The Impact of Sunday Shopping Deregulation on Employment and Hours of Work in the Retail Industry: Evidence from Canada

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August 2000

Abstract

Using aggregate data on employment and hours of work from three Canadian provinces at two levels of the retail trade industry, I estimate a simple dynamic labour demand model in order to examine retail firm responses to Sunday shopping deregulation. The estimates suggest that deregulation resulted in long run increases in both the employment level and the average weekly hours of hourly paid retail workers. Comparison of the results between the two data sets suggests that the employment gains were larger among general merchandise stores than among more specialized retail establishments. In addition, despite evidence of an immediate shortfall in the employment level below the long run optimal level, the results from both data sets suggest that firms were unable to compensate by temporarily increasing the hours of their existing employees.

Keywords: Employment determination; Demand for labor; Retail and wholesale trade

JEL Classification: J23, L81

* The author would like to thank Peter Kuhn and Lonnie Magee for valuable comments. The author also gratefully acknowledges financial assistance provided by the Social Sciences and Humanities Research Council of Canada (SSHRCC) and the Canadian International Labour Network (CILN). The author can be contacted at: (905)525-9140 ext. 23814 (phone), (905)521-8232 (fax) or skuterm@mcmaster.ca.

1. Introduction

Over the past forty years a number of countries in the Western world have witnessed the dismantling of legislation that has historically, in some cases for hundreds of years, restricted business activity on the Christian day of Sabbath. The international trend toward Sunday shopping deregulation has been most extensive in North America but is more recently showing signs of gaining momentum in Western Europe. In the United States a steady decline in the number of states that impose a general ban on all Sunday business and labour activity began in the early 1960's so that by 1985 only 22 states still had general bans compared to 35 in 1961.[1] A similar decline began in Canada in the early 1980's and continued until 1998, when Newfoundland was the last province in the country to pass some form of deregulating legislation. In contrast, in Europe only Belgium, Luxembourg, Sweden and Spain had taken any formal steps to deregulate Sunday retail activity prior to the 1990's.[2] However, over the past decade England and Wales, the Netherlands and then Finland opted to relax their restrictions on Sunday shopping.[3] Furthermore, there is indication that France and Italy are similarly moving in the direction of deregulation.[4]

Reference to the popular press of these countries reveals that legislative changes have taken place amid contentious political and public debates about the costs and benefits of Sunday shopping. In fact, in some political jurisdictions opposition to Sunday

[1] The research by Laband and Heinbuch (1987) on Sunday shopping restrictions, or "blue-laws" as they are known in the U.S., is the most recent complete collection of state legislation throughout the U.S..
[2] Kajalo (1997) has done extensive research to collect information on the legality of Sunday retail business across Europe. This information is available from his website: www.hkkk.fi/talsos/internat.htm.
[3] England and Wales deregulated all Sunday shopping in 1994, while the Netherlands in 1996 and Finland in 1997 opted to permit Sunday shopping for part of the year (Kajalo 1997).
[4] For the French case see "Government grasps Sunday law nettle" *International Management*, October 1991, pp.20-1 and for Italy see "Open up!" *The Economist*, March 14, 1998, p.59.

shopping following a deregulating initiative has actually been strong enough to reinstate restrictions.[5] A common concern in all these debates is the expected labour demand impact of Sunday shopping. In particular, will retail firms satisfy their need for Sunday employment by increasing the weekly hours of existing employees or by hiring new workers? Or is it possible that deregulation has neither an hours nor an employment impact as labour demand is reduced during the rest of the week? Opponents and proponents of deregulation have often based their arguments on their expectations of these labour demand effects.[6]

Despite the widespread debate in the popular press there is a dearth of empirical research examining the labour demand effects of deregulation. In an early attempt to evaluate the economic impact of Sunday shopping, Kay, Morris, Jaffer and Meadowcroft (1985) use consumer surveys to predict what impact deregulation will have on retail sales in England. This estimate is then combined with an assumed labour demand elasticity estimate with respect to sales to predict a short run increase in overall retail employment of 5 percent.[7] More recently, Gradus (1996) estimates a model of retail behaviour for the

[5] In 1994 Spain moved from complete deregulation to only eight Sundays per year of unrestricted Sunday shopping (Kajalo 1997). Nova Scotia, Canada opted to entirely repeal their legislation following a three month experiment which proved unpopular with retailers (see "Sunday store openings not worth it: retailers" *Halifax Chronicle Herald*, November 26, 1993, p.B6). More recently, Norway has repealed the exemption of large supermarkets from its strict Sunday shopping legislation (see "Norway's Sunday best" *The Economist*, August 1, 1998, p.43) and Kajalo (1997) reports that in Finland there is evidence of growing support among citizens for renewed regulation.

[6] Opponents of deregulation, of which Christian churches and trade unions are typically the most vocal, argue that deregulation will force some existing employees to work on Sundays against their will. They also emphasize possible undesirable effects on religious and family oriented activities. In response, proponents point to the presence of workers with low preferences for Sunday leisure, such as students, who will gain employment opportunities as a result of Sunday shopping. Further, they argue that legislators can easily provide retail employees with the legal right to refuse Sunday work. Opponents criticize that these protections are weak as they are unable to protect new hires from discrimination.

[7] In the long run, Kay et al. (1984) actually predict a slight decline of around 1 percent in full-time equivalent retail jobs. Their argument is that extended opening hours increases the sales capacity of the retail sector without actually increasing sales. The resulting overcapacity of the industry implies that smaller, less efficient stores will be unable to compete with larger, retailing firms that may operate multiple stores. In the long run this restructuring of the industry will result in overall job losses.

Netherlands and simulates the employment impact of deregulating store opening hours using evidence from the Swedish experience with deregulation. His estimates suggest that increasing opening hours by 10 will lead to a 1.6 percent increase in Dutch retail jobs.[8] The obvious problem with these estimates is that both are simulations based on data from countries that have yet to experience deregulation. In contrast, Laband and Heinbuch (1987) examine the deregulation impact by comparing states with general bans on all Sunday commercial activity to states with no restrictions. The weakness of their research is that they simply compare raw averages between regulated and unregulated states.[9] Clearly, there may be many other differences between the two sets of states that can explain the observed variations in employment and hours of work.

The Canadian experience offers an ideal setting to examine the consequences of Sunday shopping as the legislation is provincial and was introduced at different times. As a result, a "natural experiment" exists in which common movements in the retail industry data between provinces can be controlled for so as to isolate the deregulation effect. This paper exploits this setting and estimates a simple dynamic labour demand model that allows employment and hours to be imperfect substitutes in production. The resulting estimates provide some evidence on how retail firms adjust employment levels and hours of work in response to an exogenous increase in permitted business hours. They indicate that deregulation led to a long run increase in both the employment level and average weekly hours of work. Yet, despite short run rigidities in the employment level there is

[8] Note that the Gradus (1996) estimate is of full-time equivalent jobs whereas Kay et al. (1984) distinguish between full-time and part-time workers. Using the existing full-time/part-time mix in English retailing, Kay et al. predict a 3.3 percent increase in full-time equivalent jobs.

[9] For example, they suggest that deregulation reduces hours of work by comparing average weekly hours in blue law and non-blue law states. Even more troublesome is that their data is average weekly hours of production workers in the manufacturing industry.

no evidence that firms compensated by temporarily increasing the weekly hours of either new or existing employees.

The remainder of this paper is organized as follows. Section 2 presents the Canadian legal experience with Sunday shopping deregulation and discusses why data from only three provinces is used. The theoretical model, empirical specification and data used to examine the employment and hours of work response of retail firms are presented in Section 3. In Section 4 the results are examined. In conclusion, some implications of the empirical results are considered.

2. The Canadian Experience

The Canadian process of deregulation began in 1985 when the Supreme Court of Canada found the federal *Lord's Day Act*, which had designated Sunday as a weekly day of rest since its adoption in 1907, to be unconstitutional.[10] The immediate implication of this ruling was that the ten individual provinces were now responsible for determining the legality of Sunday shopping. At that time Newfoundland already had legislation in place restricting retail business on Sundays. British Columbia and Ontario had also opted out of federal control before 1985, but had passed legislation providing municipalities with exclusive autonomy to regulate retail business hours.[11] By 1993 all provinces had passed legislation either restricting Sunday shopping (Newfoundland, Prince Edward Island, Nova Scotia and New Brunswick), providing municipal autonomy (Saskatchewan,

[10] This ruling was based on the logic that the *Act* violated the guarantee of religious freedom enshrined in the *Charter of Rights and Freedoms* of 1982.

[11] Ontario passed legislation in 1975 and British Columbia in 1980. In Ontario by 1985, 13 of 45 cities adopted early closing by-laws. Ferris (1991) exploits this variation to examine the determinants of the legislation itself. For example, he finds that higher female labour force participation rates reduce the probability that a community will restrict Sunday shopping presumably because such communities value extended shopping hours relatively more.

Alberta and British Columbia) or permitting wide-open Sunday shopping (Manitoba, Quebec and Ontario).[12] Of the provinces that originally regulated business hours all have now either experimented with Sunday shopping (Nova Scotia), permitted it during part of the year (Prince Edward Island and New Brunswick) or entirely deregulated (Newfoundland). The result is a patchwork of legislation that is not only complicated by municipal jurisdiction in some provinces, but also by season and type of retail establishment.

An attempt to empirically evaluate the labour demand consequences of Sunday shopping deregulation using provincial aggregate data requires the use of a time-series indicator variable for each province that captures the dates of legal change. Table 1 contains the most complete information available at this date on the legality of Sunday shopping across Canada. It is presented here to emphasize the difficulty of creating simple time-series dummy variables for each province indicating the legality of Sunday shopping. For provinces with province-wide legislation the task is somewhat manageable. For example, the Quebec series is simply 0 prior to January 1993 and 1 thereafter. However, for the western provinces where municipalities have determined the legality of Sunday shopping there is no single date of deregulation. Ideally, a researcher could collect information from City Clerks' offices across these provinces and use the resulting legislative data, along with the proportion of total provincial retail sales made in each municipality, to construct a continuous variable between 0 and 1 indexing the legality of Sunday shopping. An attempt was made to collect legal information from cities across British Columbia. The information obtained reveals that the transition from the *Lord's*

[12] Beginning in December 1992, Manitoba conducted a 10 month province-wide experiment with Sunday shopping. This experiment was followed by legislation providing exclusive municipal autonomy. Winnipeg, the largest city in the province, has chosen not to introduce restrictions.

Day Act to deregulation has been a piecemeal process and in the case of some cities changes in the legality of Sunday shopping are somewhat ambiguous.[13] As a result, the task of constructing an accurate indicator variable for provinces like British Columbia is complicated and at times requires judgement.

A second problem exists if the legislative dummy variables are being used to study the behaviour of retail establishments that chose to respond to deregulation by opening on Sundays, rather than the impact of the legislation itself. The reason is that the legislative changes do not necessarily correspond to actual changes in the business hours of retail firms. First, many types of establishments, such as variety stores and retailers in the tourism industry, were never constrained by the *Lord's Day Act*. Second, some retailers, such as those in small, rural and religious communities may choose to remain closed on Sundays despite legislative deregulation. For these types of retailers the provincial legislative changes, even if they are province-wide, will result in neither employment nor hours adjustments. To the extent that these establishments are prevalent, any structural changes at the legislative dates are unlikely to show up in the provincial aggregate data. The point to be made is that the legislative dates in Table 1 are only empirically useful in so far as they correspond to significant increases in the amount of Sunday retail openings occurring in a province.

Given these measurement problems, it is important to first determine whether the legal changes in any of the provinces actually correspond to significant increases in Sunday retail activity. This is done by testing for structural changes at the legislative dates in the trading-day regression given by:

[13] Richmond, Victoria, Vancouver and Coquitlam deregulated Sunday retail hours in 1981, Maple Ridge in 1985 and Chilliwack in 1990. Interestingly, Langley and Abbotsford have no restrictions on Sunday shopping despite the absence of a by-law formally deregulating it.

$$Q_{it} = \alpha_i + \beta_{1i} SUN_t + \beta_{2i} MON_t + \beta_{3i} TUE_t + \beta_{4i} WED_t + \beta_{5i} THU_t + \beta_{6i} FRI_t + \beta_{7i} SAT_t + \gamma_1 u_{it} + \gamma_2 Y_{it} + \gamma_3 r_t + \gamma_{4i} T_t + \gamma_{5i} T_t^2 + \varepsilon_{it} \quad (1)$$

where Q_{it} is real, per capita retail sales, u_{it} is the unemployment rate, Y_{it} is real, per capita labour income, r_t is the national consumer loan rate, T_t is a simple linear trend and SUN_t to SAT_t are variables that take on values of 4 or 5 depending on the number of instances of that particular day in month t. In order to sharpen the results, two sources of retail sales data that are disaggregated by type of establishment were used. The first are total department store sales (TDS), which are compiled from monthly surveys of all department stores in Canada.[14] The second are department store type merchandise sales (DSTM), which are based on a much broader group of retail establishments than are the TDS data.[15] All the series are seasonally adjusted and run from January 1981 to September 1999.[16]

Since the sales data are seasonally adjusted, there is a problem in interpreting the parameter of interest, β_{1i}. The reason is that the adjustments purge the data of the effect of some months having more days than others. As a result, the effect of adding an additional Sunday to a month must be to reduce the incidence of some other day in that month. The problem is determining which day is lost. The solution is to weight the estimates of β_{ji}, $j = 1,\ldots,7$, by the vector $c = c_{5SUN} - c_{4SUN}$ where c_{kSUN} is a 7-element vector containing the means of SUN_t to SAT_t in months with k Sundays. The

[14] The TDS data are published monthly in *Department store sales and stocks*, Statistics Canada, Catalogue no. 63-002.
[15] The DSTM data are published monthly in *Retail Trade*, Statistics Canada, Catalogue no. 63-005. They are calculated as total retail sales minus food sales, all sales related to motor and recreational vehicles and establishments selling alcoholic beverages.
[16] The seasonal adjustment to the sales data is simply to regress sales on a set of month dummy variables separately for each province. These adjustments are made to overcome biases resulting from correlation between the month and the days of the week variables.

effect of adding an additional Sunday is then given by $c'\beta_i$ which has a variance of $c' Var(\beta_i) c$. If the variables SUN_t to SAT_t are also interacted with the legal dummy variables for each province in (1), another vector δ_i is obtained. The estimate $c'(\beta_i + \delta_i)$ then gives the effect of adding an additional Sunday after Sunday shopping is legal. The Wald statistic given by:

$$\frac{(c'\delta_i)^2}{c' Var(\delta_i) c} \quad \sim \quad \chi_1^2 \qquad (2)$$

provides a test of whether the before and after point estimates are statistically different. Since c depends on whether there are 30 or 31 days in a month, there are two separate cases to consider.

The results from the trading-day regression analysis are presented in Tables 2 and 3.[17] With the exception of Nova Scotia, all the point estimates suggest that Sunday sales increased following deregulation. However, the difference between these before and after point estimates is only statistically significant for Ontario and Alberta when the TDS data are examined, and for New Brunswick and Manitoba when the DSTM data are used. These results are, for the most part, consistent with the evidence collected from newspapers.[18]

[17] PEI is excluded because there is not enough variation in its legal dummy variables to identify all the interaction terms. Newfoundland, on the other hand, has had enough experience with deregulation to identify all the interaction terms but not enough to obtain meaningful estimates. British Columbia is excluded because there is no provincial legal change in the period 1981 to 1998.

[18] In Ontario, New Brunswick and Manitoba the legal changes were province-wide (for the Ontario case see "Shopping on Sunday wide open" *Globe and Mail*, July 4, 1990, pA6; for New Brunswick see "N.B. retailers fight back with Sunday shopping" *Marketing*, November 19, 1991, p1; for the Manitoba case see "Sunday shopping opens up" *Winnipeg Free Press*, November 20, 1992, pA1). In Alberta, there was a concerted decision by retailers in the two major cities, Calgary and Edmonton, to open stores in November 1984 (see "Floodgates open on Sunday shopping" *Calgary Herald*, October 26, 1984, pA1 and "Sunday shopping blooms for now in Alberta" *Toronto Star*, November 25, 1984, pA19). The weak results for Saskatchewan were expected since provincial deregulation has been a piecemeal process with Regina deregulating in June, 1989 and Saskatoon in October, 1991 (this information was obtained through personal

Since retail firms are expected to respond quite differently to deregulation if it only seasonal, the decision was made to restrict the labour demand analysis to those provinces that show both a significant increase in Sunday activity in Table 2 or 3 *and* experienced year-round deregulation. Hence, the analysis below uses only data from Ontario, Manitoba and Alberta.

3. Model

A. Theoretical Model

In order to get some idea of the kinds of firm responses to deregulation we might reasonably expect, a simple theoretical model that includes both employment and hours as imperfect substitutes in production is examined. Consider a cost-minimizing optimization problem in which homogenous retail firms within a province face the cost function:

$$C_L = w h N + q N \tag{3}$$

where C_L are total weekly labour costs, N is total employment by each firm, h is average weekly hours of those employed, w is the average wage within each firm which is assumed to be independent of average weekly hours and q are quasi-fixed costs such as hiring, training and benefit costs. Real retail sales per representative firm are given by:

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communication with Randy Markewich, City Clerk with the City of Regina, and Crystal Lowe, Records Administrator in the City Clerk's Office of Saskatoon). The Nova Scotia results were also expected as there is strong evidence that the province's Sunday shopping experiments were unpopular among consumers and retailers (see "Government retreats on Sunday shopping" *Halifax Chronicle Herald*, January 29, 1991, p1, "Sunday store openings not worth it – retailers" *Halifax Chronicle Herald*, November 26, 1993, pB6 and "Sunday shopping shot down" *Halifax Chronicle Herald*, April 14, 1994, pA3). The weak results for Quebec are however surprising. Following province-wide deregulation in January 1993, the Quebec Alliance for Sunday Shopping, a lobby group made up of retailers across the province, attributed large gains in provincial retail sales to Sunday shopping deregulation (see "The average shopper in Quebec can rejoice in the latest retail statistics" *Montreal Gazette*, March 25, 1993, pC1).

$$Q = H(u, r, Y, MONTH) \tag{4}$$

where u is the provincial unemployment rate, r is the national consumer loan rate, Y is real provincial labour income and $MONTH$ is a vector of monthly dummy variables.

The model assumes that Q is exogenous to the optimization problem of the individual firm. This seems a particularly appropriate assumption for the retail industry where sales are by and large not a function of the labour employed to operate stores. Nonetheless, the total labour input employed, L, is constrained by the requirement that:

$$L \geq G(Q) \tag{5}$$

where $G' > 0$ and $G'' > 0$. If the production function for units of total labour input is given by:

$$L = F(h, N) \tag{6}$$

where F_h, $F_N > 0$ and F_{hh}, $F_{NN} < 0$, a retail firm's optimization problem can be expressed as:

$$\min_{h,N} C_L \quad subject\ to \quad F(h, N) \geq G(Q). \tag{7}$$

A solution to this problem must satisfy the first-order conditions:

$$\frac{wN}{wh + q} = \frac{F_h}{F_N} \tag{8}$$

$$F(h, N) = G(Q). \tag{9}$$

In order to derive closed-form solutions for N and h, it is convenient to assume the following functional forms for F and G:

$$F(h, N) = (h - s)^{\varepsilon} N^{1-\alpha}, \quad 0 < \varepsilon, \alpha < 1, \quad h \geq s \tag{10}$$

$$G(Q) = Q^{\gamma} + A, \quad \gamma > 1 \tag{11}$$

where s is the time it takes each worker to "set-up" for work and A is a threshold level of labour demand which is needed to oversee an open store regardless of the level of sales. Given these functional forms the long run factor demands are then:

$$h^* = \left(\frac{1-\alpha}{1-\alpha-\varepsilon}\right)s + \left(\frac{\varepsilon}{1-\alpha-\varepsilon}\right)\left(\frac{q}{w}\right) = \beta s + \theta(q/w) \tag{12}$$

$$N^* = \left[\theta(q/w) + (\beta - 1)s\right]^{-\varepsilon/1-\alpha} (Q^{\gamma} + A)^{1/1-\alpha} \tag{13}$$

assuming that $(1-\alpha) > \varepsilon$. This solution has the attractive result that only the employment level is a function of retail sales so that optimal average weekly hours will be relatively constant over the long run as the data suggest they are.[19]

Having derived a simple theoretical model of the retail firm, it is now possible to consider what impact Sunday shopping deregulation is expected to have on employment and working time in the retail industry. In his examination of the economic impact of extending shop opening hours, Gradus (1996) distinguishes between three possible effects on employment. First, to the extent that extended hours actually leads to an increase in Q there will be an increase in the long run employment level working through the production function or in the above model through Q^{γ} in equation (13). The size of this *sales effect* will depend not only on how much Sunday shopping increases total retail activity, but also on the output elasticity of the labour input, γ, and the marginal product of employment parameter, α. However, over all reasonable values of γ and α the sales effect will be weak if deregulation has a small impact on Q.

[19] This is a consequence of the production function for the total labour input. Indeed, any function of the form $L = g(h)\, N^{1-\alpha}$ where $g' > 0$ and $g'' < 0$ will produce this result. Clearly, there exists a wide range of production functions that are multiplicatively separable in h and N, including the Cobb-Douglas form. Moreover, this particular form follows directly from the fact that the total labour input, L, is the product of the number of workers employed and the average weekly hours of these workers.

Second, even if deregulation has absolutely no impact on Q, either because Sunday sales are nil or there is a one-for-one tradeoff between Sunday and Monday-Saturday sales, increased opening hours implies a necessary increase in labour demand as there are more hours in which a store needs to be supervised. Thus, deregulation should lead to an unambiguous increase in A. Since A enters (13), but not (12), this *threshold effect* will also serve to increase the total labour input entirely through the hiring of new workers, as opposed to increasing the hours of existing workers.

Finally, Gradus follows Thurik (1984) and argues that extending opening hours could have a *labour productivity effect* by flattening sales peaks during the day and thereby reducing the labour intensity at these times. This "smoothing" effect of Sunday shopping can be formally modeled by altering the basic model above so that there is a separate labour input constraint, as given by (5), for each day of the week. The minimum weekly labour input is then constrained to equal or exceed

$$G_B(Q_B) = \sum_{i=2}^{7} (Q_{Bi}^{\gamma} + A_i) \tag{14}$$

before deregulation and

$$G_A(Q_A) = \sum_{i=1}^{7} (Q_{Ai}^{\gamma} + A_i) \tag{15}$$

after deregulation, where i indexes the days of the week and both Q_B and Q_A are vectors of their respective daily values. The impact of deregulation on labour demand is then given by:

$$G_A(Q_{Ai}) - G_B(Q_{Bi}) = A_1 + \sum_{i=1}^{7} Q_{Ai}^{\gamma} - \sum_{i=2}^{7} Q_{Bi}^{\gamma} \tag{16}$$

where the first term is the threshold effect and the difference between the second and third term captures the sales and productivity effects. If $Q_{Ai} = Q_{Bi}$ for $i = 2,\ldots,7$ the total effect is simply the sum of the threshold effect, A_1, and the sales effect, Q_{A1}^{γ}. In this case the productivity effect is nil because there is no "smoothing" of sales over the days of the week. However, to the extent that there is a redistribution of sales over the days of the week there will be a productivity effect that will serve to reduce the positive sales effect. In fact, even if $\sum Q_{Ai} > \sum Q_{Bi}$, with enough "smoothing" of sales and convexity in the labour input constraint, it is entirely possible that $\sum Q_{Ai}^{\gamma} < \sum Q_{Bi}^{\gamma}$ so the productivity effect actually dominates the sales effect.

Therefore, when all three effects are taken together the theoretical model is unable to predict whether deregulation will increase or decrease the employment level in the long run. The only unambiguous prediction of the model is that average weekly hours will be unaffected by deregulation for a wide class of production functions. The possibility that Sunday shopping actually reduces the employment level is undoubtedly contrary to popular wisdom. However, to the extent that the productivity effect dominates the threshold and sales effects, it is a theoretical possibility. This implies that a properly specified empirical model should allow for this possibility by separately identifying all three potential effects of deregulation.

B. Empirical Specification

The theoretical model suggests that deregulation will impact the optimal demand for workers, but not average weekly hours. Moreover, optimal employment can be

affected by deregulation in three possible ways. This suggests that an appropriate linear specification in the logarithms of all the continuous variables is given by:

$$N_{it}^{*} = \beta_0 + \beta_1 d_{it} + \beta_2 Q_{it} + \beta_3 (Q_{it} \cdot d_{it}) + \beta_4 w_{it} + \beta_5 T_t + \beta_6 T_t^2 + \mu_{it} \quad (17)$$

$$h_{it}^{*} = \gamma_0 + \gamma_1 d_{it} + \gamma_2 w_{it} + \gamma_3 T_t + \gamma_4 T_t^2 + \varepsilon_{it} \quad (18)$$

where t indexes the month, i the province, T_t is a linear time trend and d_{it} is the deregulation indicator variable. Although the theory predicts that $\gamma_1 = 0$, the parameter is included to provide a test of this theoretical result.

With reference to equation (17), it is possible to decompose the long run change in the employment level following deregulation into the threshold, sales and productivity effects. If the long run predicted employment level prior to deregulation is given by:

$$N_{iB}^{*} = \beta_0 + \beta_2 Q_{iB} + \beta_4 w_{iB} + \beta_5 T_B + \beta_6 T_B^2 \quad (19)$$

and after deregulation by:

$$N_{iA}^{*} = \beta_0 + \beta_1 + (\beta_2 + \beta_3) Q_{iA} + \beta_4 w_{iA} + \beta_5 T_A + \beta_6 T_A^2 \quad (20)$$

the employment impact of deregulation is simply the difference

$$\begin{aligned} N_{iA}^{*} - N_{iB}^{*} &= \beta_1 + (\beta_2 + \beta_3) Q_{iA} - \beta_2 Q_{iB} \\ &= \beta_1 + \beta_2 (Q_{iA} - Q_{iB}) + \beta_3 Q_{iA} \end{aligned} \quad (21)$$

if w_{it} and T_t are held constant. The first term in (21) is the threshold effect, the second term is the sales effect and the productivity effect is captured by the third term.[20] For the estimates to be consistent with the theory we need $\beta_1 > 0$, $\beta_2 > 0$, $\beta_3 < 0$ and

[20] Notice that this is essentially the Oaxaca decomposition, due to Blinder (1973) and Oaxaca (1973), common to the discrimination literature where the gender wage gap is decomposed into a part due to differences in human capital acquisition between men and women and a part is due to unequal returns to that human capital.

$\beta_2 + \beta_3 > 0$.

The size of the sales effect will in part be determined by β_2, which captures how exogenous shocks to Q_{it} translate into adjustments in the employment level. However, it also depends on the difference $(Q_{iA} - Q_{iB})$. Thus, to estimate the sales effect it is necessary to also obtain an estimate of the deregulation impact on Q_{it}. This is done by estimating a linear form of equation (4), which is given by:

$$Q_{it} = \alpha_0 + \alpha_1 d_{it} + \alpha_2 u_{it} + \alpha_3 Y_{it} + \alpha_4 r_t + \alpha_5 MONTH + \alpha_6 T_t + \alpha_7 T_t^2 + \omega_{it}. \quad (22)$$

Although the theoretical model assumes Q_{it} is exogenous to the labour demand decision of the firm, this assumption was tested using an omitted variable version of the Hausman test. When the TDS data are used the test strongly rejects the exogeneity of Q_{it} in equation (17). The decision was therefore made to treat Q_{it} as an endogenous variable in the empirical model and to use (22) as its reduced form equation.[21]

In order to distinguish long run from short run firm responses to exogenous shocks it is necessary to add a dynamic element to this empirical model. Following Hart and Sharot (1978), the approach taken here is to assume partial adjustment of workers and instantaneous adjustment of hours. The rationale is that there are quasi-fixed costs of adjusting the employment level, whereas temporary hours adjustments are relatively costless. The partial adjustment process is given by:

$$N_{it} = \lambda N_{it}^* + (1 - \lambda) N_{t-1} \quad (23)$$

[21] The Hausman test statistic is F(2,587) = 11.81 when the TDS data are used and F(2,786) = 2.21 with the DSTM data. It turns out that the general results are quite robust between specifications, although the point estimate of α_1 seems quite sensitive to the exogeneity assumption. This is true whether the TDS or DSTM data are used.

where λ provides a measure of the degree of rigidity in the employment level. Since it is now possible that $N_{it}^{*} \neq N_{it}$, the firm may substitute towards h_t in the short run. Therefore, optimal short run, average weekly hours is expected to be increasing in $(N_{it}^{*} - N_{it})$ which can be expressed as:

$$h_{it} = \gamma h_{it}^{*} + \pi (N_{it}^{*} - N_{it}), \quad \pi > 0 \tag{24}$$

where π measures to what extent hours are increased in the short run to accommodate shortfalls in the employment level.

A complication with estimating equations (17) and (18) is that the retail wage is likely to be endogenous. To identify exogenous retail wage fluctuations, monthly provincial data on minimum wages and the average manufacturing wage are used as instruments in a reduced form equation for w_i. When this is done and the dynamic structure in (23) and (24) is applied to equations (17) and (18) to allow for temporary hours adjustments, the complete empirical model is given by the following equations:

$$\begin{aligned} N_{it} = {} & \lambda\beta_0 + \lambda\beta_1 d_{it} + \lambda\beta_2 Q_{it} + \lambda\beta_3 (Q_{it} \cdot d_{it}) + \lambda\beta_4 w_{it} + \lambda\beta_5 T_t + \\ & + \lambda\beta_6 T_t^2 + (1-\lambda) N_{i,t-1} + \mu_{it} \end{aligned} \tag{25}$$

$$\begin{aligned} h_{it} = {} & \gamma_0 + \gamma_1 d_{it} + \gamma_2 w_{it} + \gamma_3 T_t + \gamma_4 T_t^2 + \gamma_5 \left(\frac{1-\lambda}{\lambda}\right)(N_{it} - N_{i,t-1}) + \\ & \varepsilon_{it} \end{aligned} \tag{26}$$

$$\begin{aligned} w_{it} = {} & \delta_0 + \delta_1 d_{it} + \delta_2 Q_{it} + \delta_3 (Q_{it} \cdot d_{it}) + \delta_4 mw_{it} + \delta_5 manw_{it} + \delta_6 T_t + \\ & \delta_7 T_t^2 + \delta_8 N_{i,t-1} + \eta_{it} \end{aligned} \tag{27}$$

and equation (22). The presence of the endogenous variable N_{it} in (26) does not present any problems due to the exclusion restrictions on Q_{it} and $(Q_{it} \cdot d_{it})$.

The estimation procedure involves estimating the parameters in (22), (25) and (26) using data from the three provinces that experienced significant changes in Sunday retail activity following deregulation. In order to obtain a single set of parameter estimates and to identify exogenous fluctuations in Q_{it}, N_{it} and w_{it}, the 12 equation system is estimated by 3SLS with cross-equation restrictions on all the parameters. This estimator also allows us to gain efficiency from contemporaneous correlations as the estimated error-covariance matrix captures all the variances and covariances of the errors in (22), (25) and (26). Thus, as in a fixed effects model, common unexplained movements in the sales, employment and hours data within and between cross-sections are accounted for.

C. Data

The labour demand model is estimated separately using the total department store (TDS) and department store type merchandise (DSTM) sales data. Corresponding data by industrial classification on employment, average weekly hours and wages of hourly paid workers were constructed from data published by Statistics Canada in *Employment, Earnings and Hours*.[22] Unfortunately, these payroll data are not matched perfectly by industrial classification to either the TDS or DSTM sales data. The payroll data corresponding to the TDS sales data include department stores as well as smaller, general merchandise stores (SIC 6412 and 6413). The payroll data corresponding to the DSTM sales data exclude drug stores (SIC 641), which are in the DSTM sales data, and include a miscellaneous classification (SIC 659), which are not in the DSTM sales data. Monthly,

[22] The payroll data published in *Employment, Earnings and Hours*, Statistics Canada, Catalogue no. 72-002 are compiled from monthly surveys of employers in each province at detailed industrial levels.

provincial aggregate data on the remainder of the variables in the empirical model were collected which produced two complete seasonally unadjusted, time-series data sets covering three from January 1983 to September 1999. Summary statistics on all the remaining variables are provided in the Appendix. Ideally, data from the late 1970's should have been included in these series, but the payroll data from Statistics Canada only begin in 1983. This is a problem given that Alberta experienced deregulation in November 1984.

4. Empirical Results

The results from estimating equations (22), (25) and (26) with the TDS and DSTM data are presented in Tables 4 and 5 respectively. The sales, threshold, productivity and hours effects estimates are shown in Table 6 with their 95 percent confidence intervals. The results from both data sources suggest that quite significant gains in retail sales were made following deregulation. The TDS data suggest a 9.0 percent increase in retail sales, whereas the more aggregate data suggest a 7.8 percent gain. Given that store hours probably increased by about 8 percent for the typical establishment, these estimates are high, but not implausible.[23] The difference between the results obtained from the two data sources may reflect that general merchandise stores benefited relatively more from deregulation as expected.[24] When these estimates of α_1

[23] Typical retail hours in Canada are 10AM to 9PM from Monday to Friday, 10AM to 6PM on Saturday and 12PM to 5PM on Sunday. In this case, Sunday openings will increase total retail hours by about 8 percent. The relatively large estimated gains in retail sales may reflect pent-up recreational or tourist demands for Sunday shopping or simply a shift in sales away from establishments that are not included in the sales data. The latter consideration is particularly important in the TDS data.

[24] In Canada, there is strong evidence that political pressure for deregulation was largely driven by coalitions of the major department stores presumably because they expected to gain the most from deregulation (see "Quebec retailers join to promote Sunday shopping" *Marketing* October 5, 1992, p3,

are combined with the labour intensity estimates, β_2, the results suggest a modest sales effect on employment of about 2 to 3 percent.[25]

In contrast, the threshold effect estimates of 48.9 percent from the TDS data and 18.2 percent from the DSTM data exceed any reasonable explanation.[26] Similarly, the productivity effect estimates, given by β_3, exceed expectation. From equation (21), the magnitude of the productivity effect depends on at what value of Q_{iA} it is evaluated. However, it is not obvious what the appropriate value should be. The approach taken here is to calculate for each province the annual average level of log retail sales in the twelve-month period in which deregulation occurs in the sixth month. The average of these values over the provinces is 11.703 in the TDS data and 6.313 in the DSTM data, which imply productivity effects of 38.0 percent and 13.0 percent respectively. Although we have no strong predictions regarding the magnitude of the productivity effect, intuition suggests that the amount of "smoothing" needed to reduce the long run employment level by one-third could not have resulted from the addition of a single day of shopping. The problem is that both the threshold and productivity effects are estimated imprecisely since

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"Sunday closings will hurt us: Club Price" *Montreal Gazette*, December 17, 1991, pB1, "Bay boycott urged" *Briarpatch* 18(4):5 and "Prairie city sees itself battling Bay St. in Sunday shopping war" *Toronto Star*, October 26, 1988, pA18).

[25] In fact, the sales effect is greater in the DSTM data. The reason is that the estimate of the labour intensity parameter, β_2, is larger in the DSTM data. At least part of this difference probably reflects the superior sales capacity of the larger, general merchandise stores relative to the smaller, specialized merchandise stores included in the DSTM data.

[26] Intuition suggests that the increase in the level of threshold labour, A in (13), should be equivalent to the increase in store hours. Thus, the threshold effect point estimates imply that the threshold labour elasticity of employment exceeds 3 and 5 respectively. Is this theoretically plausible? From (13) this elasticity reduces to:

$$\varepsilon_{NA} = \frac{1}{(1-\alpha)(Q^{\gamma}/A + 1)} \quad .$$

A necessary condition for this elasticity to exceed 5 is $\alpha > 0.8$ and by a considerable margin unless Q^{γ} / A is close to 0. Since a solution to (7) requires that $(1 - \alpha) > \varepsilon$ the threshold effect point estimates imply strong decreasing returns to scale in the production of the labour input as given by (10) which is clearly a difficult result to explain.

quite plausible values of both effects fall within 95 percent confidence intervals. In addition, plausible estimates are obtained when the estimates of the two effects are combined. The TDS and DSTM data then imply a 10.9 and 5.2 percent increase in the long run employment level respectively.

It appears that the empirical model is unable to separately identify both the threshold and productivity effect. The reason is simply that the threshold effect is calculated at $Q_{it} = 0$, but there are no data points close to 0. As a result of the linearity imposed on the data, any reduction in labour intensity following deregulation, reflected in a negative estimate of β_3, necessarily implies a corresponding increase in the threshold effect. Because there are no observations when Q_{it} is close to 0, the threshold effect is entirely determined by this change in the slope of the fitted regression line via this tradeoff. The point is that both estimates are identified by a single source of information, the change in labour intensity following deregulation. It is therefore no surprise that when this information is limited to identifying a single parameter, by combining the two effects, the estimation implies an entirely plausible employment effect of deregulation. When all three employment effects are combined the TDS data imply a permanent 12.7 percent increase, whereas the DSTM data imply an 8.5 percent gain.

In contradiction of the theoretical prediction of constant h_{it}^{*}, the estimate of γ_1, from both data sources, implies a *permanent* 3 percent increase in average weekly hours. How can these results be explained? A serious oversimplification of the theoretical model is that it assumes retail firms can adjust N and h in any possible way to produce the required L. However, in reality individual establishments must produce work schedules that divide total hours of work in a way that is acceptable to all new and

existing employees. The resulting coordination problems, which will be particularly important with heterogeneity in workers' tastes, may make setting a unique level of L without some adjustment to h impossible. The evidence here suggests that obtaining the desired L following deregulation involved having either some existing employees work Sunday shifts in addition to their regular shifts or having some new employees work more than the pre-deregulation level of average weekly hours.[27]

The partial adjustment parameter, λ, estimates reveal some stickiness in the retail industry employment level. At first glance this rigidity of employment appears considerable, particularly with the DSTM data, but it should be emphasized that it is estimated using monthly data so N_{it} will be more than half-way to reaching N_{it}^{*}, two to three months following a shock. The point here is that the low estimate of λ leads to some short run dynamics. However, this in turn produces no short run fluctuations in average weekly hours due to the insignificant estimates of γ_4 from both data sets. Thus, in the short run the total labour input employed, L, falls below its optimal long run level. Given that there were significant increases in Sunday opening hours, as the trading-day regression analysis suggests, how did general merchandise stores overcome this temporary shortfall in the labour input? The lack of substitutability between workers and hours probably reflects the difficulty of adjusting workers' weekly hours of work. This rigidity is likely to be particularly important when retail firms are asking their existing workers, who in some jurisdictions have the legal right to refuse Sunday work, to

[27] In either case, these results are in contrast to that of Upton (1986) who collected information from five large British retail firms that operated stores in Scotland, where there has never been formal regulation of Sunday shopping, to find out how their needs for Sunday employment were satisfied. He found that among these firms much of the labour was provided by "Sunday-only" part-timers who the firms claimed they had little difficulty in recruiting. Clearly, to the extent that this strategy is dominant in the industry, average weekly hours should fall, not rise, following deregulation.

temporarily work Sunday shifts until new workers can be hired. A possible firm response is for store owners or managers to work Sunday shifts themselves until new employees with low preferences for Sunday leisure are recruited. Since the hours of store owners and managers do not appear in the data there is no evidence of a short run tradeoff between workers and hours.

5. Conclusion

Using aggregate data on employment and hours of work at two levels of the retail trade industry classification, a simple dynamic labour demand model was estimated to examine retail firm responses to an exogenous increase in permitted opening hours. The results suggest that Sunday shopping deregulation led to long run increases in both the employment level of retail workers paid by the hour and in their combined average weekly hours of work. There is evidence that the employment gains were driven by an increase in the level of threshold labour that dominated an offsetting gain in labour productivity. In addition, the results suggest that the employment gains were larger among general merchandise stores than among more specialized retail establishments.

There is also evidence that retail firms were unable to *temporarily* raise the weekly hours of their existing employees to overcome the significant rigidities in the employment level. However, both data sources suggest that there was an instantaneous and *permanent* 3 percent increase in average weekly hours. Although these results imply that existing employees satisfied at least some of the need for Sunday labour immediately following deregulation, they do not provide any direct evidence on whether new or existing employees satisfied this need in the long run. Indeed, the results from both data

sources are consistent with either new or existing employees working all the Sunday shifts in the long run. More precise evidence will require establishment level data with information on the hours of individual employees.

Table 1
Regulation of retail business hours in Canada

Province	Legal change date and general rule	Legislation
Newfoundland	Jan.1998: amendment to the *Shops Closing Act* passed to permit wide-open Sunday shopping throughout the province.	*Shops Closing Act* (1977)
Prince Edward Island	Nov.1992: legislation passed to permit business establishments to open on Sundays from the last Sunday in November to the Sunday preceding Christmas.	*Day of Rest Act* (1985) *Retail Businesses Holidays Act* (1992)
Nova Scotia	Mar.1990 - Jan.1991: temporary experiment which allowed stores less than 40,000 sq. feet to open on Sundays. Oct.1993 - Dec.1993: temporary experiment with deregulation by legislative amendment.	*Retail Business Uniform Closing Act* (1985) *An Act to Amend Chapter 402 of the Revised Statutes* (1993)
New Brunswick	Nov.1991 - Dec.1991: temporary amendment to permit shopping in most retail establishments. September - December of every year beginning in 1992: amendment to *Days of Rest Act* which allows Sunday shopping from first Sunday following Labour Day to the Sunday immediately preceding Christmas. August - January of every year beginning in 1996: amendment to *Days of Rest Act* which allows Sunday shopping from first Sunday in August to the second Sunday after Christmas.	*Days of Rest Act* (1985)
Quebec	Jan.1993: wide-open Sunday shopping legislated on Dec. 18, 1992.	*Act respecting commercial establishments business hours* (1990) *Act to amend this law* (1992)
Ontario	Jul.1990 - Mar.1991: in Jun.1990 the *Retail Business Holidays Act* found to be unconstitutional by Ontario Supreme Court and in Mar.1991 the Ontario Court of Appeal reversed this decision. Result was 9 months of wide-open Sunday shopping. Dec.1991: legislation amended to permit Sunday shopping in the month of December. Jun.1992 - present: Bill introduced to permit wide-open Sunday shopping which came into force on June 3, 1992.	*Retail Business Holidays Act* (1990) *Retail Establishments Statute Law Amendment Act* (1991) *Act to Amend the Retail Business Holidays Act in respect of Sunday Shopping* (1992)

Manitoba	Dec.1992 - Sept.1993: two separate amendments to *Retail Business Holiday Closing Act* which led to 10 month experiment with wide-open Sunday shopping. Oct.1993: municipal autonomy.	*Retail Business Holiday Closing Act* (1987) *Bill 4, Retail Businesses Sunday Shopping* (1992) *Bill 23, An Amendment to Retail Businesses Sunday Shopping* (1993)
Saskatchewan	Spring 1988: Province passed legislation providing municipal autonomy.	*Urban Municipality Amendment Act* (1988)
Alberta	Nov.1983: Alberta Court of Appeal struck down *Lord's Day Act* in Nov. 1983, but wide-spread Sunday shopping began in major cities in Nov. 1984. In 1985, legislation passed officially providing municipal autonomy.	*Municipal Government Amendment Act* (1985)
British Columbia	1980: legislation passed providing municipal autonomy.	*Holiday Shopping Regulation Act* (1980)

SOURCES: Human Resources Development Canada website at: http://labour-travail.hrdc-drhc.gc.ca/policy/leg/e, APEC Newsletter 36(8), various newspaper articles.

Table 2
Trading-day Regression – TDS data

	30 Days			31 Days		
	Before	After	Wald	Before	After	Wald
Nova Scotia	-0.477	-2.209	4.67	-1.124	-1.849	0.84
	(0.567)	(0.934)		(0.515)	(0.902)	
New Brunswick	-0.701	-0.311	0.44	-1.284	-0.950	0.39
	(0.426)	(0.658)		(0.387)	(0.597)	
Quebec	-0.562	-0.376	0.32	-0.909	-0.956	0.03
	(0.434)	(0.471)		(0.395)	(0.426)	
Ontario	-1.407	-0.353	7.54	-1.612	-1.149	1.77
	(0.454)	(0.476)		(0.413)	(0.431)	
Manitoba	-1.169	-0.345	1.86	-1.717	-1.284	0.63
	(0.658)	(0.737)		(0.600)	(0.665)	
Saskatchewan	-0.770	-0.565	0.20	-0.688	-0.936	0.34
	(0.542)	(0.498)		(0.495)	(0.452)	
Alberta	-2.110	-0.497	4.05	-2.467	-1.131	3.50
	(0.929)	(0.683)		(0.830)	(0.623)	

NOTE: Standard errors are in parentheses.

Table 3
Trading-day Regression – DSTM data

	30 Days			31 Days		
	Before	After	Wald	Before	After	Wald
Nova Scotia	-2.498	-4.388	0.42	-3.793	-4.034	0.01
	(2.343)	(3.557)		(2.124)	(3.402)	
New Brunswick	-4.163	1.840	7.98	-5.385	-0.389	6.52
	(2.122)	(2.783)		(1.922)	(2.549)	
Quebec	-3.884	-2.932	0.45	-4.633	-3.820	0.40
	(1.975)	(2.148)		(1.792)	(1.943)	
Ontario	-5.164	-2.319	3.23	-4.458	-3.914	0.14
	(1.882)	(1.998)		(1.706)	(1.809)	
Manitoba	-3.507	-0.427	5.17	-4.313	-2.546	2.10
	(1.066)	(1.332)		(0.970)	(1.196)	
Saskatchewan	-4.039	-2.491	0.59	-4.892	-3.251	0.80
	(1.948)	(1.741)		(1.770)	(1.574)	
Alberta	-5.579	-3.412	0.61	-4.990	-4.159	0.12
	(2.780)	(1.748)		(2.445)	(1.594)	

NOTE: Standard errors are in parentheses.

Table 4
Labour Demand Model - TDS data

Q_{it}		N_{it}		h_{it}	
d_{it} (α_1)	0.090	d_{it} (β_1)	0.489	d_{it} (γ_1)	0.032
	(11.47)		(2.81)		(4.73)
u_{it} (α_2)	-0.001	Q_{it} (β_2)	0.200	w_{it} (γ_2)	-0.129
	(-0.59)		(2.66)		(-2.37)
Y_{it} (α_3)	1.511	$Q_{it} \cdot d_{it}$ (β_3)	-0.033	T_t (γ_3)	-0.002
	(33.91)		(-2.24)		(7.82)
r_{it} (α_4)	0.007	w_{it} (β_4)	0.077	T_t^2 (γ_4)	0.1E-04
	(3.14)		(0.29)		(7.61)
T_t (α_5)	-0.009	T_t (β_5)	-0.4E-03	N_{it}-$N_{i,t-1}$ (γ_5)	-0.001
	(-35.05)		(-0.23)		(0.07)
T_t^2 (α_6)	0.3E-04	T_t^2 (β_6)	-0.1E-04		
	(21.55)		(-1.48)		
		$N_{i,t-1}$ (λ)	0.202		
			(12.87)		

NOTE: Asymptotic t-statistics are in parentheses. All estimates are the derived long-run parameter values shown in parentheses beside the variable name.

Table 5
Labour Demand Model - DSTM data

Q_{it}		N_{it}		h_{it}	
d_{it} (α_1)	0.078	d_{it} (β_1)	0.182	d_{it} (γ_1)	0.025
	(13.18)		(2.79)		(5.29)
u_{it} (α_2)	-0.012	Q_{it} (β_2)	0.424	w_{it} (γ_2)	-0.604
	(-8.76)		(8.67)		(-19.09)
Y_{it} (α_3)	1.095	$Q_{it} \cdot d_{it}$ (β_3)	-0.021	T_t (γ_3)	-0.003
	(30.38)		(-2.05)		(-14.09)
r_{it} (α_4)	0.003	w_{it} (β_4)	-0.073	T_t^2 (γ_4)	0.1E-04
	(1.56)		(-0.53)		(11.11)
T_t (α_5)	-0.002	T_t (β_5)	0.9E-03	N_{it}-$N_{i,t-1}$ (γ_5)	0.036
	(-13.14)		(1.29)		(1.58)
T_t^2 (α_6)	0.3E-05	T_t^2 (β_6)	-0.7E-05		
	(3.14)		(-2.32)		
		$N_{i,t-1}$ (λ)	0.271		
			(11.26)		

NOTE: Asymptotic t-statistics are in parentheses. All estimates are the derived long-run parameter values shown in parentheses beside the variable name.

Table 6
Labour Demand Model – Combined employment and hours effects

	TDS		DSTM	
	Estimate	95% CI	Estimate	95% CI
Sales effect	0.018	0.004 to 0.031	0.033	0.024 to 0.042
Threshold effect	0.489	0.148 to 0.831	0.182	0.054 to 0.309
Productivity effect	-0.380	-0.713 to –0.047	-0.130	-0.254 to –0.005
Total employment effect	0.127	0.067 to 0.187	0.085	0.051 to 0.119
Hours effect	0.032	0.019 to 0.045	0.025	0.015 to 0.034

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Appendix

Variable descriptions and first and second moments.

Symbol	Description	Ontario	Manitoba	Alberta
TDS Data				
Q_{it}	Real retail sales	13.069	10.844	11.819
		(0.284)	(0.303)	(0.292)
N_{it}	Employment of hourly paid workers	11.182	9.006	9.878
		(0.133)	(0.170)	(0.307)
h_{it}	Average weekly hours of hourly paid workers	3.112	3.133	3.179
		(0.086)	(0.075)	(0.069)
w_{it}	Average real wage of hourly paid workers	2.260	2.149	2.269
		(0.059)	(0.062)	(0.086)
DSTM Data				
Q_{it}	Real retail sales	7.660	5.225	6.417
		(0.214)	(0.199)	(0.183)
N_{it}	Employment of hourly paid workers	12.065	9.691	10.682
		(0.068)	(0.066)	(0.084)
h_{it}	Average weekly hours of hourly paid workers	3.186	3.178	3.193
		(0.067)	(0.057)	(0.053)
w_{it}	Average real wage of hourly paid workers	2.212	2.112	2.189
		(0.037)	(0.062)	(0.068)
Common				
d_{it}	Sunday shopping deregulation indicator	0.490	0.410	0.895
		(0.501)	(0.493)	(0.307)
Y_{it}	Real seasonally adjusted labour income	16.405	13.895	14.975
		(0.100)	(0.042)	(0.107)
r_t	National consumer loan rate (Bank of Canada index)	12.158	12.158	12.158
		(2.348)	(2.348)	(2.348)
u_{it}	Seasonally adjusted unemployment rate	8.099	7.930	8.430
		(2.239)	(1.217)	(1.701)
mw_{it}	Real minimum wage	1.758	1.639	1.578
		(0.090)	(0.064)	(0.045)
$manw_{it}$	Average real manufacturing wage	2.738	2.518	2.670
		(0.029)	(0.020)	(0.050)

NOTE: Standard deviations are in parentheses. All real variables are constructed using the provincial consumer price index (1992=100).