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### **Do Large Retailers Affect Employment? Evidence from an Emerging Economy**

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## ABSTRACT

This paper studies the effect of the emergence of large retailers (hypermarkets and department stores) on employment in the commerce sector in the regions of Chile. We use a panel with quarterly data from eleven Chilean regions for the period 1996-2004. Our results indicate that the entry of large retailers produces a discrete increase in employment in the commerce sector in the quarter that the entry occurs. We also find that there is an additional positive effect on employment throughout the year entry occurs, suggesting that suppliers or other parts of the chain of production follow the large retailer into the local market. However, after the first year of the entry there is a partial reversion, suggesting that smaller retailers exit or contract in response to the entry of the large retailer. The net effect on employment of the entry of a large retailer is an increase of 300 jobs.

Key words: entry, employment, retail.  
JEL Classification: L81, L10, J23.

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## 1. INTRODUCTION

The emergence of large retailers (hypermarkets and department stores) has been one of the most significant developments in the last couple of decades in the retail industry. Recent literature has focused on the effects of this development on economic variables such as prices, employment and productivity<sup>1</sup>. For instance, Basker (2005a) finds that entry of Wal-Mart in a given location increases retail employment by 100 jobs in the year of entry and that half of that gain disappears over the next five years. Lira et. al. (2005) report that in the case of Chile the entry of a hypermarket in a given city reduces the price of a bundle of goods sold by retailers in that city by 10 percent. They also find that half of that reduction takes place the year before the hypermarket actually opens for business.

The purpose of this paper is to study the effect of the emergence of large retailers in the regions of Chile on employment in the commerce sector<sup>2</sup>. The effect of the entry of a large retailer on employment can be divided into three components. First, the direct (positive) effect due to the new jobs offered by the entrant. Second, there is a potential additional effect due to the fact that suppliers of other parts of the chain of production follow the large retailer into the local market. Third, there is a negative effect if small retailers exit or contract after the entrance. The net effect will depend on the magnitudes of these component effects.

We use a panel with quarterly data from eleven Chilean regions for the 1996-2004 period. We control by economic activity. Our results indicate that the entry of a large retailer has a positive effect on employment in that region: there is a discrete increase in employment in the commerce sector in the quarter that entry occurs. However, part of this effect disappears over the three years following entry, indicating

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<sup>1</sup> Basker (2005a and 2005b), Dickinson & Urbant (1994), Foster et. al (2002), Lira et. al (2005).

<sup>2</sup> The metropolitan region i.e. Santiago, Chile's capital, is not included in this study. Given that Chile is highly centralized, with Santiago concentrating 40% of the population and 47% of GDP, the capital could be studied separately, using the different areas of the city as units of analysis. Unfortunately, we do not have data on the variables used in this study by areas (counties) of Santiago.

that other smaller retailers exit or contract some time after entry occurs. Nonetheless, the net effect is positive.

This paper is organized as follows. In the next section we describe the methodology and data. Section 3 presents our econometric results, and section 4 concludes.

## 2. DATA AND METHODOLOGY

The period under analysis is from 1996:I to 2004:IV, and we use ‘large retailers’ to mean hypermarkets and department stores. The information on hypermarkets<sup>3</sup> was obtained from the ACNielsen 2004 Retail Census, which includes location (region) and inauguration date. The information on department stores was obtained from the annual reports of the large department stores that operate in the Chilean market<sup>4</sup>. Appendix 1 includes a table with the number of large retailers by region, with hypermarkets and department stores listed separately. The data on regional product were obtained from the National Statistics Institute (INE) and the Central Bank of Chile. Employment in the commerce and agriculture sectors, and population data were obtained from INE. This study considers eleven of the twelve Chilean regions. We excluded the eleventh region because this is a region with a very small population (only 0.6% of the total, by far the lowest of all regions) and with the lowest population density in Chile (only 0.8 inhabitants per square km). As a direct result of this, it is the only region that does not have any large retailers, and they are unlikely to enter in the foreseeable future.

To test our hypothesis we estimated the following equation:

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<sup>3</sup>Hypermarket is defined as a supermarket with an area larger than 6,000 square meters (Lira, 2005).

<sup>4</sup>These are Falabella, Almacenes Paris and Ripley.

$$(1) \quad \frac{employment_{i,t}}{population_{i,t}} = \beta_0 + \beta_1 \left( \frac{y_{i,t}}{population_{i,t}} \right) + \beta_2 \left( \frac{R_{i,t}}{population_{i,t}} \right) + \beta_3 \left( \frac{R_{i,t-h}}{population_{i,t-h}} \right) + \mu_i + \lambda_t + v_{it}$$

Subscript  $i$  denotes the region ( $i = 1, 2, \dots, 11$ ) and subscript  $t$  denotes the quarter, with  $t$  going from 1996: I to 2004: IV. The dependent variable is the number of people employed in the commerce sector in region  $i$  in the  $t^{\text{th}}$  quarter of the period under consideration as a percentage of the population of that region. The commerce sector includes three sub-sectors (retail, wholesale and restaurants & hotels). Unfortunately the data are not disaggregated by sub-sectors, hence we could not estimate the effect on employment in each sector separately.  $y_{i,t}$  is GDP of the region  $i$  in quarter  $t$ . As the data on regional GDP is only available annually, we used the index of regional economic activity (INACER) from INE to construct a quarterly series of regional GDP. This series was constructed in two stages. Firstly, quarterly regional GDP for 1996 was obtained by disaggregating total regional GDP for that year using the (quarterly) INACER data. Secondly, with 1996 as the base year the series was completed using the rate of growth in the INACER data for each region.

$R_{i,t}$  is a variable which indicates the number of large retailers in region  $i$  in quarter  $t$ . Lagged variables ( $R_{i,t-h}$ ), were used to capture potential additional employment effects in the quarters following the entry of a retailer. If, for instance, incumbents significantly contract or exit the market in the quarters after the entry takes place, then the coefficient of these variables should be both negative and statistically significant. We use the lagged variable for one, two and three years after entry. Finally,  $\mu_i$  is a city-specific fixed effect,  $\lambda_t$  is a temporal fixed effect, and  $v_{it}$  is an iid  $(0, \sigma_v^2)$  distributed error term.

### 3. ESTIMATION RESULTS

Equation (1) was estimated using the fixed effects method, and the region-specific fixed effects ( $\mu_i$ ) were examined for correlation with the explanatory variables, using the Hausman Test. The application of this test rejects the null hypothesis that no such correlation exists, thus validating estimation via the fixed effect model. Unit root tests were run confirming that the variables considered are stationary (Appendix 2).

Tables 1 presents estimation results. As a first approximation, the estimates in Table 1 suggest that the entry of a retailer has a positive impact on employment in the commerce sector in a given region. Regression 1 shows that the contemporaneous entry is statistically significant and has a positive coefficient. This implies that when the entry occurs employment jumps by about 500 people. The income variable is not statistically significant.<sup>5</sup>

In regressions 2, 3 and 4 we include lagged entry variables to capture possible additional effects in the quarters following the entry. This could be the case if, for instance, after the entry other smaller retailers contract or exit producing a discrete decrease in the employment in the commerce sector. It could also be the case that the entry gives rise to positive external effects, producing a further increase in employment after the entry occurs. In regression 3, for instance, we see that the entry produces a contemporaneous increase of about 500 new jobs in the commerce sector. There is an additional increase of 600 new jobs the year after the entry occurs. However, about the same 600 jobs are lost two years after the entry, consistent with the hypothesis that smaller retailers exit or contract. However it is clear that the coefficient estimates in equations 2 to 4 in Table 1 may be inaccurate if, as is likely, the entry variables are highly correlated, leading to multi-colinearity. A possible solution to this problem is to use the estimation method known as the Almon polynomial.

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<sup>5</sup> The fact that the income variable is not statistically significant, suggests that the increase in employment in this sector over time is captured by the time effect.

The Almon polynomial provides a flexible way to reduce parameterization. The parameters accompanying these variables are termed  $\delta_0$ ,  $\delta_1$ ,  $\delta_2$  and  $\delta_3$ , and it is assumed that these coefficients can be approximated by the function:

$$f(j) = \alpha_0 + \alpha_1 j + \alpha_2 j^2 + \dots + \alpha_n j^n$$

where

$$\delta_0 = f(0) = \alpha_0$$

$$\delta_1 = f(1) = \alpha_0 + \alpha_1 + \alpha_2 + \dots + \alpha_n$$

$$\delta_2 = f(2) = \alpha_0 + 2\alpha_1 + 4\alpha_2 + \dots + 2^n \alpha_n$$

$$\delta_3 = f(3) = \alpha_0 + 3\alpha_1 + 9\alpha_2 + \dots + 3^n \alpha_n$$

$f(j)$  is then substituted into equation (1) and the coefficients  $\alpha_0, \alpha_1, \alpha_2 \dots \alpha_n$  are estimated. Given the significance of the parameters  $(\alpha_0, \alpha_1, \alpha_2 \dots \alpha_n)$  the coefficients of the correlated regressors can be approximated by a second degree polynomial. Finally, using the estimates of  $\alpha_0, \alpha_1$ , and  $\alpha_2$  the coefficients  $\delta_0, \delta_1, \delta_2$  and  $\delta_3$  were backed out.

Regression 5 in Table 1 makes use of the Almon method. The result indicates that the entry of a large retailer increases employment in the region's commerce sector by 600 people in the quarter that entry occurs. There is an additional positive effect the year after and a negative effect three years after the entry. Total negative effects amount to 300 jobs lost. Hence the net effect on employment of the entry of a large retailer is the creation of 300 new jobs in the commerce sector over a period of three years.

To check for the robustness of our estimations we decided to run the same regressions for a different sector. As commerce and agriculture are the two sectors that employ the highest number of workers in the private sector for the regions we are considering, we ran the same regressions for the agriculture sector. Obtaining the same results for the entry variable that we found for the commerce sector would suggest that we are detecting a pattern common to many sectors that is unrelated to the entry of new

retailers per-se. The results are reported in Table 2. They confirm that the entry of a new retailer does not have an effect on employment in the agriculture sector.

#### 4. CONCLUSION

This paper studies the effect on employment of the emergence of large retailers in Chile's regions. We find that the entry of a large retailer produces a net increase in employment in the commerce sector of that region amounting to approximately 300 people. The initial increase is larger, as employment increases both in the period that the entry occurs and over the year following entry. However, there is a partial reversion in the years after that, leading to a net effect that is smaller than the initial effect. This suggests that other smaller retailers exit or contract after the large retailers enters.

The emergence of large retailers has raised questions regarding their impact on several important economic variables. The archetype for this class of retailer is Wal-Mart in the USA, but this phenomenon has also reached parts of the developing world, albeit with a lag. Further research in this area could address issues such as the impact of large retailers on productivity, on value added, or on small and medium sized firms.

**Table 1: Employment in the commerce sector.**

Dependent variable : commerce employment/population

Variable	1	2	3	4	5
GDP / population	0.001 (0.27)	0.002 (0.37)	0.007 (-0.27)	0.009 (1.25)	0.009 (1.36)
H <sub>t</sub> / population	512.3** (2.92)	329.0 (1.20)	494.5* (1.74)	372.7 (1.19)	629.8** (2.99)
H <sub>t-4</sub> / population	-	303.7 (1.08)	635.5* (1.89)	718.9** (2.00)	236.8** (2.37)
H <sub>t-8</sub> / population	-	-	-651.0** (-2.17)	-447.1 (-1.24)	-156.1 (-1.56)
H <sub>t-12</sub> / population	-	-	-	-528.8.1 (-1.51)	-549.0** (-2.60)
constant	0.060** (21.81)	0.057** (14.62)	0.052** (15.59)	0.054** (13.69)	0.053** (13.84)
Time effects	yes	yes	yes	yes	yes
R <sup>2</sup> overall	0.0120	0.0164	0.0893	0.1857	0.1857
R <sup>2</sup> within	0.1739	0.1751	0.1655	0.1694	0.1694
R <sup>2</sup> between	0.0007	0.0006	0.0760	0.1893	0.1893
No of data points	396	352	308	264	264
Groups	11	11	11	11	11

T statistic in parentheses

\*\* indicates statistical significance at the 5% level and \* at the 10% level

**Table 2: Employment in the agriculture sector.**

Dependent variable : agriculture employment/population

Variable	1	2	3	4
GDP / population	0.022** (2.98)	0.017** (2.06)	0.010 (1.15)	0.009 (0.96)
H <sub>t</sub> / population	115.9 (0.47)	-42.5 (-0.12)	-281.5 (-0.73)	-416.3 (1.02)
H <sub>t-4</sub> / population	-	-0.110 (-0.00)	340.7 (-0.75)	-346.1 (0.73)
H <sub>t-8</sub> / population	-	-	601.7 (1.48)	372.7 (0.79)
H <sub>t-12</sub> / population	-	-	-	331.6 (.72)
constant	0.069** (18.11)	0.057** (10.84)	0.062** (13.62)	0.069** (13.30)
Time effects	yes	yes	yes	yes
R <sup>2</sup> overall	0.3199	0.3011	0.1365	0.0990
R <sup>2</sup> within	0.3898	0.3346	0.3366	0.3096
R <sup>2</sup> between	0.6637	0.6762	0.6868	0.6413
No of data points	396	352	308	264
Groups	11	11	11	11

T statistic in parentheses

\*\* indicates statistical significance at the 5% level and \* at the 10% level

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**Appendix 1: Number of large retailers by region**

region		1996	1997	1998	1999	2000	2001	2002	2003	2004
1	hypermarkets	0	0	1	1	1	1	1	1	1
	departament stores	0	0	0	0	1	1	2	2	2
2	hypermarkets	0	0	1	1	1	1	2	2	2
	departament stores	2	3	3	4	4	5	6	7	7
3	hypermarkets	0	0	0	0	0	0	0	0	0
	departament stores	0	0	1	1	1	1	1	1	1
4	hypermarkets	0	0	1	1	1	1	1	1	1
	departament stores	0	0	2	2	2	3	3	3	3
5	hypermarkets	1	1	2	2	2	4	4	4	4
	departament stores	2	2	3	6	6	8	8	8	8
6	hypermarkets	0	0	0	0	1	1	2	2	2
	departament stores	1	1	3	3	3	3	3	3	3
7	hypermarkets	0	0	0	0	0	0	0	0	0
	departament stores	0	1	1	1	2	3	3	3	3
8	hypermarkets	0	0	1	1	1	1	2	2	2
	departament stores	5	6	7	7	7	8	8	11	11
9	hypermarkets	0	0	0	0	0	1	1	1	2
	departament stores	2	2	2	2	3	3	3	3	3
10	hypermarkets	0	0	0	0	0	0	2	2	2
	departament stores	4	5	5	5	5	7	7	7	7
12	hypermarkets	0	0	0	0	0	0	0	0	1
	departament stores	0	0	0	0	0	0	0	0	0

**Appendix 2: Unit Root Test**

	Maddala-Wu p-value	Levin-Lin p-value
Commerce employment / population	0.0029	0.0356
Agriculture employment / population	0.0000	0.0978
GDP / population	0.0000	0.0000