Convergence to the Law of One Price in China*

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Abstract

Among the transitional economies, China has been often cited as the most successful example for its sustained rapid economic growth accompanied by its increasing reliance on markets as the mechanism to coordinate production and exchange. However, the economic transition in China has been gradual and far from complete. Recently, some economists cast doubts on whether the Chinese economic reform and its self-claimed "socialist market economy system" is leading to a more and more market oriented economy. In this paper, we will examine whether and to what extent the law of one price holds in the Chinese domestic markets as this can serve as an important indicator for the extent of marketization of the Chinese economy. Using a panel data of several dozen of homogenous products and services in 36 major cities in China and adopting the approach similar to that of Parsley and Wei (1996), we find that prices do converge in China for almost all the products in our dataset. This finding provides support to the successfulness of the marketization of the Chinese economy.

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1.Introduction

This paper aims to test the convergence to the law of one price for the Chinese domestic market. It hopes to make contributions to the existing literature on the following three aspects. First, although there is already a huge literature on the topic of Purchasing Power Parity (PPP) or convergence to the law of one price (LOP), few studies have been done for transitional economies such as China[1]. Furthermore, among the transitional economies, China has been often cited as the most successful example for its sustained rapid economic growth and its increasing reliance on markets as the mechanism to coordinate production and exchange. In fact, as a symbol to China's successful transformation, China has recently been admitted to the World Trade Organization (WTO), which requires all its members to adopt market economy rules. However, the economic transition in China has been gradual and far from complete. Recently, some economists cast doubts on whether the Chinese economic reform and its self-claimed "socialist market economy system" is leading to a full market economy. For example, Young (2000) posits that while incremental reform in China releases segments of the economy from centralized control, the freed segments of the economy may find it profitable to exploit the rent seeking opportunities by protecting local markets. Thus, Young argues that the Chinese economy has actually become more fragmented internally, while opening up internationally. Since the proper functioning of a market economic system requires that the prices for a homogenous good eventually converge across different markets this empirical test can serve as a direct check on how well the market system performs in China.

Secondly, there is an on-going debate amongst economists on whether the Purchasing Power Parity (PPP) or the law of one price (LOP) holds for different countries and markets[2]. Recently, the attention has been shifted from looking at mainly international markets to both international and domestic markets, and from using time-series data to panel data[3]. Our work follows this trend by using a panel dataset to study the domestic market of a large developing country --- China.

Finally, a recent study by Taylor (2001) demonstrates that the conventional empirical study on price convergence can be serious biased (underestimation of convergence) if researchers use low frequency data. The current study employs monthly data that is more frequent than the quarterly or

[1] In fact, we noticed Conway (1999) as the only study that has been published on the study of LOP for transitional economies.
[2] Recently, economists have devoted increasing attention to the issues related to the law of one price (and PPP in its international version). For example, in an excellent review article, Froot and Rogoff (1995) could declare that what was a "fairly dull research topic" only a decade ago has become the focus of substantial controversy and the subject of a growing body of literature.
[3] Foe example, see Engle and Rogers (1996) and Parsley and Wei (1996).

annual data typically used by previous studies on this subject. Our study can therefore reduce the possible bias caused by the use of low frequency data.

Specifically, we examine the convergence to LOP for a total of 86 homogenous products or services across 36 major cities in China for the period of 1990 to 2001. Our results indicate that there are overwhelming evidences on the convergence to LOP in the Chinese domestic market. The estimated speed of convergence by half-lives ranges from 0.3 month to 187 months, with an average of 10 months, which is rather fast by international standards. Hence, our results support that China's transition to the market economy has been quite successful during the past decades. This is interesting as we used virtually the same dataset employed by Young (2000) but a more appropriate method to test price convergence, and reached quite different conclusion.

In what follows, Section 2 describes the data sets used in this paper; Section 3 discusses the methodology; Section 4 analyzes the main empirical findings; Section 5 summarizes the paper.

2. Data

The datasets used in this empirical study are from two sources. Our main data source is the exactly same data used by Young (2000)[4], which is the data from *China Price* magazine published by the China Price Information Centre. This dataset contains the monthly price information for 49 industrial materials in 36 cities[5] for the period 3/90 to 5/99, and 33 agricultural products in the same 36 cities for the period 6/93 to 5/99. However, the data contains a lot of missing information for prices or cities from time to time, and the missing information seems to be random. So we have unbalanced panels for these 82 product prices. As this set of price data covers narrowly for industrial materials and agricultural products only, we searched the homepage of the China Price Information Centre and managed to find another set of price data. This data covers the monthly price information for 55 products and services in once again the same 36 cities for the period 1/98 to 12/01. Yet again, we have huge missing information for various products and cities from time to time, and the resulting datasets are unbalanced panel data. All the price information is collected by the China Price Information Centre on either 5th or 25th of a month, and sometimes for both of these dates. However, for uniformity, we only use the spot price information for one of these two dates

[4] In fact, we downloaded this dataset from Young's homepage.
[5] The 36 main Chinese cities are Beijing, Changchun, Changsha, Chengdu, Dalian, Fuzhou, Guangzhou, Guizhou, Ha'erbin, Haikou, Hangzhou, Hefei, Huhehaote, Jinan, Kunming, Lasha, Lanzhou, Nanchang, Nanjing, Nanning, Ningbo, Qingdao, Shenzhen, Shenyang, Shijiazhuang, Taiyuan, Tianjin, Wulumuqi, Wuhan, Xi'an, Xining, Xiamen, Yinchuan, Zhengzhou, Chongqing, Shanghai.

for each month. Like Young (2000), we also dropped the month 1/93, 2/93 and 6/96 for data problem. Since there are some overlaps between the two data sets and some product panels contain too many missing data, our final dataset contain panel data for 86 products and services. The product names and the summary statistics for the price variations are presented in Table 1. The price variation here is defined as $p_{ijt} = \ln(g_{ijt}/\hat{g}_{jt})$, where i, j and t stand for city, product and time, respectively. g_{ijt} denotes raw price of product j in city i at time t, and $\hat{g}_{jt}$ denotes for the mean of g_{ijt} over cities.

Despite the missing data problem, this dataset has some very distinctive features. First, we have monthly time series for all the prices. We believe this time frequency of price data matches with the time needed for price arbitrage activities across main cities in China quite well. So our empirical test can possibly avoid the biases caused by low data frequency pointed by Taylor (2000). Secondly, all the product definitions in this dataset are quite specific and stable over time. So we are fairly confident that the product natures and qualities do not change much over time. To ease our presentation, we group the product into four categories. They are: agricultural products (26), other consumer products (16), industrial products (32) and services (12). Such a categorization is inevitably arbitrary, but aims to show both the characteristics of these products in the Chinese domestic market and the tradability of them.

3. Methodology

Price convergence to the law of one price means that the price for the same product sold in different markets will eventually converge to one level assuming there are no cost differences in doing business or other regulatory or tax differences in these markets. In mathematical terms, this means that the price differences between any two markets for the same product will follow a zero mean AR(1) process. In our empirical work, we measure price variability by the log price difference between a city's price for a specific product and the mean price of that product over all cities at a point of time. Following Parsley and Wei (1996), we carry out the following Augmented Dickey-Fuller (ADF) test for the log price difference series, p_t (for simplicity, we omitted city and product index i and j in the following discussion). The null hypothesis is that the series has a unit root, and the alternative hypothesis is that the series is stationary and hence follow a zero mean AR(1) process.

$$\Delta P_t = \alpha P_{t-1} + \sum_{J=1}^{K} \beta_J \Delta P_{t-j} + \varepsilon \qquad (1)$$

where Δ is a first difference operator, t denotes for time, ε is an i.i.d. (identically independently distributed) error term.

As our time series are monthly data, we account for the possible seasonality problem by including a set of monthly dummies in the model:

$$\Delta P_t = \alpha P_{t-1} + \sum_{J=1}^{K} \beta_J \Delta P_{t-j} + \sum monthdummy + \varepsilon \qquad (2)$$

We further consider a model with nonzero city-specific means (fixed-effect model). This is to allow the sale prices of the products to reflect the cost of local non-traded components. So specifically, we add following city dummies into the model:

$$\Delta P_t = \alpha P_{t-1} + \sum_{J=1}^{K} \beta_J \Delta P_{t-j} + \sum cityandmonthdummies + \varepsilon \qquad (3)$$

In what follows, we carry out the panel unit root test for 86 commodities in 4 categories by running feasible general least square (FGLS) estimation of (2) and fixed effect estimation of (3). The critical values of the test-statistics can be found in Levin and Lin (1992).

4. Results

We first fit the FGLS models (2) for our 86 products. The results are contained in Table 2, 3, 4 and 5 under the column without fixed-effect. The critical values used for the unit root test are 1.74 and 1.38 for 5% and 10% significance levels[6].

The results in Table 2 show that for 25 out of 26 agricultural products we can reject the null hypothesis of having a unit root. So virtually all product prices converges to the LOP. For the other consumer products, we find price convergence for 10 out 16 products. The non-convergence products include salt, laundry detergent, type I and II medicine, domestic made refrigerator and washing machine. For industrial products, we find that prices converge for all 32 products. Finally, prices converge for 5 out of 12 services. So on the whole, 72 out of 86 or 84% products/services converge to the LOP. This high percentage rate of convergence is comparable to that found by Parsley and Wei (1996) in their study for the US (86% of their non-perishable, 80% of their

[6] These two figures corresponding to a panel with 25 cross-section units and 25 to 100 time periods (see Table1 of Levin and Lin, 1992). Although we have 36 cities, due to missing data, the average number of cities reporting prices each month is about 25.

perishable and 50% of their services converge to the LOP), although this kind of direct comparison may be a bit misleading as the product types of the two studies are quite different. With such a high percentage rate of convergence, it is hard to believe that there exists serious fragmentation of the Chinese domestic market. Nevertheless, looking at the non-convergence products we may find some weak evidence to support Young's argument of regional fragmentation. Products such as refrigerator and washing machine are relatively high value-added products in our sample and the failure for the prices of these two products to converge to the LOP may indicate some kind of local protectionism of high profit-margin goods.

Next, we turn to the fixed-effect estimation results. The critical values used here are 7.74 and 7.45 for 5% and 10% significance levels[7]. On the whole, we still have 67 out of 86 or 78% products/services converge to the LOP. More specifically, under the fixed-effect model there are more other consumer products (13) and services (10) converge to the LOP, but less agricultural (21) and industrial products (23) converge to the LOP. The big swing of price convergence for the industrial products and services is interesting. A possible explanation may be that the prices for both of these two types of products/services are still heavily influenced by the government, especially for services. For the industrial products, prices remain relatively stable in different cities over time, while for services prices change more rapidly for different cities over time due to the reform of welfare system and widening of income disparity amongst Chinese cities. This is reflected in the relative small and large means of price variation for these two types in Table 1. So the accounting for the city specific effects may have bigger effects on the test for convergence of these two categories. Finally, the result that after controlling for fixed effect there are less products/services converge to the LOP is consistent with the finding of Parsley and Wei (1996).

Let's now turn to the speed of convergence. We find that the use of the fixed-effect model significantly raises the speed of convergence. Amongst all converged products/services, the average half-lives estimated by the model without fixed-effect is 17.7 months, but with fixed-effect, this is reduced to merely 0.6 month. The overall average half-lives is 10 months. For the individual category of products/services, agricultural products in general have the fastest speed of convergence: the average half-lives is 7.1 months without fixed-effect and 1.4 months with fixed-effect. Industrial products ranked number two, followed by other consumer products and services[8].

[7] The 5% critical values for a panel with 25 cross-section units and 25, 50 and 100 time periods are 7.74, 7.71 and 7.69 respectively, while the 10% critical values are 7.45, 7.39 and 7.38, respectively (see Table 5 of Levin and Lin 1992). So the two values we used can be viewed as the upper-band values.

[8] There is a huge difference in estimated average half-lives for services, depending on the model with or without fixed-effect. We rank speed here by taking the overall average for the results from with and without fixed-effect models.

Overall, this ranking fits the intuition well. We all know that the Chinese economic reform starts with the agricultural sector and gradual moving towards the industrial sector and then the service sector. So the agricultural markets in China are by far the freest markets in China. However, the overall extremely fast price convergence speed (much faster then that in the US estimated by Parsley and Wei, 1996) estimated here for China appears to be a little puzzling. This may be ascribed to the effect of non-linear price convergence. As the initial price gaps are quite large across Chinese cities, this encourages more people to engage in arbitrage and so prices converge quickly[9].

5. Conclusion

Recently, there has been a surge of economic literature on the research of the law of one price and its international version --- purchasing power parity (e.g. see the survey by Froot and Rogoff (1995) and Taylor (2001)). This large body of literature has been motivated by the increasing awareness that the issues of market integration and the extent of the market are central to the very foundation of the economic discipline.

Motivated by this recent wave of studies on price convergence, this paper empirically examines the convergence to the LOP in the transitional economy of China. By so doing, this paper sheds light on not only the price convergence inquiry but also recent debate on the extent of marketization of the Chinese economy and the degree of success of the Chinese-style economic reform. Using a panel data of several dozen of homogenous consumer products and services in 36 major cities in China and adopting the approach similar to that of Parsley and Wei (1996), we find that prices do converge in China for almost all the products in our dataset. Thus, the evidence revealed in this analysis is consistent with the argument that the Chinese economic reform has been generally successful in transforming China from a planned economy to a market-oriented economy.

However, as our price convergence story is largely based on two overly represented types of product, i.e. agricultural products and industrial materials, it may not provide a complete picture on the integration and segregation of Chinese local markets. For example, Young (2000) argues, as the centralized control over factor allocations in China loosened, local governments throughout the economy might seek to capture rents by developing high margin industries. Because these high margin industries (e.g. cigarettes) are characterized by product differentiation in different regions of China, we have only few of these products included in our study. Based on the results of the two

[9] In a recent study by O'Connell and Wei (2002), they specially addressed this issue and they identified that there is nonlinear price convergence in the US.

high profit margin products, refrigerator and washing machine, in our sample, they failed to show convergence in the estimation without fixed-effect. This may show some support to Young's argument. Thus, further studies are needed to test Young's hypothesis.

Furthermore, our study used a relatively high frequency data to test price convergence. The results seem to give us more support on the convergence story. We also identify higher speed of convergence with this dataset. All these appear to be consistent with the theoretical study put forward by Taylor (2001), in which he claimed that the failure to use high frequency data to test price convergence could seriously bias the results towards non-convergence. Finally, Taylor (2001) and others (see Michael et al., 1997, Talyor et al. 2001 and O'Connell and Wei, 2002) also pointed out that exchange rate/price convergence may follow a nonlinear pattern, and failure to account for the nonlinearity of convergence may also result in serious biases in testing of price convergence. We hope to extend out study on price convergence in China with a nonlinear convergence framework in our next stage of investigation.

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Table 1 - Summary Statistics

Product	Mean	Std Dev.	Obs.
Agricultural Products			
Flour	-0.0128	0.1289	1220
Polished Round-gained nonglutinous rice (Mark 2)	-0.0080	0.1272	1660
Polished Long-gained nonglutinous rice (Mark 2)	-0.0129	0.1609	805
Corn Flour (Top Grade) ( )	-0.0343	0.2569	1231
Soybean (Top Grade)	-0.0110	0.1279	1726
Rapeseed Oil (Second Grade)	-0.0027	0.0727	1258
Soya-bean Oil (Second Grade)	-0.0073	0.1303	951
Chinese Cabbage (First Grade)	-0.1234	0.4957	1661
Cabbage (Lotus Flower White, First Grade)	-0.1203	0.4907	1791
Chinese Chives (Fragrant Garlic First Grade)	-0.0586	0.3439	1889
Cucumber (First Grade)	-0.0526	0.3292	2018
Tomato (First Grade)	-0.0740	0.3899	2029
Eggplant (First Grade)	-0.0903	0.4281	1841
Radish (First Grade)	-0.0889	0.4245	1741
Green Peppers (First Grade)	-0.0744	0.3873	2022
Potato (First Grade)	-0.0462	0.3010	2035
Bean curd (Fresh, in Water)	-0.0678	0.4726	1419
Pork (De-boned, Fresh) ( )	-0.0107	0.1464	2010
Beef (De-boned) ( )	-0.0129	0.1603	1862
Mutton (De-boned) ( )	-0.0270	0.2291	1161
Chicken	-0.0333	0.2519	1799
Eggs (Fresh, Intact)	-0.0114	0.1468	2060
Fresh Hair tail (Less than 0.5kg a piece)	-0.0229	0.2134	1947
Silver Carp (More than 0.5kg a piece)	-0.0410	0.2781	1506
Apples (First Grade)	-0.0499	0.3193	1794
Watermelon (First Grade)	-0.0828	0.4210	891
Other Consumer Products			
Car (Sedan, Santana) ( )	-0.0018	0.0705	1664
Car (Sedan, Xiali) ( )	-0.0057	0.1123	1523
Flour (Enriched)	-0.0126	0.1265	974
Gas (I)	-0.0243	0.2183	864
Gas (II)	-0.00154	0.1781	864
Salt	-0.0207	0.1992	864
Coal	-0.0566	0.3413	757
Landry Detergent	1.0082	0.4153	867
Jewelry	-0.0019	0.0615	866
Medicine (I) (I)	-0.5478	1.1641	648
Medicine (II) (II)	-0.00914	0.4750	648
Medicine (III) (III)	-0.0276	0.3271	648
Refrigerator (Chinese, 210-250 liter) (210-250)	-0.0387	0.2429	648

Washing Machine	0\-0.00614	0.3412	648
Color Television (25-29inches) (25 29)	-0.00469	0.2968	648
Car (ShenLong) ( )	-0.0161	0.2079	648
Industrial Products			
Hot Rolled Ordinary Carbon Primary/Elemental Steel	-0.0019	0.06130	2764
Hot Rolled Carbon Tied Elemental Steel	-0.0042	0.0923	2118
Threaded Steel	-0.0013	0.0508	2210
Hot Rolled Ordinary Carbon Angle Steel	-0.0032	0.0773	1920
Hot Rolled Ordinary Carbon Wire Rod	-0.00123	0.0504	2763
Hot Rolled Ordinary Carbon Medium Plate	-0.0040	0.0932	2688
Hot Rolled Ordinary Carbon Sheet Metal	-0.0048	0.0981	2428
Cold Rolled Ordinary Carbon Sheet Metal	-0.0053	0.1027	2626
Zinc-plated (Galvanized) Plate	-0.0052	0.1034	1894
Cast Pig Iron (Manganese Something)	-0.0064	0.1097	1998
Copper (Electrolysis)	-0.0027	0.0799	2570
Aluminum (Electrolysis)	-0.0020	0.0634	2388
Lead (Electrolysis)	-0.0060	0.1128	2327
Zinc (Refined)	-0.0063	0.0989	2406
Anthracite	-0.0462	0.3113	961
Bituminous Coal (Ordinary)	-0.681	0.3868	2452
Gasoline (For Cars)	-0.0061	0.1035	2018
Diesel Oil (Light)	-0.0051	0.1019	2579
Caustic Soda (Solid Content > 98%)	-0.0065	0.1189	2542
Soda Ash (First Quality Content > 98.5%)	-0.0049	0.0988	2517
Sulphuric Acid (Content > 98%)	-0.0220	0.2000	2049
Polythelene (High Pressure Industry Use)	-0.0036	0.0877	2015
Polypropylene (Equal to First Quality)	-0.0043	0.0918	2034
Cement (Silicate)	-0.0128	0.1744	2529
Plate Glass (Standard 3MM)	-0.0221	0.1988	2307
Pine Logs (4-5.8 M Long, 18-28 CM Diameter)	-0.2503	0.2243	1908
China Fir Logs (5-5.8 M Long, 14-28 CM Diameter)	-0.3509	0.2636	896
Plywood, Veneer Wood (3 ply Board)	-0.0575	0.3677	1430
Medium Model Trains (5 Ton Liberty Model)	-0.0081	0.1286	1998
Medium Model Trains (5 Ton East Wind Model)	-0.0072	0.1183	2084
Light Model Trains (1.75-2 Ton, 130 Model)	-0.0483	0.3047	1526
Synthetic Rubber, Butadiene Styrene Rubber	-0.0086	0.1497	1176
Services			
Monthly Bus Fare	-0.4505	1.2553	1476
Kindergarten Fee	-0.0061	0.4951	1512
Rent	-0.1355	0.4697	864
Subsidized Housing	-0.0475	6.2912	612
Housing	-0.0597	0.3364	648
Rent of Public Housing	-0.1172	0.4517	648
Middle School Tuition	-0.0848	0.3952	648
High School Tuition	-0.2044	0.6798	648

University Tuition	-0.0667	0.3895	648
Hospital Registration Fee	-0.1430	0.4914	864
Running Water	-0.0361	0.2909	1512
Town Gas	-0.2788	0.6115	1512

Table 2 - Test of Price Convergence for Agricultural Products

Product	Without Fixed-effect	Half-life	With Fixed-effect	Half-life
Flour	-0.0329 (2.840)*	20.7198	-0.2299 (8.870)*	2.6533
Polished Round-gained nonglutinous rice (Mark 2)	-0.0913 (6.072)*	7.2399	-0.2891 (13.261)*	2.0314
Polished Long-gained nonglutinous rice (Mark 2)	-0.0811 (3.962)*	8.1954	-0.2314 (5.136)	
Corn Flour (Top Grade) ( )	-0.0266 (0.826)		-0.1063 (4.515)	
Soybean (Top Grade)	-0.0443 (3.559)*	15.2975	-0.2511 (9.635)*	2.3972
Rapeseed Oil (Second Grade)	-0.1227 (6.920)*	5.2950	-0.3367 (11.999)*	1.6884
Soya-bean Oil (Second Grade)	-0.0639 (3.786)*	10.4970	-0.1832 (5.960)	
Chinese Cabbage (First Grade)	-0.3065 (13.243)*	1.8934	-0.5946 (13.831)*	1.3072
Cabbage (Lotus Flower White, First Grade)	-0.4831 (15.352)*	1.0502	-0.7801 (18.363)*	0.4576
Chinese Chives (Fragrant Garlic First Grade)	-0.3419 (12.288)*	1.6563	-0.7060 (16.221)*	0.5661
Cucumber (First Grade)	-0.4780 (16.813)*	1.0060	-0.8133 (17.321)*	0.4129
Tomato (First Grade)	-0.3658 (17.911)*	1.5218	-0.6777 (17.535)*	0.6120
Eggplant (First Grade)	-0.6320 (13.659)*	1.5421	-0.8297 (17.277)*	0.3915

Table 2 –Continuous

Product	Without Fixed-effect	Half-life	With Fixed-effect	Half-life
Radish (First Grade)	-0.2194 (9.519)*	2.7979	-0.5049 (16.664)*	0.9868
Green Peppers (First Grade)	-0.3944 (16.986)*	1.3819	-0.7258 (17.788)*	0.5356
Potato (First Grade)	-0.1516 (7.117)*	4.2153	-0.5774 (17.055)*	0.8046
Bean curd (Fresh, in	-0.0420	16.1538	-0.3070	1.8898

Water)	(3.232)*		(9.631)*	
Pork (De-boned, Fresh) ,	-0.0914 (5.299)*	7.2300	0.2737 (10.870)*	2.1698
Beef (De-boned) ,	-0.0897 (5.195)*	7.3739	-0.2828 (10.740)*	2.0865
Mutton (De-boned) ,	-0.0890 (4.301)*	7.4356	-0.3811 (11.934)*	1.4444
Chicken	-0.0295 (2.620)*	23.1463	-0.1738 (6.768)	
Eggs (Fresh, Intact)	-0.0918 (6.233)*	7.1970	-0.3504 (8.957)*	1.6053
Fresh Hair tail (Less than 0.5kg a piece)	-0.0545 (3.760)*	12.3662	-0.2709 (10.456)*	2.1935
Silver Carp (More than 0.5kg a piece)	-0.0769 (4.940)*	8.6625	-0.2690 (8.683)*	2.2117
Apples (First Grade)	-0.1900 (9.325)*	3.2890	-0.3711 (11.753)*	1.4942
Watermelon (First Grade)	-0.4814 (9.869)*	1.0554	-1.0231 (7.867)*	0.4729
* - Significant at 5% level, ** - Significant at 10% level				

Table 3 - Test of Price Convergence for Other Consumer Products

Product	Without Fixed-effect	Half-life	With Fixed-effect	Half-life
Sedan (Santana) ( )	-0.4428 (17.466)*	1.1862	-0.6463 (23.303)*	0.6669
Sedan (Xiali) ( )	-0.1231 (7.970)*	5.2766	-0.2548 (12.213)*	2.3568
Flour (Enriched)	-0.0228 (2.554)*	2.6786	-0.1948 (8.350)*	3.1992
Gas (I)	-0.0037 (1.406)		-0.2172 (7.395)	
Gas (II)	-0.0333 (3.588)*	1.7116	-0.3329 (11.959)*	1.7123
Salt	0.0026 (0.3288)		-0.2833 (5.776)	
Coal	-0.0044 (1.475)**	157.1866	-0.5486 (11.414)*	0.8717
Landry Detergent	0.0087 (1.235)		-0.4392 (7.986)*	1.1984
Jewelry	-0.0903 (3.479)*	7.3240	-0.4650 (11.565)*	1.1082
Medicine (I) (I)	0.0032 (1.466)		-0.1682 (3.418)	
Medicine (II) (II)	-0.0111 (1.347)		-0.4880 (10.238)*	1.0354
Medicine (III) (III)	-0.0551 (2.993)*	12.2299	-0.3550 (9.106)*	1.5807
Refrigerator (Chinese, 210-250 liter) (210-250)	-0.0262 (0.874)		-0.6528 (13.393)*	0.6552
Washing Machine	0.0026 (0.684)		-0.2868 (8.199)*	2.0593
Color Television (25 29)	-0.0195 (2.247)*	35.1983	-0.2211 (7.603)**	2.7740
Car (ShenLong) ( )	-0.0351 (2.167)*	19.3991	-0.4649 (12.379)*	1.1086

* - Significant at 5% level, ** - Significant at 10% level

Table 4 - Test of Price Convergence for Industrial Products

Product	Without Fixed-effect	Half-life	With Fixed-effect	Half-life
Hot Rolled Ordinary Carbon Primary/Elemental Steel	-0.1325* (7.219)	4.8765	-0.2001 (7.746)*	3.1045
Hot Rolled Carbon Tied Elemental Steel	-0.1077 (7.078)*	6.0828	-0.2440 (10.694)*	2.4781
Threaded Steel	-0.1628 (8.189)*	3.9008	-0.2343 (8.259)*	2.5964
Hot Rolled Ordinary	-0.1088	6.0176	-0.3052	1.9036

Carbon Angle Steel	(6.178)*		(11.702)*	
Hot Rolled Ordinary Carbon Wire Rod	-0.1647 (9.094)*	3.8616	-0.2311 (9.934)*	2.6376
Hot Rolled Ordinary Carbon Medium Plate	-0.1314 (6.611)*	1.9204	-0.3862 (12.342)*	1.4201
Hot Rolled Ordinary Carbon Sheet Metal	-0.1053 (7.239)*	6.2296	-0.1816 (7.232)	
Cold Rolled Ordinary Carbon Sheet Metal	-0.1139 (6.886)*	5.7320	-0.1889 (8.191)*	3.3107
Zinc-plated (Galvanized) Plate	-0.1022 (6.044)*	6.4295	-0.2410 (12.223)*	2.5136
Cast Pig Iron (Manganese Something)	-0.0746 (5.246)*	8.9405	-0.1974 (10.140)*	3.1521
Copper (Electrolysis)	-0.2543 (14.067)*	2.3622	-0.4872 (12.645)*	1.0378
Aluminum (Electrolysis)	-0.2167 (10.866)*	2.8379	-0.3005 (12.875)*	1.9395
Lead (Electrolysis)	-0.0656 (4.461)*	10.2158	-0.2509 (8.295)*	2.3994

Table 4 - Continuous

Product	Without Fixed-effect	Half-life	With Fixed-effect	Half-life
Zinc (Refined)	-0.2876 (10.090)*	2.0439	-0.5812 (15.304)*	0.7964
Anthracite	-0.0255 (2.265)*	26.8642	-0.2869 (5.441)	
Bituminous Coal (Ordinary)	-0.0151 (2.930)*	45.5563	-0.1754 (8.408)*	3.5941
Gasoline (For Cars)	-0.1468 (6.155)*	4.3659	-0.4717 (10.430)*	1.0863
Diesel Oil (Light)	-0.1703 (12.003)*	3.7128	-0.2739 (13.432)*	2.1626
Caustic Soda (Solid Content > 98%)	-0.0670 (4.916)*	9.9949	-0.1378 (6.934)	
Soda Ash (First Quality Content > 98.5%)	-0.0775 (4.721)*	0.4647	-0.2339 (10.031)*	2.6015
Sulphuric Acid (Content > 98%)	-0.0894 (5.768)*	7.4043	-0.2444 (7.664)**	2.4724
Polythelene (High Pressure Industry Use)	-0.2872 (15.623)*	2.0474	0.3417 (16.939)*	1.6579
Polypropylene (Equal to First Quality)	-0.1429 (8.355)*	4.4951	-0.1880 (9.141)*	3.3284
Cement (Silicate)	-0.0342 (3.424)*	19.9189	-0.2440 (14.520)*	2.4781
Plate Glass (Standard 3MM)	-0.0488 (5.894)*	13.8644	-0.0981 (5.276)	
Pine Logs (4-5.8 M Long, 18-28 CM Diameter)	-0.0633 (5.473)*	10.5998	-0.0993 (2.524)	
China Fir Logs (5-5.8 M Long, 14-28 CM Diameter)	-0.0840 (4.245)*	7.9001	-0.2111 (5.650)	
Plywood, Veneer Wood (3 ply Board)	-0.0584 (4.780)*	11.5189	-0.1281 (5.622)	
Medium Model Trains (5 Tone Liberty Model)	-0.0475 (4.986)*	14.2432	-0.1006 (5.177)	

Table 4 – Continuous

Product	**Without Fixed-effect**	**Half-life**	**With Fixed-effect**	**Half-life**
Medium Model Trains (5 Tone East Wind Model)	-0.1302 (8.220)*	1.9691	-0.2192 (10.215)*	2.8013
Light Model Trains (1.75-2 Tone, 130 Model)	-0.0269 (2.608)*	25.4194	-0.0940 (2.846)	
Synthetic Rubber, Butadiene Styrene Rubber	-0.2124 (7.180)*	2.9031	-0.2700 (8301)*	2.2025
* - Significant at 5% level, ** - Significant at 10% level				

Table 5 - Test of Price Convergence for Services

Product	Without Fixed-effect	Half-life	With Fixed-effect	Half-life
Monthly Bus Fare	-0.0014 (0.944)		-0.3936 (12.948)*	1.3867
Kindergarten Fee	-0.0008 (0.359)		-0.0331 (1.900)	
Rent	-0.0082 (1.77)*	84.1831	-0.2569 (9.010)*	2.3344
Housing (I)	-0.0127 (1.045)		-0.8643 (12.657)*	0.3599
Housing (II)	-0.0003 (0.1327)		-0.3626 (5.998)	
Rent of Public Housing	0.0046 (0.528)		-0.5651 (10.320)*	0.8235
Middle School Tuition	-0.0066 (2.161)*	104.6753	-0.6590 (41.355)*	0.6443
High School Tuition	-0.0062 (1.764)*	111.451	-0.8622 (66.934)*	0.3497
University Tuition	-0.0165 (1.099)		-0.8988 (14.523)*	0.3026
Hospital Registration Fee	0.0008 (0.418)		-0.3087 (13.158)*	1.8775
Running Water	-0.0249 (3.116)*	27.4892	-0.1723 (7.901)*	3.6654
Town Gas	-0.0128 (2.286)*	53.8048	-0.4092 (10.376)*	1.3171

* - Significant at 5% level, ** - Significant at 10% level