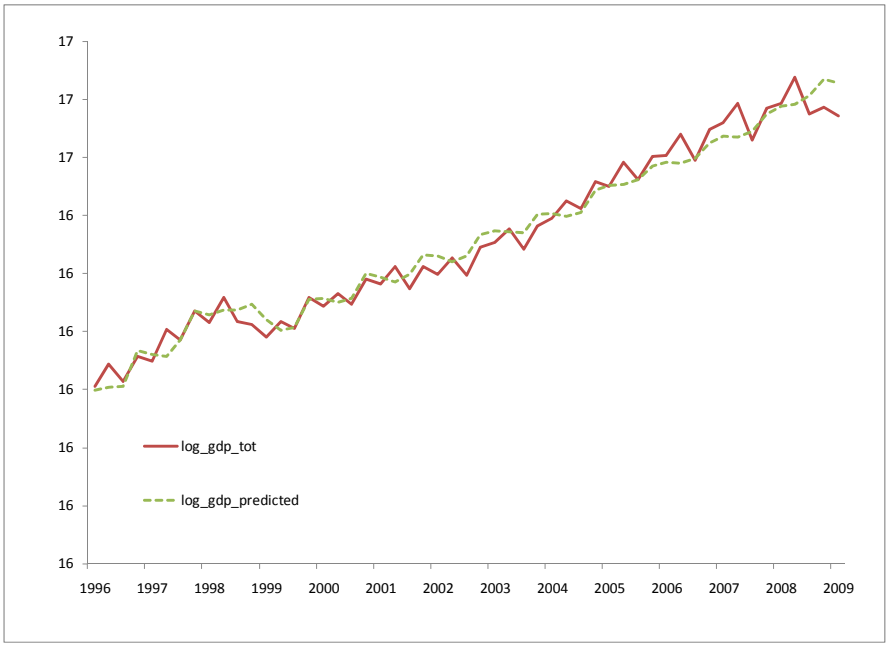
The methodology that shall be applied will be a model that will facilitate a good *out of sample* (OOS) estimate of the number of jobs, using the formula obtained in equations (5) and (6). First, the equation will be calculated (5). The previous regression has been estimated, produces the following result[3]:

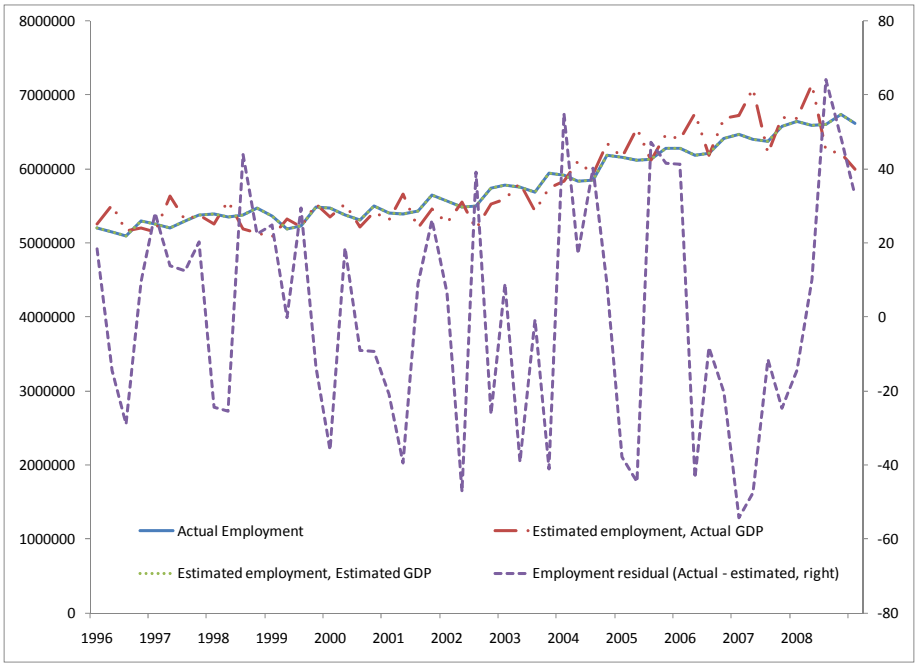
$$y_t = 8{,}7 + 1 \cdot k_t + 0{,}6 \cdot l_t$$
$$(32{,}68)^{***} \quad (3{,}61)^{***} \quad (36{,}81)^{***}$$

[3] (***) Statistically significant variable to 1%, (**) to 5% and (*) to 10%.

R-squared of 97%.The generation of the IS estimate for the data shown produces the following results;

Graph 4: *In-sample* projections, based on GDP regressions





For a model OOS projection, the previous analysis produces a result of 257,301 jobs. Meanwhile, the following regression has been calculated, supposing inverse causality, which means that the work will be determined by the existence of a certain amount of capital and level of production. This produces 284,972 jobs. In other words;

$$l_t = -14{,}1 - 1{,}7 \cdot y_t - 2{,}1 \cdot k_t$$

$$(-18{,}63)^{***} \quad (3{,}61)^{***} \quad (-6{,}81)^{***}$$

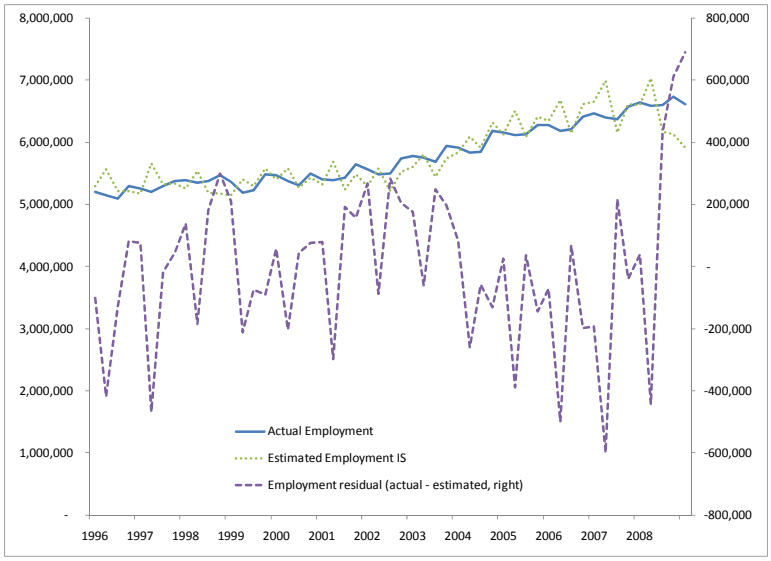
It is also possible to suggest that this relation has some lagging, that is, that unemployment is a lagging variable of the economy. It can therefore be modeled according to the lags in production and the formation of gross fixed capital. The best model resulting from the introduction of these variables in the previous quarters is for the following regression:

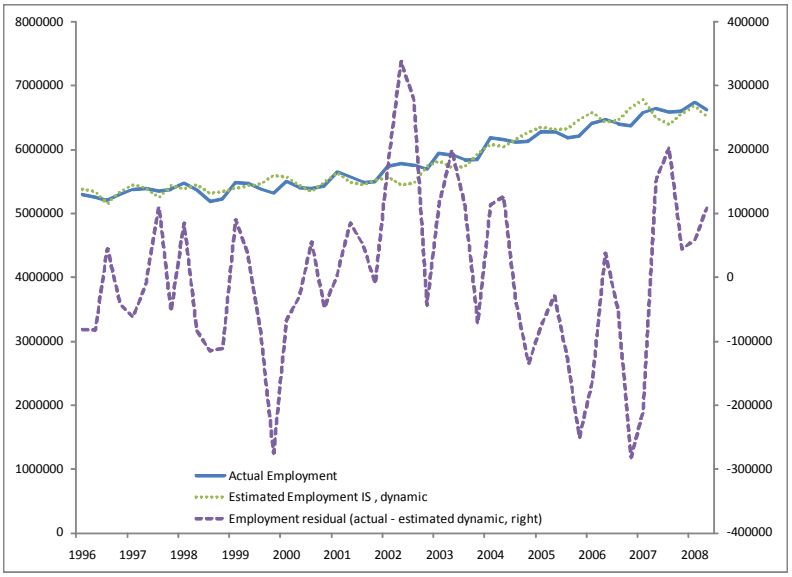
$$l_t = -13{,}8 + 0{,}8 \cdot y_{t-3} + 0{,}9 \cdot y_{t-2} - 1{,}95\, k_{t-2}$$

$$(-30{,}64)^{***} \quad (3{,}1)^{***} \quad (3{,}84)^{***} \quad (-7{,}79)^{***}$$

R-squared of 99%. This produces 270,153 jobs.

Graph 5: *In-sample* projections, based on employment regressions. Static model projection and dynamic model projection.





4. RESULTS AND CONCLUTIONS

Table 4 shows the summary of the previous results.

Table 4: Summary of results

Type of approximation	Number of employees
Data National Economy – linear estimate	237,662
Data Public Market – linear estimate	245,072
Cobb-Douglas GDP	257,301
Cobb-Douglas Static Regression	284,973
Cobb-Douglas Dynamic Regression	270,513

Considering the different approximations used in this paper, we found reasonably consistent results, which give us evidence that lead us to estimate that the total number of jobs created by ChileCompra through the public market is around 260,000 jobs.

Given the significant participation (in the public procurement market) of small businesses (that are usually labor-intensive enterprises), some possible extensions of this study could be focused on the particularities of the impact of ChileCompra in job creation in that particular type of business.

In a wider context, job creation is one of the positives externalities to be carefully addressed when defining polices about public procurement.

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