Using Pass-through as an Economic Tool: Evidence from two Imperfectly Competitive Retail Markets

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CRETE 2023, Naxos

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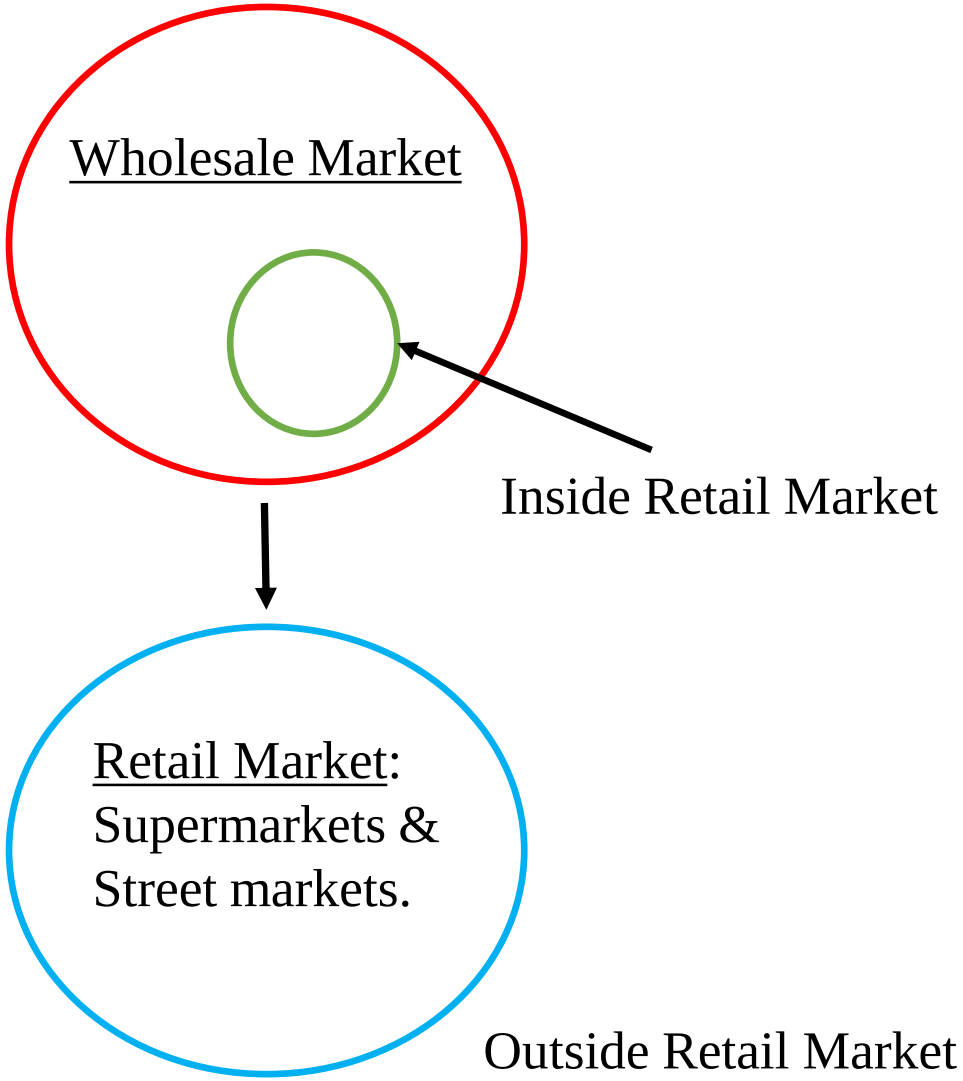
Introduction

- After the pioneer work of Weyl and Fabinger (2013) many studies make use of pass-through as “an economic tool” to examine the degree of competition in several markets.
- Competition is usually measured by the number of competitors a firm face in a given geographical area.
- However, designating the boundaries of a geographical area to define a market is tricky.
- For example, since consumers drive to work, they may fill their fuel tanks in other gas stations than those near their houses.
- Hence, ignoring substitution effects between neighbouring areas, may bring about biased measurement of competition.
- The purpose of this paper is to investigate whether the boundaries of a geographical area define distinct retail markets.

Setting

- I concentrate on the fruit and vegetables market in Athens, Greece.
- Fruit and vegetables are sold from supermarket chains as well as from street markets. This retail market is defined as the outside market.
- During the sample period two major supermarket chains, facing bankruptcy, are acquired by other market players and thus, the scenery of the outside market changes.
- Furthermore, from 2014 a new retail market opens and operates inside the wholesale market. This retail market is referred as the inside market.
- Initially, in 2014 one store was selling fruit and vegetables, while one year later, another store enters this retail market.
- The fact that the inside market is bounded, since it operates inside the area of wholesale, provides an ideal setup to examine potential differences between these two markets considering that substitution effects are not absent.

Setting & Research Questions

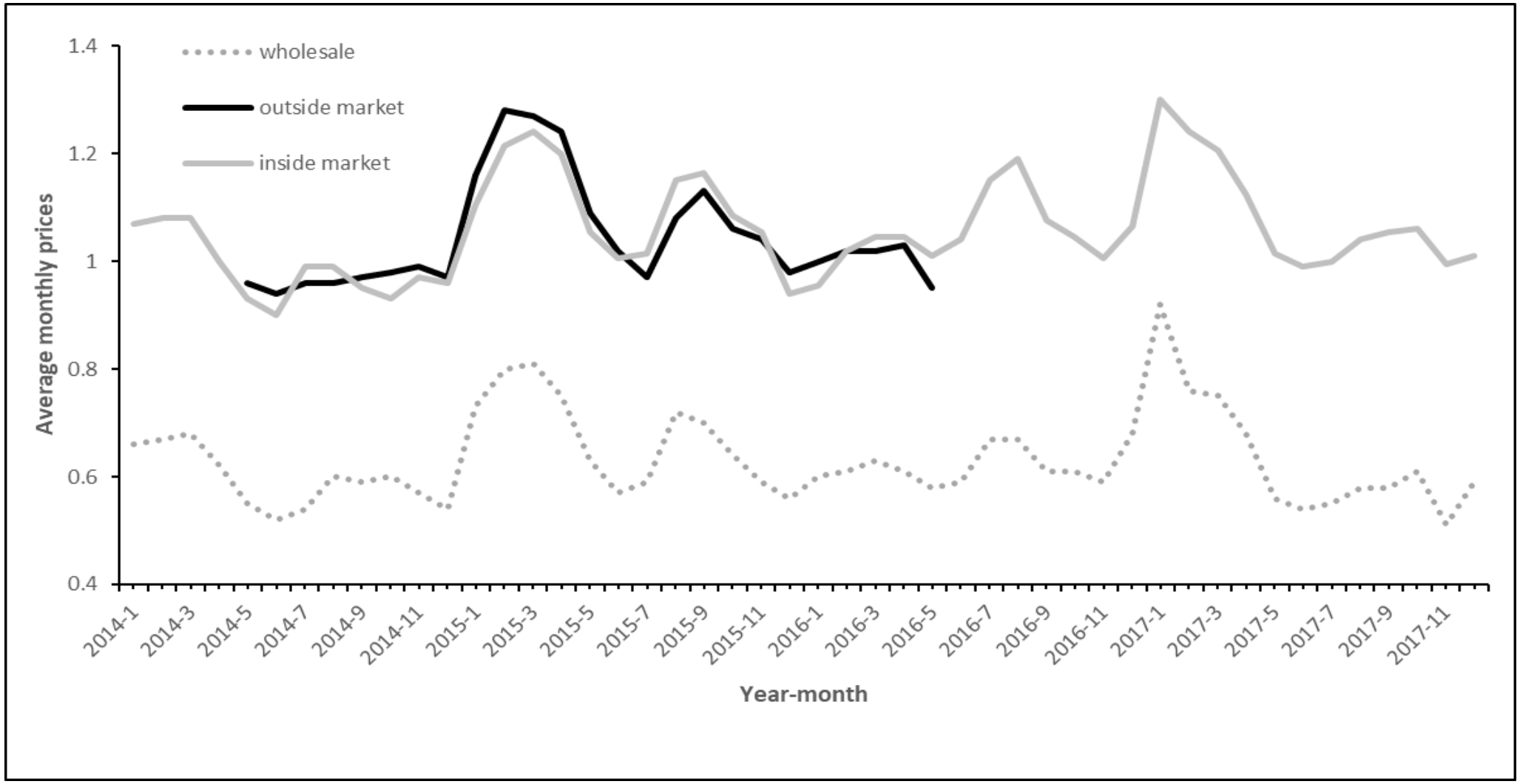


1. Do geographical boundaries suffice as the only way to define distinct retail markets?
2. How pass-through alters with the number of market players?
   i. Monopoly vs Duopoly (inside market)
   ii. Six to four supermarkets (outside market)
3. Does vertical integration affect pass-through? (the entrant in the inside market is vertically integrated, while the incumbent is vertically separated)

Data

- Several datasets are utilized for this paper. First, wholesale prices for fruit and vegetables are obtained from the administration of the Central market and cover the period from 4 January, 2014 to 29 December, 2017.
- Second, daily retail prices for the two stores selling fruit and vegetables in the inside market are obtained from the same source and correspond to the same period.
- Third, weekly store – level retail prices for the outside market for fruit and vegetables in Athens come from the Greek Ministry for Development and Competitiveness and contain information from 14 May, 2014 to 9 June, 2016 for 24 supermarkets stores and 26 street markets.
- Prices were later averaged to have common frequencies.
- Fourteen products (apple, banana, beetroot, carrot, cucumber, eggplant, lemon, lettuce, onion, orange, pepper, potato, tomato and zucchini) were examined for this essay.
- The selection of products is driven by two facts. First, to study products that are common in all datasets and second, not to have products with missing observations during the sample period.

Average Retail and Wholesale Prices



Empirical Methodology

- The prevalent approach to measuring long – run wholesale price pass-through to retail prices is to estimate the following model:

$$\Delta r_{ijt} = a + \sum_{k=0}^{6} b_{ik} \Delta w_{it-k} + e_{ijt} \ , \qquad (1)$$

- where, Δr_{ijt} is the retail price change of product *i*, in store *j*, at week *t*, Δw_{it-k} is the corresponding wholesale price change and, e_{ijt} is a mean zero error term.
- Equation (1) is estimated adding eleven-month indicator variables to capture seasonal effects, which are a typical phenomenon for the fruit and vegetables market.
- It is also estimated using store indicator variables, year indicator variables, and the interaction of month and product fixed effects to allow for even dissimilar seasonal effects among products. Results are quantitatively similar.
- Long - run pass - through is defined as the sum of the coefficients, $\sum_{k=0}^{6} b_{ik}$.
- The number of 6 lags is selected, following Nakamura and Zerom (2010) such as an additional lag does not change the estimated long-run pass-through.

Empirical Methodology

- As Nakamura and Steinsson (2012) point out, in case that the dependent and independent variables are cointegrated the "aggregate" pass-through approach may be misspecified.
- Since the null hypothesis of no cointegration between retail and wholesale prices is rejected, a dynamic panel error correction ARDL(p,q) model is also estimated:

$$\Delta r_{ijt} = \mu_{ij} + \rho_{ij} r_{ijt-1} + \theta_i w_{it-1} + \sum_{i=1}^{p-1} a_{ijk} \Delta r_{ijt-k} + \sum_{i=0}^{q-1} \gamma_{ik} \Delta w_{ijt-k} + e_{ijt}, \qquad (2)$$

- where, r_{ijt-1} and w_{it-1} are the lagged values of retail and wholesale prices, respectively, μ_{ij} is the product-store - specific effect, Δ denotes the first difference operator, p, q are the lag order of the dependent and independent variables respectively, and e_{ijt} is the error term that must be *iid* across N and T dimensions.
- The long-run pass-through is measured by the negative of the ratio θ_i / ρ_{ij}.
- Equation (2) can be estimated under three different approaches. Here the Dynamic Fixed Effects (DFE) approach is presented, since it was found through conventional Hausman testing to be the most appropriate.

Empirical Methodology

- To allow for asymmetric pass-through, the following regressions are estimated, which are the asymmetric versions of equations (1) and (2), respectively:

$$\Delta r_{ijt} = \alpha + \sum_{k=0}^{6} b_{ik}^{+} \Delta w_{it-k}^{+} + \sum_{k=0}^{6} b_{ik}^{-} \Delta w_{it-k}^{-} + e_{ijt}, \quad (3)$$

$$\Delta r_{ijt} = \mu_{ij} + \rho_{ij} r_{ijt-1} + \theta_{it}^{+} w_{it-1}^{+} + \theta_{it}^{-} w_{it-1}^{-} + \sum_{k=1}^{p-1} a_{ijk} \Delta r_{it-k} + \sum_{k=0}^{q_1-1} \gamma_{ik}^{+} \Delta w_{it-k}^{+} + \sum_{k=0}^{q_2-1} \gamma_{ik}^{-} \Delta w_{t-k}^{-} + e_{ijt} \quad (4)$$

- where, wholesale price changes have been decomposed to positive, Δw_{it-k}^{+}, and negative Δw_{it-k}^{-} components and their lags.

Pass-through in Retail Markets

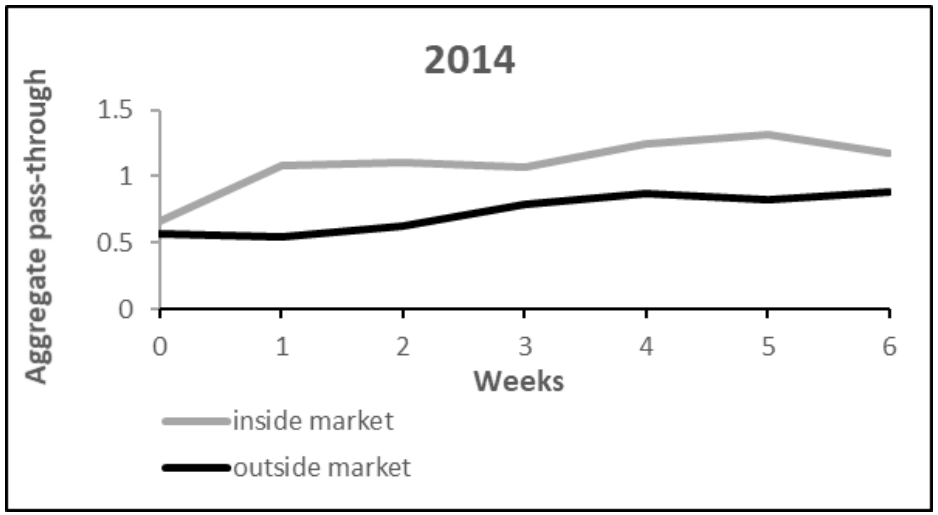
Market	Inside Market		Outside Market	
Year	Aggregate	ARDL	Aggregate	ARDL
2014	1.179***	1.132***	0.887***	0.898***
	(0.155)	(0.095)	(0.152)	(0.164)
2015	1.207***	1.224***	1.270***	1.228***
	(0.077)	(0.076)	(0.063)	(0.073)
2016	1.252***	1.262***	1.181***	1.123***
	(0.071)	(0.058)	(0.071)	(0.058)
2017	1.045***	1.001***		
	(0.054)	(0.093)		

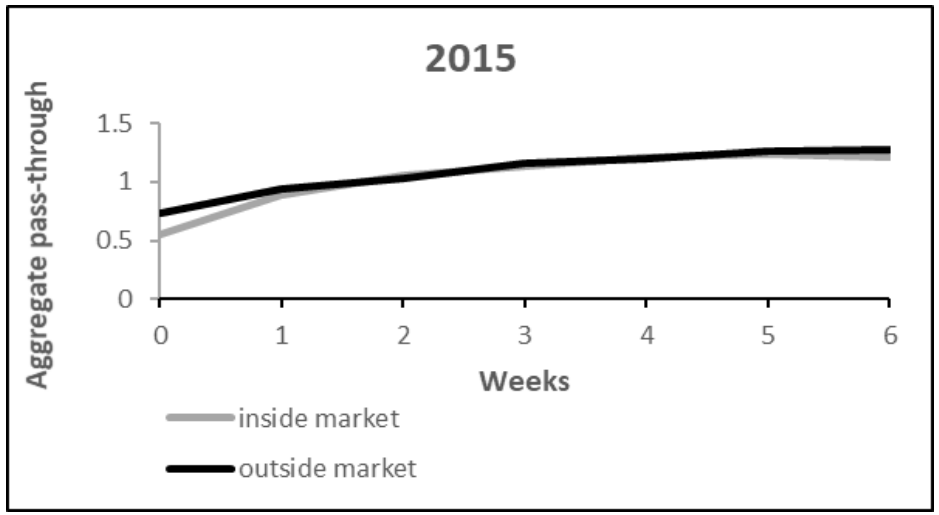
- The table above, summarizes the results of long-run pass-through under the two estimation methods for both retail markets.
- The “aggregate” long-run pass-through (Equation 1) for the inside market in 2014 is almost 1.18, while under panel error correction (“ARDL”) method (Equation 2) is 1.13.
- For any examined year both estimation approaches produce identical results of long-run coefficients for each market.
- Moreover, notice that the inside market has the same level of pass-through with the outside market.

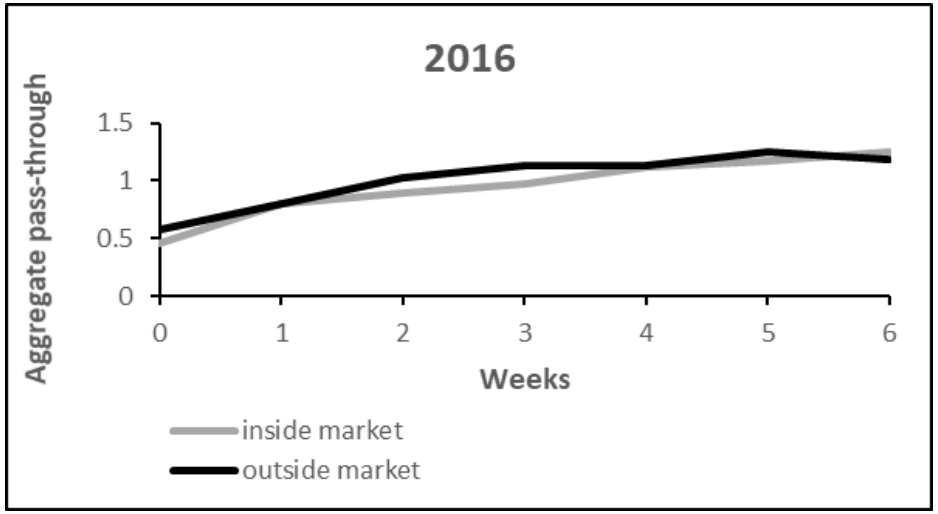
Pass-through in Retail Markets

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Market	Inside market				Outside market		
Year	2014	2015	2016	2017	2014	2015	2016
$\Delta w_{i,t}$	0.660***	0.553***	0.465***	0.456***	0.563***	0.730***	0.573***
	(0.095)	(0.060)	(0.050)	(0.026)	(0.118)	(0.115)	(0.049)
$\Delta w_{i,t-1}$	0.424***	0.338***	0.334***	0.403***	-0.018	0.204***	0.233***
	(0.062)	(0.062)	(0.023)	(0.024)	(0.033)	(0.058)	(0.052)
$\Delta w_{i,t-2}$	0.015	0.162**	0.098***	0.075**	0.083	0.093	0.216***
	(0.057)	(0.073)	(0.031)	(0.032)	(0.077)	(0.074)	(0.034)
$\Delta w_{i,t-3}$	-0.035	0.078	0.080***	-0.015	0.157***	0.137	0.111***
	(0.062)	(0.104)	(0.021)	(0.050)	(0.031)	(0.112)	(0.031)
$\Delta w_{i,t-4}$	0.183**	0.075	0.140***	0.064**	0.089	0.030	-0.006
	(0.069)	(0.090)	(0.046)	(0.027)	(0.078)	(0.071)	(0.022)
$\Delta w_{i,t-5}$	0.071	0.031	0.055	0.043	-0.046	0.064	0.122**
	(0.113)	(0.047)	(0.044)	(0.027)	(0.045)	(0.067)	(0.050)
$\Delta w_{i,t-6}$	-0.139	-0.031	0.079**	0.018	0.059*	0.012	-0.069*
	(0.088)	(0.077)	(0.031)	(0.032)	(0.031)	(0.047)	(0.039)
Long-run pass-through	1.179***	1.207***	1.252***	1.045***	0.887***	1.270***	1.181***
	(0.155)	(0.077)	(0.071)	(0.054)	(0.152)	(0.063)	(0.071)

Pass-through in Retail Markets





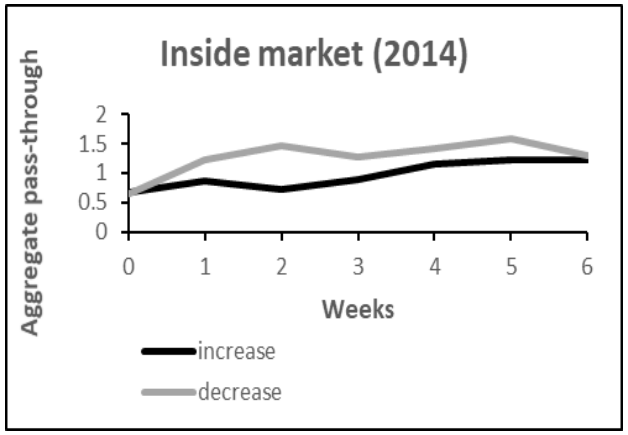


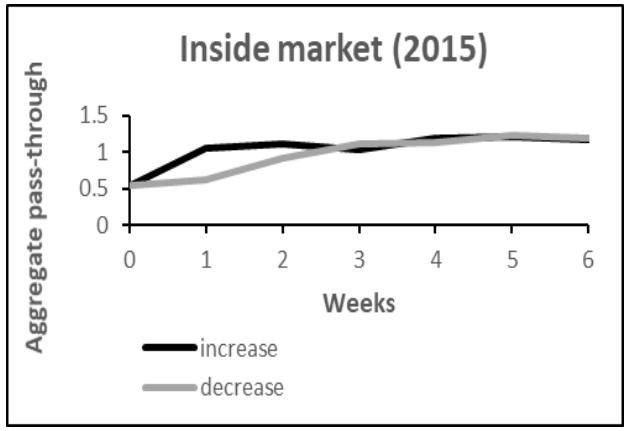
Pass-through in Retail Markets (Asymmetric case)

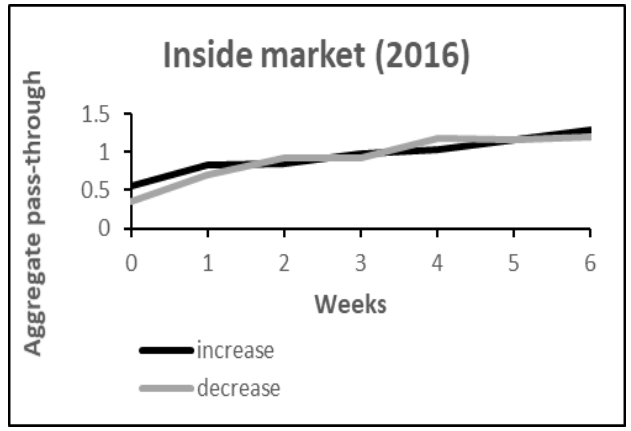
Market	Inside market				Outside market			
Year	Aggregate		ARDL		Aggregate		ARDL	
Price change	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative
2014	1.232***	1.304***	1.257***	1.344***	1.178***	1.364***	0.870***	1.188***
	(0.149)	(0.136)	(0.075)	(0.065)	(0.199)	(0.389)	(0.204)	(0.321)
2015	1.171***	1.184***	0.999***	1.165***	1.191***	1.226***	1.190***	1.241***
	(0.075)	(0.045)	(0.150)	(0.101)	(0.045)	(0.045)	(0.073)	(0.053)
2016	1.287***	1.203***	1.242***	1.287***	1.169***	1.125***	1.131***	1.106***
	(0.084)	(0.068)	(0.043)	(0.087)	(0.062)	(0.061)	(0.089)	(0.067)
2017	1.039***	0.995***	1.023***	1.004***				
	(0.064)	(0.065)	(0.141)	(0.097)				
2014	[0.558]		[0.005]		[0.437]		[0.453]	
2015	[0.577]		[0.023]		[0.409]		[0.087]	
2016	[0.023]		[0.432]		[0.232]		[0.545]	
2017	[0.154]		[0.695]					

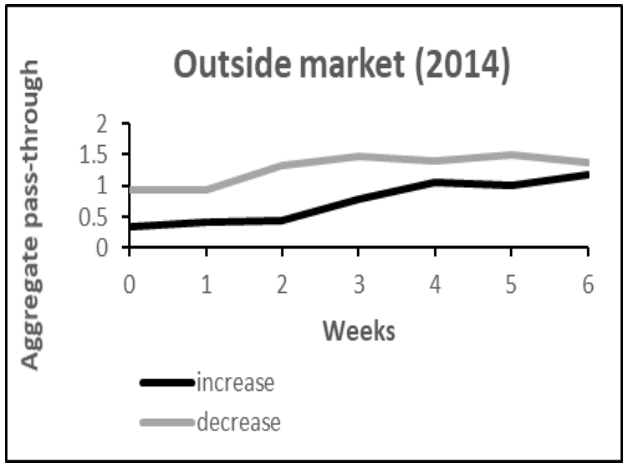
- To further explore potential differences between the inside and the outside market, asymmetries in pass-through are considered.
- Both methods coincide that not only in both markets, but also at any year examined there are no asymmetric effects on long-run pass-through after positive and negative wholesale price shocks.
- Again, estimation results of long-run pass-through are identically under both approaches.

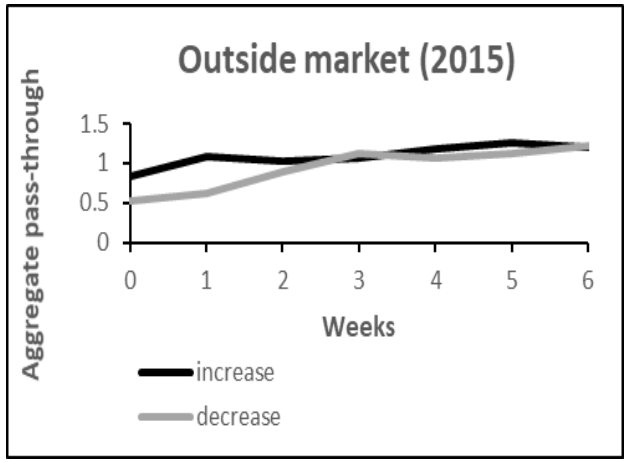
Pass-through in Retail Markets (Asymmetric case)

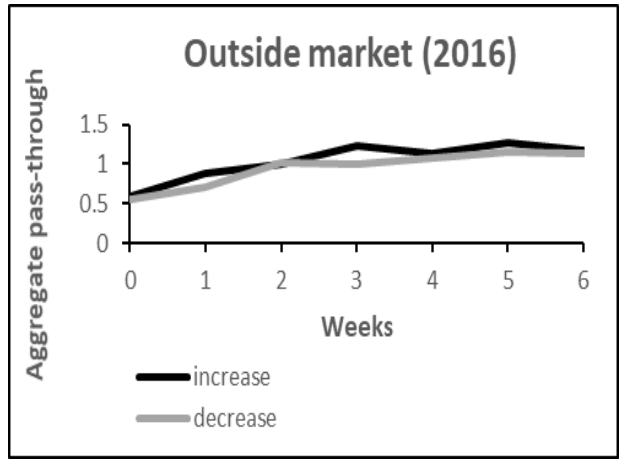












Discussion

- After all the similarities have been presented through the pass-through analysis the following can be inferred:
- First, all the concerns held by supermarket owners that the inside market operation would cause unfair competition, due to its operation of seven days per week, were unjustifiable.
- The inside market launch does not distort competition since the long-run pass-through and speed of price adjustment for both markets are the same.
- Second and more important, do boundaries suffice as the only way to define distinct markets?
- The use of pass-through as an economic tool indicates that the boundaries between markets are so vague even non-existent and the presence of substitution effects between markets make them indistinguishable.

Pass-through and the Number of Market Players

- As previously showed, in 2014 just one retailer operates inside the Central market. “Aggregate” long-run pass-through (Equation 1) is 1.18, while under panel error correction (“ARDL”) method (Equation 2) is 1.13.
- In 2015, when the other store enters the inside market, market’s pass-through is 1.21 and 1.22 under the two methods and it is not statistically different from the previous year. Almost the same results hold for 2016.
- Finally, inside market’s long-run pass-through is almost one (1.05 and 1.00) for 2017. Again, the estimated results of long-run pass-through are not statistically different among years.
- This is a striking result. Based on economic theory, we would expect either pass-through to increase with competition under linear or concave demand, or to decrease under sufficiently convex demand.
- To put it differently, pass-through converges to 1 from below as the number of firms increases with linear or concave demand (Genakos and Pagliero, 2022), or it converges to 1 from above with sufficiently convex demand (Miller *et al*., 2017).

Pass-through and the Number of Market Players

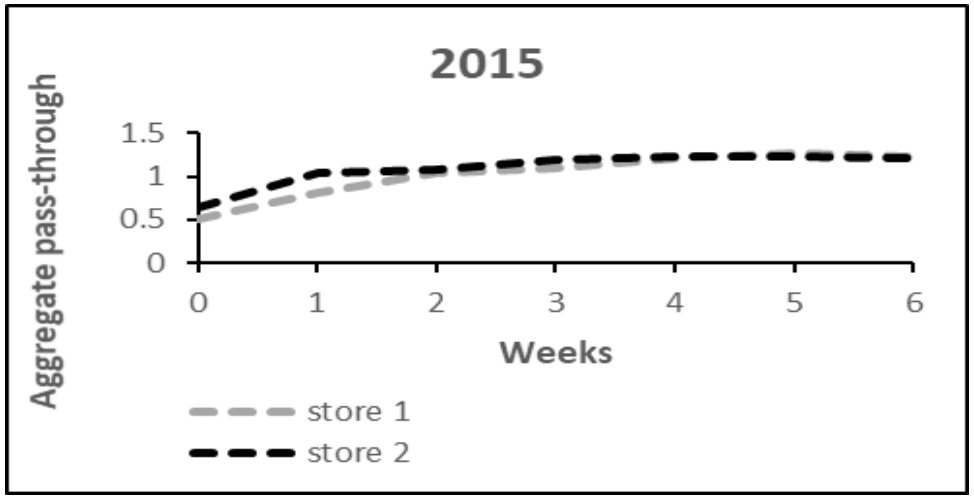
- Thus, the results of long-run pass-through for the inside market are not in line with these two possibilities.
- Almost the same picture emerges for the outside market.
- The number of supermarket chains reduces in 2016 after the horizontal acquisition of Veropoulos by Metro and the fact that Marinopoulos chain operates below its potentials before its acquisition by Sklavenitis.
- The estimated long-run pass-through for 2016 (1.27 and 1. 23 under both methods) is not statistically different from the one for 2015 (1.18 and 1.12 respectively).
- Hence, the results of both markets indicate that the number of players, either an increase in market players in the inside market, or a decrease in market players by horizontal acquisitions in the outside market, seems to have no impact on pass-through.
- In other words, the market of fruit and vegetables seems to be large enough to absorb all potential changes in the number of retail market participants.

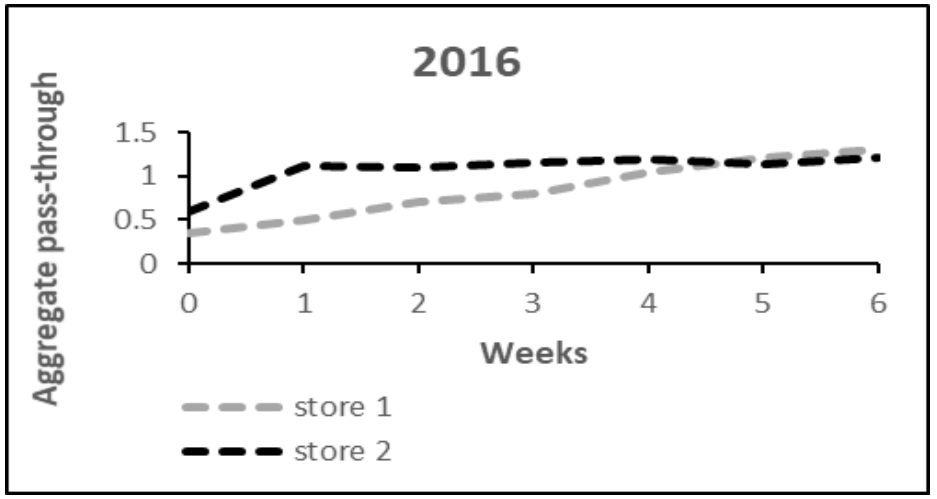
Vertical Integration, Pass-through, and Speed of Adjustment

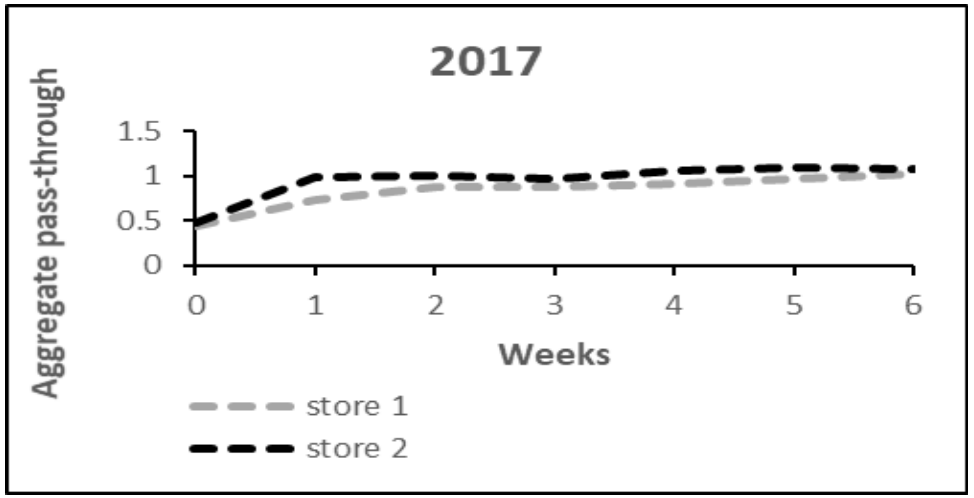
Store	Store 1		Store 2	
Year	Aggregate	ARDL	Aggregate	ARDL
2014	1.179***	1.132***		
	(0.155)	(0.095)		
2015	1.224***	1.274***	1.201***	1.244***
	(0.108)	(0.036)	(0.067)	(0.089)
2016	1.301***	1.343***	1.204***	1.218***
	(0.169)	(0.093)	(0.080)	(0.045)
2017	1.012***	1.091***	1.079***	1.045***
	(0.084)	(0.138)	(0.047)	(0.064)

- The purpose is to explore any differences in long-run pass-through and speed of adjustment between the two stores in the inside market considering that store 2 is vertically integrated.
- The two estimation methods produce identical estimates of long-run pass-through for each store and year.
- Furthermore, firm specific long-run pass-through for either firm is very close in magnitude with those of the market, as reported previously.
- Both stores share the same long-run pass-through for any given year. So, irrespective of whether retail firms are vertically integrated (store 2) or not (store 1), they exhibit the same long-run pass-through.

Vertical Integration, Pass-through, and Speed of Adjustment







Discussion

- Hence, although both stores have identical long-run pass-through, they differ in the speed they reach it. The vertically integrated store adjusts its prices rapidly, while for the vertically separated one it takes more weeks to adjust retail prices.
- The intuition for the last result, is that through the reduction of double marginalization the vertically integrated store enjoys direct and rapid information on wholesale price changes compared with the vertically separated one and thus, it adjusts retail prices more rapidly.
- There is a considerable debate on the theoretical literature on the effects of vertical integration in competition. One the one hand, the reduction of double marginalization improves market efficiency, while on the other hand, vertical integration leads to foreclosure effects.
- From a policy perspective, since I concentrate in a retail market with two firms, vertical integration of one of them does not harm competition according to Loertscher and Reisinger (2014). They point out that the double marginalization effect dominates over the foreclosure effect at retail markets with few competitors, while the opposite holds for less concentrated markets.

Conclusion

- This paper investigates whether retail markets can be distinctly defined by the physical boundaries of an area only. Two kinds of retail markets are examined, namely the inside and the outside market.
- Results indicate that both markets have the same level of pass-through at each year and that they also adjust their prices with the same speed after a wholesale price change. Hence, there seems to be a single market.
- Thus, it informs competition authorities that, while some markets initially designed to serve consumers with lower prices, this must not be taken without further investigation.
- Moreover, I find that long-run pass-through does not alter with the level of competition- measured by the number of firms- for either market. From a policy view, the results of the outside market provide ex post confirmation for the HCC decision to allow horizontal acquisitions of supermarkets.
- Finally, results of the inside market provide indirect evidence that the level of vertical integration between firms does not alter pass-through but it affects the speed of adjustment. The vertically integrated firm passes-through cost changes more rapidly than the vertically separated one.

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The Production and Distribution of Fruit and Vegetables

- This paper concentrates in the case study of a vertically non-integrated oligopoly market.
- More specifically, it focuses in the fruit and vegetables market in Athens, which is a primary market in the Greek food industry, since fruit and vegetables constitute almost the 20 percent of the typical household food expenditure (Hellenic Statistical Authority, 2013).
- The Greek market for fruit and vegetables includes three levels: the production, the wholesale and the retail level.
- These three basic layers of the fruit and vegetables market have their share on the final price that consumers face.
- Particularly, 40 % of a product's price corresponds to the production level, 21 % to the wholesale level, and 28 % to the retail level. The remaining 11 % represents the VAT rate (HCC, 2013).
- In this paper, I focus in the price transmission between wholesale and retail market.

Appendix

- There are several techniques to estimate dynamic nonstationary panels, where both N and T dimensions are large.
- On the one extreme, the dynamic fixed effect estimation (DFE) approach could be used, where data are pooled across cross-section dimension.
- This method imposes the restriction of slope homogeneity for both long-run and short-run parameters.
- The fixed effect method further restricts the error correction coefficient together with the error variances to be equal across the cross-section dimension and it only allows for different intercepts.
- The DFE approach is appropriate, when someone expects prices among groups to have identical patterns.
- On the other extreme, the Mean Group (MG) estimator, proposed by Pesaran and Smith (1995), allows for heterogeneous slopes, intercepts and error variances across groups.

Appendix

- The MG estimator relies on estimating N time series regressions and later calculating the unweighted means of the N estimated slopes and intercepts.
- Finally, Pesaran *et al*. (1999) have proposed an intermediate estimator, which combines both techniques of pooling and averaging.
- This estimator, named as Polled Mean Group (PMG), allows for heterogeneous intercepts, short-run and error correction coefficients as well as error variances, but it restricts for common long-run slopes.
- Before the implementation of the panel ARDL in its error correction form, as presented in equation (4.2), several steps are required.
- Although the ARDL method is valid irrespective of whether the variables are integrated of order zero, $I(0)$, order one, $I(1)$, or a combination of them, it must be ensured that no variable is integrated of order two, $I(2)$, or more.
- For this reason, five panel unit root tests are considered. These are the Levin-Lin-Chu (LLC; 2003), the Breitung (2000), the Im-Pesaran-Smith (IPS; 2003), the Choi (2001), and the Hadri (2000) tests.

Appendix

Panel A	Inside market				Wholesale market			
2014	r_t	p-value	Δr_t	p-value	w_t	p-value	Δw_t	p-value
LLC	-2.592***	[0.005]	-18.114***	[0.000]	-2.413***	[0.008]	-15.177***	[0.000]
Breitung	0.799	[0.782]	-13.695***	[0.000]	0.420	[0.663]	-11.392***	[0.000]
IPS	-0.236	[0.407]	-12.754***	[0.000]	-2.085**	[0.019]	-13.661***	[0.000]
Choi	0.333	[0.631]	-15.545***	[0.000]	-1.621*	[0.053]	-13.820***	[0.000]
Hadri	56.808***	[0.000]	-0.327	[0.628]	52.989***	[0.000]	-0.690	[0.755]
2015								
LLC	-2.850***	[0.002]	-19.870***	[0.000]	-1.593*	[0.056]	-21.494***	[0.000]
Breitung	2.641	[0.996]	-19.610***	[0.000]	3.519	[1.000]	-15.350***	[0.000]
IPS	-1.104	[0.135]	-18.449***	[0.000]	-0.337	[0.368]	-18.000***	[0.000]
Choi	-0.498	[0.309]	-17.593***	[0.000]	0.064	[0.526]	-18.646***	[0.000]
Hadri	68.373***	[0.000]	2.312**	[0.011]	67.069***	[0.000]	0.484	[0.314]
2016								
LLC	-2.090**	[0.018]	-16.731***	[0.000]	0.287	[0.613]	-14.464***	[0.000]
Breitung	5.291	[1.000]	-15.068***	[0.000]	6.563	[1.000]	-11.164***	[0.000]
IPS	0.705	[0.760]	-19.312***	[0.000]	2.047	[0.980]	-17.941***	[0.000]
Choi	1.275	[0.899]	-17.296***	[0.000]	2.044	[0.980]	-15.141***	[0.000]
Hadri	52.701***	[0.000]	4.684***	[0.000]	47.903***	[0.000]	5.455***	[0.000]
2017								
LLC	-1.677**	[0.047]	-19.144***	[0.000]	-2.292**	[0.011]	-16.282***	[0.000]
Breitung	2.535	[0.988]	-12.595***	[0.000]	2.816	[0.998]	-14.271***	[0.000]
IPS	-0.361	[0.359]	-19.115***	[0.000]	0.464	[0.679]	-18.260***	[0.000]
Choi	0.158	[0.563]	-17.692***	[0.000]	0.768	[0.779]	-15.067***	[0.000]
Hadri	60.861***	[0.000]	1.486*	[0.069]	63.090***	[0.000]	-0.090	[0.536]
Panel B	Outside market				Wholesale market			
2014								
LLC	-4.085***	[0.000]	-17.387***	[0.000]	-6.329***	[0.000]	-10.689***	[0.000]
Breitung	-0.363	[0.358]	-15.605***	[0.000]	1.795	[0.964]	-8.724***	[0.000]
HT	2.040	[0.979]	-33.691***	[0.000]	-1.144	[0.126]	-28.873***	[0.000]
Choi	-1.373*	[0.085]	-20.074***	[0.000]	-2.062**	[0.020]	-17.430***	[0.000]
Hadri	34.242***	[0.000]	0.310	[0.378]	46.918***	[0.000]	-0.932	[0.824]
2015								
LLC	0.861	[0.806]	-17.857***	[0.000]	-1.187	[0.118]	-19.981***	[0.000]
Breitung	-0.202	[0.420]	-19.401***	[0.000]	3.528	[1.000]	-18.893***	[0.000]
HT	6.223	[1.000]	-53.768***	[0.000]	5.651	[1.000]	-39.031***	[0.000]
Choi	1.096	[0.864]	-22.057***	[0.000]	0.359	[0.640]	-22.612***	[0.000]
Hadri	82.325***	[0.000]	-0.389	[0.652]	69.941***	[0.000]	-0.613	[0.730]
2016								
LLC	-4.173***	[0.000]	-11.453***	[0.000]	-3.047***	[0.001]	-11.658***	[0.000]
Breitung	-1.678**	[0.047]	-12.527***	[0.000]	3.020	[0.999]	-9.282***	[0.000]
HT	7.576	[1.000]	-24.802***	[0.000]	7.213	[1.000]	-17.866***	[0.000]
Choi	-0.591	[0.277]	-14.063***	[0.000]	1.678	[0.953]	-14.456***	[0.000]
Hadri	21.385***	[0.000]	-0.250	[0.599]	21.386***	[0.000]	1.063	[0.144]

Appendix

- All of them are compatible with this study, where the number of groups is less than the time dimension (N<T).
- Pre-testing for a cointegrating relationship between retail and wholesale prices might be optional, since it is ascertained by the statistical significance of the long-run coefficients.
- However, two sets of cointegration tests are considered. The first set of tests was constructed by Pedroni (1999, 2004), while the second by Westerlund (2007).
- In the next step, the optimal lag length (*p*,*q*) of the error correction ARDL(*p*,*q*) model should be determined. Following Pesaran *et al*. (1999), 28 (one for each product-store) ARDL regressions for every year are considered.
- Using the Bayesian Information Criterion (BIC), the most common lag structure across products-stores is selected for each year and market.
- Finally, after the estimation of the model under the three approaches mentioned earlier, the Hausman test is performed to decide on the suitable estimator.

Appendix

Market	Inside market		Outside market	
2014	z-value	p-value	z-value	p-value
Pedroni - Panel ADF Statistic	-2.276**	[0.011]	-10.470***	[0.000]
Pedroni - Group ADF Statistic	-2.837***	[0.002]	-10.220***	[0.000]
Westerlund - Panel Statistic	-3.415***	[0.000]	-1.694**	[0.045]
Westerlund - Group Statistic	-2.653***	[0.004]	-2.204**	[0.014]
2015				
Pedroni - Panel ADF Statistic	-8.346***	[0.000]	-12.230***	[0.000]
Pedroni - Group ADF Statistic	-9.088***	[0.000]	-12.280***	[0.000]
Westerlund - Panel Statistic	-11.188***	[0.000]	-8.591***	[0.000]
Westerlund - Group Statistic	-8.492***	[0.000]	-8.172***	[0.000]
2016				
Pedroni - Panel ADF Statistic	-3.874***	[0.000]	-11.700***	[0.000]
Pedroni - Group ADF Statistic	-4.288***	[0.000]	-10.020***	[0.000]
Westerlund - Panel Statistic	-7.942***	[0.000]	-4.184***	[0.000]
Westerlund - Group Statistic	-6.052***	[0.000]	-4.756***	[0.000]
2017				
Pedroni - Panel ADF Statistic	-10.210***	[0.000]		
Pedroni - Group ADF Statistic	-9.534***	[0.000]		
Westerlund - Panel Statistic	-8.292***	[0.000]		
Westerlund - Group Statistic	-7.931***	[0.000]		