

Price Convergence and Market Integration: Strong Evidence Using Canada Data

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Abstract: Based on panel econometric method, this study quantitatively assesses the dynamics of 42 province-level price indices, as well as real wage and unemployment rate within Canada. It finds a overwhelming majority reject the unit root null hypothesis in favor of mean-reverting process without stochastic trend. The average speed at which CPI subgroups move toward parity is well under half a year varying across spectrum of items. The pace accelerates in regression using CPI major components and in estimating individual province coefficient, bounding around two months. These imply Canada's economy is highly integrated. There is a noteworthy observation that tradable goods are not easier to reject nonstationarity than services that challenges findings of some existing literatures. Our investigation also manifests unemployment rate discrepancies between provinces will persist a longer time than real wage.

Keywords: Price Convergence, Economic Integration, Panel Unit Root Test, Half Life

JEL classification: F15 O51

1. Introduction

The theory of purchasing power parity (PPP) is always drawing scholars' attention over a century. It states that in the absence of government intervention and significant freight charges and tariffs, an internationally traded basket of similar goods should sell for the same effective price. Though simple in theory, PPP doesn't hold by numerous empirical studies. (Rogoff, 1996).

To date, there has been a growing body of works shifting from this well-established field in international economics to a intra-national version—the Law of One Price (LOP), fueled by newly found panel dataset and innovated econometric methodology. In recent studies

examining the convergence of prices within a single domestic country without trade barriers and exchange rate fluctuation, mostly in U.S, Parsley and Wei (1996) found convergence rates substantially higher than typically found in cross-country data using a panel of 51 prices from 48 cities. Engel and Rogers (2001) used new disaggregated data on consumer prices to determine why there is variability in prices of similar goods across US cities. Ceccetti, Mark and Sonora (2002) studied the dynamics of price indices for major US cities and found that relative price levels among cities mean revert at a very slow rate.

Our study intends to further examine the Law of One Price and more precisely investigate whether prices for homogeneous products are similar across different national parts after market forces adjustment. In mathematical sense, price series are stationary without random walk and price differentials will shrink gradually over cross-sections. We will explore data on 42 official monthly CPI items for twelve Canada provinces from 1995 to 2004. Our work is partially inspired by the remarkable study by Engel and Rogers (1996), Ceglowski (2003), Culver and Papell (1999).

However, our study owns some unique characteristics compared to their previous works. Firstly, the paper employs a monthly CPI dataset from Statistics Canada, instead of disaggregated retail prices (Ceglowski 2003), as they are closer monthly average data than point-in-time data. And in order to get a single product price, several outlets are sampled during the month. They cover a substantially broader range of goods and services than just raw prices. Categorized items could be used for separate panel unit root tests to get their specific attributes. Secondly, the dataset happens to exactly continue the time series by Engel and Rogers, who gleaned Canada's CPI from 1978 to 1994, and roughly extend the data series by Ceglowski, who assembled Canada retail prices up to 1993. Thirdly, we use province-level price indices rather than city-specific ones. This represents a first attempt combining pure econometric investigation of law of one price and regional development inequality comparison. Previous studies had not explored it sufficiently observing city data. Fourthly, in an effort to refer to the price movement, we pool two more economic indicators—real wage and unemployment rate into the panel to examine whether they follow any convergence pattern. More, it is a novel paradigm for policy wisdom to account for income inequality and market segmentation.

After a set of empirical analysis procedures, we find that most CPI items including main components and subgroups along with real wage and unemployment rate demonstrate strong evidence of convergence to the cross sectional mean, with half life average well under half a year. The results are based on the commonly-implemented criterion of convergence established by Levin and Lin (1992). The half life we estimate is much smaller or speed of convergence is fairly faster than consensus estimates of one year or so examining domestic price convergence (Parsley and Wei, 1996, Ceglowski 2003). This phenomenon could be explained particularly by utilizing higher frequent and province-level data as the former has more power and the latter is approximate to the mean, and generally by Canada such integrated economy.

The remaining of our study is organized as follows. Section 2 briefly describes data collection. Section 3 spells out the econometric method applied in our paper. Section 4 presents empirical results and concluding remarks are given in the final section.

2. Data

The panel dataset we employed is official CPI data on 42 items (8 major components and 34 subgroups) from twelve Canadian provinces from January 1995 to March 2004. They were retrieved from monthly publication of Consumer Price Index by Statistics Canada. Canada CPI is calculated as a weighted average of specified commodity price indices. The weights are derived from the Survey of Household Spending data. It measures price change by comparing, through time, the cost of a fixed basket of commodities with equivalent quantity and quality, so it reflects only pure price movement. The prices used in the CPI calculation are final prices, including the Goods and Services Tax (GST), as well as provincial retail sales taxes wherever applicable. We also employ real wage and unemployment rate data. They are extracted from monthly journal of Canada Economic Observer. Real wage is computed via two economic indicators, average weekly earnings divided by CPI for All-Item in that month.

3. Methodology

Panel unit root tests have been widely used in the test of PPP/LOP in recent years. This is due partly to the fact that they are more powerful than unit root tests for a single time series

data as well as to the availability of panel data with long time span. The test we applied in this paper is the most popular one which is developed by Levin and Lin (dubbed ‘LL test’). The LL test can be viewed as a natural extension of the Dickey and Fuller (1981) test for a unit root, or pooled Dickey-Fuller test, when lags are considered. The structure of the LL test analysis can be summarized in the following equation:

$$\Delta Y_{i,k,t} = \alpha_i + \delta_i t + \theta_t + \beta_i Y_{i,k,t-1} + \xi_{i,t}, i = 1, 2, \dots, N, t = 1, 2, \dots, T.$$

In our panel econometric analysis, we took account of a common time effect (the cross sectional means); the results are independent of the choice of a numeraire province. Thus, $Y_{i,k,t}$ is the log-difference of the price of product i in province k , relative to the mean price of all provinces for product i at time t , and Δ denotes the first difference operator. In what follows, i will equivalently be regarded as the real wage and the unemployment rate wherever applicable, and its price will correspondingly be interpreted as the actual value of the real wage and the unemployment rate. α_i is a unit-specific constant used to control non-time-depending heterogeneity across units, such as income levels and sale taxes, θ_t is a common time effect, which captures the impact of macroeconomic shocks.

LL test amounts to testing for the null hypothesis $H_0 : \beta_i = 0$ for all i , against the alternative $H_A : \beta_i < 0$ for all i , with auxiliary assumptions under the null being required about the coefficients relating to the deterministic components. The estimated value of $\hat{\beta}_i$ is the core of the test of convergence. If $\hat{\beta}_i \geq 0$, the price differential $Y_{i,k,t}$ is non-stationary, indicating persistent or explosive price divergence, while a negative and significant value of $\hat{\beta}_i$ suggests price convergence, and its magnitude determines the speed of convergence. Specifically, the half-life of a shock to the price differential is computed as

$$-LN(2) / LN(1 + \hat{\beta}_i).$$

If the equation is estimated by using monthly data as in this paper, an estimated value of $\hat{\beta}_i$, say -0.5 , would suggest that the price differential is to be reduced by half in 1 month, while others stay unchanged.

More specifically, the LL test assumes that each individual unit in the panel shares the same AR(1) coefficient, but allows for individual effects, time effects and a possible time trend. The unit-specific fixed effect is an important source for heterogeneity in here since the coefficient of the lagged dependent variable is restricted to be homogeneous across all units of the panel. Lags of the dependent variable may be introduced to allow for serial correlation in the errors. After transformation, the t-star statistics will be distributed standard normal under the null hypothesis of nonstationarity.

The main theorem in Levin and Lin relates to deriving the asymptotic distributions of the panel estimator β_i under different assumptions on the existence of fixed effects or heterogeneous time trends. The simplest cases to be considered are those with $\xi_{i,t} \sim IID(0, \sigma^2)$ for fixed i , the errors are also assumed to be independent across the units of the sample. For example, if $\alpha_i = \delta_i = 0$ for all i and there are no common time effects, then the asymptotic distribution of the ordinary least square pooled panel estimator β will be given by

$$T\sqrt{N}\beta \Rightarrow N(0,2), T, N \rightarrow \infty \quad t_{\beta=0} \Rightarrow N(0,1)$$

in which the convergence rate to normality of the coefficient estimator goes faster as $T \rightarrow \infty$ than as $N \rightarrow \infty$.

4. Empirical Result

4.1 Test of convergence

In this section, we firstly testify whether price indices are unit root processes, i.e. series which contain a stochastic trend or unit root which makes them diverge from one another. After rejection of null hypothesis, that is, the level of price indices in various provinces converges to a steady-state value, we turn to the issue of the rate of convergence. For exponential convenience, we discuss every single item at the same time.

We used cross sectional mean instead of set any province as benchmark; as the panel analysis makes it unnecessary to select a *numeraire* since any movements in a *numeraire* province level will be absorbed into the common time effect (see Cecchetti, Mark and

Sonora, 2002). As mentioned above, the null hypothesis is a stochastic trend or a random walk, and the alternative hypothesis is a zero-mean AR(1) process common to all province-pairs. Durbin Watson statistics measures the degree of estimation accuracy, the closer to two, and the more precise. If some biases mislead to results far from being conclusive during the procedure, more lags would be added for correction.

In Table 1, the regression results are displayed on an item-by-item base. Levin and Lin (1992) have shown that panel data can dramatically increase the power of the unit root test, and that in contrast to the univariate case, the test statistics in a panel context is asymptotically normal. In all cases, the point estimate of beta is negative. According to Levin and Lin, the critical values for $t=100$ $N=10$ (nearest to our panel) at 1%, 5% and 10% are -2.48, -1.81 and - 1.44 respectively. Based on these thresholds, we found that a vast majority of cases (33 out of 34) reject the null hypothesis and support the law of one price within Canada. The excluded one is automotive vehicle insurance premium. This insurance premium is mostly subject to diversified provincial insurance plans, which are exercised by local monopoly power. For instance, in provinces like Alberta, Yukon, Northwest Territories, Ontario, Newfoundland, New Brunswick, Nova Scotia and Prince Edward Island, all car insurance is provided by private non-government insurance companies which compete for business. Physical Damage and compulsory Third Party Liability coverage's are also provided by private non-government insurance companies in Quebec. And Basic Bodily Injury coverage is provided by the government, with additional Accident Benefits coverage available from private insurers. In provinces like British Columbia, Saskatchewan and Manitoba, a government-owned insurer provides the basic compulsory coverage. The government and private insurers compete for optional and top-up "excess" or additional coverage. For the remaining 33 items, all but Replacement cost and Recreation are rejected at 5% significant, the others are easily rejected at 1% significant.

As the next step, we estimated the half life for all the other 33 items than the automotive vehicle insurance premium by $-LN(2)/LN(1 + \beta_i)$. Shocks don't present delaying at a constant rate and make the calculated half life diversified, ranging from 0.28 (Gasoline) as bottom to 67.2 (Recreation) as pink, with average 4.72 closest to 4.17 (Fuel oil and other fuel), it economically means price differential of Gasoline within Canada provinces could

Table 1: Testing for Stationarity and Estimating Rates of Convergence for CPI subgroup

	β	t-statistic	Half life	DW Stat.
Food purchased from stores	-0.209	-7.69 ***	2.96	2.05
Meat	-0.254	-9.45 ***	2.36	2.05
Dairy products	-0.272	-10.11 ***	2.18	2.04
Bakery and other cereal products	-0.369	-14.1 ***	1.51	2.08
Fresh fruit	-0.304	-11.32 ***	1.91	2.09
Fresh vegetables	-0.158	-5.72 ***	4.03	2.03
Food purchased from restaurant	-0.126	-4.59 ***	5.15	2.03
Rented accommodation	-0.882	-29.3 ***	0.32	2.04
Owned accommodation	-0.77	-25.9 ***	0.47	2.09
Replacement cost	-0.055	-1.83 **	12.3	2.01
Homeowners' insurance premium	-0.702	-23.5 ***	0.57	2.08
Homeowners' maintenance	-0.721	-24.5 ***	0.54	2.11
Water, fuel and electricity	-0.327	-12.2 ***	1.75	2.12
Electricity	-0.545	-20.2 ***	0.88	2.09
Natural gas	-0.682	-17.8 ***	0.6	2.06
Fuel oil and other fuel	-0.153	-5.28 ***	4.17	2.01
House operation	-0.074	-2.69 ***	9.02	2.01
Telephone services	-0.11	-3.99 ***	5.95	2.01
Household furnishings	-0.159	-5.83 ***	4.0	2.06
Women's clothes	-0.322	-11.89 ***	1.78	2.06
Men's clothes	-0.378	-14.45 ***	1.46	2.13
Foot wear	-0.371	-14.18 ***	1.49	2.14
Private transportation	-0.257	-9.55 ***	2.33	2.08
Purchase and lease of auto vehicles	-0.488	-17.83 ***	1.04	2.05
Gasoline	-0.915	-33.17 ***	0.28	2.03
Auto vehicle insurance premium	-0.034	-1.23	NA	2.01
Public transportation	-0.115	-4.18 ***	5.67	2.02
Health	-0.074	-2.69 ***	9.02	2.01
Personal care	-0.613	-22.93 ***	0.73	2.12

Table 1 continued

Recreation	-0.011	-2.2 **	62.7	1.82
Education and reading	-0.703	-26.24 ***	0.57	2.13
Alcoholic beverages	-0.165	-6 ***	3.84	2.01
Tobacco products	-0.319	-12.04 ***	1.80	2.08
Energy	-0.247	-9.1 ***	2.44	2.07
Average	-0.349	-12.46 ***	4.72	2.05

Note: Critical values at 1%, 5%, and 10% are -2.48, -1.81 and -1.44 respectively. And *** indicates 1% significant level, ** 5% significant level, and * 10% significant level.

die out by half in 0.28 month, i.e. about eight days, and in a very different 67.2 months for Recreation. To some extent, we could exclude Recreation as a convergence example. The average rate of convergence, 4.72 months, could be cited for international comparison. Parsley and Wei (1996) argued that the speed of convergence within U.S. border is about 4-4.5 quarters for goods and 5 years for services. Ceglowski (2003) got a similar pace under a year employing Canada city-specific retail prices. Papell (1997), Lothian (1997) Wei and Parsley (1995), pointed out that relative prices will revert to a common mean at rates ranging from 4 to 5 years across different currency areas. The rapid pace of convergence falls into our expectation provided the high frequency of labor and capital mobility and steady economic circumstances in Canada, despite being accompanied by slight regional inequality.

To make a rough contrast among big groups, we will exert the same LL test again for eight main CPI components in Table 2, to uncover whether tradable goods are easier to reject the null hypothesis with faster speed of adjustment than services, this notion is almost undoubted by some existing literatures. Anomalous half lives didn't confirm their statements. Food is the second slowest item to converge, which is preceded by Recreation, though with minimum price variability. On the contrary, Alcohol and tobacco have the largest price dispersion while they revert to mean fastest. Though disappointed, we trimmed out an interesting linkage between the initial price differential and the convergence speed from a cluster of figures, that is, the larger the initial price differentials are, the faster they move toward parity, which is true for seven items other than Recreation.

T-statistics shows that all eight components can be rejected by unit root null at 1% level. Average half live 1.95, dramatically lower than 4.72, manifests that the degree of convergence for components is higher than that of subgroups, which is subsequently higher than that of raw price data.

Table 2 Statistics and Convergence Test for CPI major component

	Absolute mean	Standard deviation	β	t-statistics	Half life	Sample size
Food	0.021	0.018	-0.21	-7.83	2.94	1332
Shelter	0.039	0.059	-0.68	-25.7	0.61	1332
Household operation and furnishing	0.031	0.023	-0.24	-8.96	2.53	1332
Clothing and footwear	0.032	0.032	-0.69	-25.9	0.59	1332
Transportation	0.032	0.024	-0.32	-12.2	1.8	1332
Health and personal care	0.032	0.032	-0.66	-24.5	0.64	1332
Recreation, education and reading	0.039	0.033	-0.11	-4.04	5.95	1332
Alcoholic beverage and tobacco	0.078	0.081	-0.73	-27	0.53	1332
Average	0.038	0.038	-0.46	-17.02	1.95	1332

4.2 Specific Provincial Feature of Convergence

The deficiency of LL test is that the coefficients in the test were restricted to be homogeneous over different cross-sectional units, namely, the rejection of unit root in the LL test implies that prices across all units have to converge at the same speed. Table 3 entitles us to have a crude glance at some summary statistics of individual provinces; however, it can't answer such questions as whether Law of One Price holds true for every single province, with what kind of speed, and whether the real wage and the unemployment rate have the equal order of mean reversion? Table 4 is displayed to fill this gap. And the price differential is separately defined as the log difference of price for one province over the mean value of all provinces. According to Levin and Lin (1992), the critical values for

T=100, N=1, are -2.59, -1.92 and -1.61 at 1% significant, 5% significant, 10% significant respectively. Using this gauge, we rejected most of items at 1% significant. Surprisingly, there emerge seven items not passing through the criterion of convergence. Except Transportation in Newfoundland, Recreation in Nova Scotia, New Brunswick, and British Columbia, they didn't approach to mean value. For clothing and footwear in Ontario, Alcoholic beverage and tobacco in Manitoba and Real wage in Alberta, the beta values are

Table 3: Summary Statistics of CPI (major component), real wage, and unemployment rate for 10 province

	Newfoundland and Labrador		Prince Edward Island		Nova Scotia		New Brunswick		Quebec	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Food	116.9	5.51	119.3	9.38	121.5	9.06	118.9	8.13	119	6.27
Shelter	113.4	7.53	113.2	8.64	117.6	7.67	117.8	7.35	119.4	12.9
Household operation and furnishing	111.3	4.11	<u>122.2</u>	7.17	113.5	5.98	113.2	6.38	115.8	7.15
Clothing and footwear	112.2	13.4	115.2	11.2	118.7	10.1	115.3	10.9	112.5	14.8
Transportation	134.7	9.55	128.8	9.28	131.7	8.63	130.5	9.38	124.6	6.8
Health and personal care	111.7	11.9	122.2	14.1	118.6	12.3	116.9	12.9	122.4	15
Recreation, education and reading	129.3	11.8	127.9	11.7	128.7	9.99	126.7	10.7	124.9	15.3
Alcoholic beverage and tobacco	125.1	3.56	123.2	6.19	121.6	2.33	115.8	1.69	113.8	2.68
Real wage	4.86	0.41	4.3	0.38	4.53	0.43	4.75	0.45	5.14	0.53
Unemployment rate	16.5	3.52	13.7	1.79	10.8	1.46	10.9	1.16	10.2	1.31

Table 3 continued

	Ontario		Manitoba		Saskatchewan		Alberta		British Columbia	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Food	119.4	7.17	<u>125.3</u>	9.39	122.7	11	117.9	6.59	123.5	10.2
Shelter	119.5	13.4	120.1	8.09	<u>124.7</u>	7.68	122.5	13.7	108.9	12.1
Household operation and furnishing	114.6	10.4	119.1	7.95	113.9	5.74	114.7	4.06	121.5	6.92
Clothing and footwear	112.5	13.1	<u>123.8</u>	11.6	117.1	12.9	111.2	12.5	117.8	9.56
Transportation	<u>140.2</u>	9.76	134.9	8.16	134.7	9.99	137.2	10.6	137.4	12.6
Health and personal care	120.7	13.3	123.1	12.1	123.4	20.7	121.3	14.7	<u>124.3</u>	9.91
Recreation, education and reading	<u>133.9</u>	9.87	131.6	12.6	128.8	10.9	131.5	11.8	130.7	12.3
Alcoholic beverage and tobacco	117.9	3.65	130.4	2.73	135.6	2.69	<u>141.2</u>	2.18	135.6	2.99
Real wage	<u>5.63</u>	0.58	4.58	0.47	4.59	0.51	5.21	0.65	5.37	0.55
Unemployment rate	7.58	1.71	6.04	1.0	<u>5.84</u>	0.72	5.96	0.93	8.03	1.39

Note: S.D. is Standard Deviation of Raw Data.

eccentric enough to equal or more than one point, this is not practical in our analysis, we have all of them denoted by NA for negative examples, this may be incurred by much less unit in panel. At least we can conclude that Recreation is endowed with regional colors, not easy to flow over provinces and their costs for provincial residents are persisting unless one frequently migrates among provinces. Without exception, the speed of convergence for the unemployment rate is proportionally less than that of the real wage for all ten provinces in Table 3, and the pace of movement for the real wage is comparably on par with average

level of CPI. It is advisable to policy makers that when economy is changed, it would accelerate the speed of the real wage toward new equilibrium more than that of the unemployment rate, in other words, the real wage is more sensitive to external conditions and its adjustment imposes pressure for provincial residents to migrate to provinces with higher wage, which eventually alters the local unemployment rate. The overall average

Table 4: Convergence Test for CPI (main component), real wage, and unemployment rate for 10 provinces

	Newfoundland and Labrador		Prince Edward Island		Nova Scotia		New Brunswick		Quebec	
	β	speed ⁶	β	speed	β	speed	β	speed	β	speed
Food	-0.28	2.11	-0.33	1.73	-0.27	2.2	-0.29	2.02	-0.13	4.98
Shelter	-0.5	1	-0.48	1.06	-0.43	1.23	-0.47	1.09	-0.4	1.36
Household operation and furnishing	-0.49	1.03	-0.38	1.45	-0.55	0.87	-0.44	1.2	-0.34	1.67
Clothing and footwear	-0.6	0.76	-0.59	0.78	-0.64	0.68	-0.71	0.56	-0.54	0.89
Transportation	-0.03	NA	-0.57	0.82	-0.2	3.1	-0.07	<u>9.55</u>	-0.47	1.09
Health and personal care	-0.66	0.64	-0.69	0.59	-0.64	0.68	-0.75	0.5	-0.79	0.44
Recreation, education and reading	-0.23	2.65	-0.05	<u>13.5</u>	0.02	NA	-0.02	NA	-0.17	3.72
Alcoholic beverage and tobacco	-0.75	0.5	-0.07	<u>9.55</u>	-0.79	0.44	-0.76	0.49	-0.74	0.51
Real wage	-0.41	1.31	-0.31	<u>1.87</u>	-0.62	0.71	-0.53	0.92	-0.51	0.97
Unemployment rate	-0.09	7.35	-0.26	2.3	-0.33	1.73	-0.4	1.36	-0.08	8.31
Average		1.93		3.37		1.29		1.97		2.39

Table 4 continued

	Ontario		Manitoba		Saskatchewan		Alberta		British Columbia	
	β	speed	β	speed	β	speed	β	speed	β	speed
Food	-0.14	4.96	-0.2	3.11	-0.19	3.29	-0.23	2.65	-0.05	<u>13.5</u>
Shelter	-0.41	1.31	-0.49	1.03	-0.38	1.45	-0.98	0.18	-0.1	<u>6.58</u>
Household operation and furnishing	-0.3	1.94	-0.43	1.23	-0.41	1.31	-0.39	1.4	-0.15	<u>4.27</u>
Clothing and footwear	-1.01	NA	-0.47	<u>1.09</u>	-0.85	0.37	-0.55	0.87	-0.86	0.35
Transportation	-0.45	1.16	-0.89	0.31	-0.28	2.11	-0.22	2.79	-0.22	2.79
Health and personal care	-0.8	0.43	-0.52	0.94	-0.43	<u>1.23</u>	-0.95	0.23	-0.64	0.68
Recreation, education and reading	-0.39	1.4	-0.14	4.6	-0.1	6.58	-0.19	3.29	-	NA
Alcoholic beverage and tobacco	-0.87	0.34	-1.01	NA	-0.95	0.23	-0.69	0.59	-0.7	0.58
Real wage	-0.54	0.89	-0.53	0.92	-0.48	1.06	-1.0	NA	-0.59	0.78
Unemployment rate	-0.11	1.95	-0.29	2.02	-0.4	1.36	-0.3	1.94	-0.07	<u>9.55</u>
Average		1.60		1.69		1.9		1.55		<u>4.34</u>

convergence speeds for the remaining eight provinces bound around two points, in line with average pace of convergence by category in Table 2. It is a mystery why British Columbia Province deviates from common mean value more than its counterparts do, probably being owed by its recent weak economy as well as its heavy relying on international trade other than domestic trade. Whereas we consider the small gap is not

persuasive enough to regard British Columbia being breaking apart from the whole country economy.

5. Conclusion

After a series of econometric analysis utilizing our unique data set, we conclude that Canada is a well-developed market economy entity, the law of one price is proved to be authentic, the whole market is closely integrated, and regional differences do exist but within thinnest band. The remarks are drawn from the following three points of view. Firstly, we carried out the well accepted panel unit root test in a three-step examination, which started off from all subgroups with pooled data, then proceeded to major components with a whole cross sectional data package, and eventually came to major components as well as two economic indicators for ten provinces separately. No step ended with big puzzling outcomes. Based on common criteria of convergence, we found that only 1 out of 34 subgroups failed in rejecting the null hypothesis, no one single unsuccessful case for major components and 7 out of 100 cases failed in test for individual provinces. Secondly, the speed of convergence, either averaging 4.72 for 34 CPI subgroups, or 1.95 for 8 major components, are substantially smaller than that of U.S. and Euro areas, it is likely attributable to the collection of more timely monthly CPI data and typically it proves that Canada has a more integrated economy than U.S. and European. Initial provincial discrepancies in price, real wage or unemployment rate won't endure in average over half a year. Thirdly, tentative attempt testing convergence for individual unit in panel illustrated provincial distinctive features from a special angel. It is worth noting that there are only tiny gaps among provincial pairs for those economic indicators and no sharp tendency followed by any item in any province. In a word, we are confident to announce that there is no market segmentation in Canada, and that product, labor and capital are better integrated, which, together with the steady political and economic circumstances, contributes to ensure Canada an even better tomorrow.

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