

# **Test Of Pauper Labor Argument: The Case Of Turkish Manufacturing Sector**

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## **Abstract**

*This paper aims to explore low cost labor advantage on export performance of Turkey. Two alternative models have been explored which shows that among the given variables there is no long term impact. Both LS and VAR technique has been adopted to find statistical significance of competitiveness determinants and the impulse-response relations. For the 1988-2000 period examined data set shows that there is a meaningful linkage as hypothesized.*

*Findings also show that there higher wages in no way restricts international competitiveness which is very parallel with US and UK experiences.*

**Jel No:** F2

Although there are serious concerns towards the national competitiveness issue, still the measure is becoming a more of a strategic issue at intergovernmental and sectorial levels. On the other hand a group of economists argue that increased economic openness holds out the promise of higher economic growth and an increasing well being of for workers, reason being high labor demand leading to efficient use of resources. The other school of economists asserts that increased economic openness present a potential threat to workers. Similar research is being conducted by (Wagner 2002), (Kandil, Mirzaie 2002) testing the effect of labor productivity, wages and exchange rates on international competitiveness.

But it is inevitable that a dynamic evaluation of competitiveness of nations must be implemented to the ultimate goal of nations namely to increase the well being of a nation or its people ( Aiginger 1998).

There is another group of economists who deny the importance of national competitiveness especially in a world of flexible exchange regimes (Cooper, 1961;Suntum, 1986). Recent era in international globalization can be summarized as the rebirth of "pauper labor argument". Industrialized countries have rigorously used the concept as a rationale for decreasing competitiveness in international markets, while developing focused on the so what humanitarian abuse of low waged workers. This study applies to export competitiveness of manufacturing sector in

Turkey. The major objective is to contribute towards wage sensitivity and its direction while also employing determinants as labor productivity and exchange rates. The first phase of the study employs least squares test to verify the statistical significance of the above cited variable interaction. While during the second phase we would like to employ VAR analysis to test long run impact of innovations on export competitiveness.

Given the format the study aims to put forward ex-post and ex-ante competitiveness determinants for Turkish manufacturing sector.

### **Data and stylized facts**

This paper uses ISIC rev 3 industry level data on manufacturing employment, wages, output, export and import quarterly data for Turkey. All data comes from Turkish State Statistics Institute (SSI) for the 1988-2000 period. Wages include regular pay and have been calculated as an hourly wage. The measure of exchange rate has been gathered from Turkish Central Bank (CB) for the same time period. All data used in the model are in dollar values. Among the data being used, availability of physical capital formation do not exist at a quarterly level thus as a proxy  $q/l$  (output per man) has been used.  $X/M$  is the ratio of exports to imports, a measure for competitiveness, thus reflecting higher competitiveness as the  $X/M$  ratio gets bigger. Looking at the scatter diagram and the tests involved asked for logarithmic values for all variables.

All data passes the unit root test showing variables are stationary. Verifying a non-spurious relationship.

### **The Model**

The following standard model is used to derive our specification of wages, output per man and exchange rates on international competitiveness. We will show that international competitiveness is a function of productivity, wages, and exchange rates.

Assume that firms in the manufacturing (tradable goods) sector assess their international competitiveness as,

$$x/m_t = f(q/l_t, w, er)$$

where,

$x_t$  = industry specific exports in time  $t$

$m_t$  = industry specific imports in time  $t$

$q_t$  = output of the specific sector in time  $t$

$l_t$  = level of employment of the specific sector in time t

$w_t$  = hourly wages of the specific sector in time t

$er_t$  = exchange rate at time t

ISIC rev 3 covers sectors from 15-36 covering 22 sub sectors of manufacturing. Among the existing 22 sectors, only 16 pass the test of significance measured in terms of t values.

For the four variable linear model, least squares (LS) regression is used for estimation for all 16 sectors. Parameter estimates and summary statistics for the model of industry characteristics are given in Appendix 1

Following LS estimates for individual sectors we have tested whether competitive sectors vary in terms of q/l, wages and responsiveness to exchange rate. For most sectors parameter sign seems to be parallel with the expected sign.

To test whether parameters by sign or size vary between competitive and less competitive sectors we have used the structural change test among sector groups. Towards that goal we have adapted test of structural change. In this respect we wish to investigate whether there is any change between competitive and noncompetitive sectors measures as the ratio of sectors exports to sectors imports. We have predicted the following equation to test structural change between competitive and noncompetitive sectors

$$X/m = \alpha_0 + \beta_1 q/l + \beta_2 w + \beta_3 er + \beta_4 Dq/l + \beta_5 Dw + e$$

**D =1 for competitive**

**D =2 for less competitive**

Due to the nature of the data AR1 (Cochrane-Orcutt) technique has been adopted to remove serial correlation problems, distorting the DW test.

## **Findings**

Finding show that q/l has a negative sign. Showing the level of technology adopted is significantly influencing the overall competitiveness. Which could be a measure of higher technology adapted, inducing imports leading to a decrease in export competitiveness in basic industries. Wage variable has a positive sign showing wage increases are positively influencing competitiveness in both sectors. Simply be interpreted, as labor qualifications are the key determinant to international competitiveness in the Turkish manufacturing sector. Thus shows the invalidity of "pauper labor argument". This one more time creates evidence that absorption of technology is more important than the given technology employed. Thus unlike the classical pauper labor argument

wage increases that matches with the skill differences is positively influencing the export competitiveness of sectors. Recent emphasis on higher wages leading to lower competitiveness seems to be contradicted with our findings. In an era of frequent technological changes, labor capital substitutability seems to be rare case versus capital labor complementarity, which is positively related by higher wages.

One other striking observation is that competitive sectors are less influenced by wage increases with respect to less competitive sectors. Which also validates our findings related to human capital accumulation vs the absolute wages being paid to sectors. Predicted structural forms are given below,

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Dependent variable xm  
 Annual Data From: 1988.01 to 200.04  
 Usable Observations : 103  
 Centered R\*\*2 0.960714  
 Uncentered R\*\*2 0.979450  
 Degrees of Freedom 96  
 Standard Error of Estimate 0.194860614  
 Sum of Squared Residuals 3.6451832532  
 Durbin-Watson Statistic 1.975699

Variable	Coeff	Sttd Error	T-Stat	Significance
Constant	-0.277531820	1.253114764	-0.22147	0.82519412
q/l	-0.157267592	0.114595957	-1.37237	0.17314755
W	0.178337928	0.110313008	1.61665	0.10923460
Er	0.053831828	0.028436449	1.89306	0.06136232
Dw	-0.139558690	0.015090508	-9.24811	0.00000000
Dql	0.097354282	0.035355849	2.75356	0.00705124
RHO	0.492758114	0.095087680	5.18214	0.00000121

$$\mathbf{X/m = -0.277 - 0.157 q/l + 0.178 w + 0.05 er + 0.097 Dq/l - 0.139 Dw}$$

As a residual of this finding we also have explored whether competitive sectors structurally different with respect to noncompetitive sectors. To develop such a data set we have taken the averages of statistically significant 16 sectors having eight sectors as competitive and the other eight being noncompetitive. Leaving us with 52 observations for each variable. Rats4 has been adapted as a statistical package for the estimates.

$$\mathbf{X/m = -0.277 - 0.157 q/l + 0.178 w + 0.05 er \quad \text{less competitive sectors}}$$

$$\mathbf{X/m = -0.277 - 0.06 q/l + 0.039 w + 0.05 er \quad \text{competitive sectors}}$$

Having similar intercepts and error responses we see that less competitive sector is more responsive to wage and productivity differences, with respect to competitive sectors. The findings can be interpreted as, learning by doing and highly qualified human capital accumulation in competitive sectors reducing  $q/l$  and  $w$  responses.

In the second phase of our analysis we will test long run implications of innovations given to wages with respect to competitiveness.

## **Conclusion and Recommendations**

First drawback of the model stems from the exchange rate adapted which is not sector specific. Unfortunately annual sector specific exchange rates are available. Using the national TL to dollar exchange rate should be creating biases in terms of responses given. ISIC 3 Rev3 does not enable detailed performances in export import activities.

We have started with the modest goal of testing Turkish manufacturing sector competitiveness for the 1988-2000 period with special reference to wages, testing whether as a dominant variable restricts sectorial competitiveness. Both LS and dynamic time series techniques show that higher wages are incorporated with higher export performance. An initial focus might seem contradicting while a close look will show that higher wages reflect higher labor productivity thus increasing the export competitiveness.

Looking at dynamic time series analysis to verify long run consistency of our findings, we see that in the long run wage is not a significant contributor to international competitiveness. Shown by very short run responses that fade out at most within six terms.

One other striking finding is that, competitive sector wage responses are shorter with respect to less competitive sectors, emphasizing the role of human capital. Looking at  $q/m$  which could be a measure of productivity and to  $er$  (exchange rate) we see that they have longer distortions around the average with respect to wage component.

We have started with the modest goal of examining the export performance of the real sector in Turkey for the 1988-2000 periods. Export performance of competitive and less competitive sectors seems to be weakly influenced by wage component. This in practice shows the importance of human capital formation and knowledge spillovers among sectors. This observation seems to be consistent with LS and VAR analysis.

As a policy implication it seems that Turkey at a governmental level and at a firm level should focus on qualified labor creation and employment versus pauper labor argument, which emphasizes low cost labor competitiveness, which no longer exists. Similar findings in other countries, makes the case more strategic in the improvement of export performance

## Özet

*Bu çalışma Türkiye'nin düşük iş gücü maliyetinin ihracat performansını ne yönde etkilediğini araştırmaktadır. İki farklı ekonometrik yöntem ile test edilen veriler iş gücünün 1988-2000 döneminde rekabet gücünü azaltmadığını ve ilişkinin uzun dönemde de tutarlılık gösterdiğini ortaya koymaktadır. Kullanılan en küçük kareler ve Var yöntemi istatistiki açıdan anlamlı ve hipotezi destekler sonuçlar vermiştir. Etki tepki fonksiyonlarındaki tutarlılık çalışmayı uzun dönem açısından da anlamlı kılmaktadır.*

*Ekonometrik bulgular ABD ve İngiltere bulguları ile özdeşlikler taşımaktadır. Ve ücretlerin yüksekliği rekabeti azaltmadan öte artırıcı nitelikte gözükmektedir.*

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## APPENDIX 1

### COMPETITIVE SECTORS

SECTOR	R Square	VARIABLE	COEFF	STD ERROR	t	SIGNIFICANCE
15	.331	CONSTANT	-5.307	1.292	-4.109	.000
	DW	q/l	.437	.098	4.476	.000
	1.432	W	-.363	.089	-4.076	.000
		Er	.111	.029	3.796	.000
16	.760	CONSTANT	3.621	6.426	.563	.576
	DW	q/l	-1.210	.505	-2.394	.021
	1.074	W	.959	.469	2.045	.046
		Er	.472	.170	2.781	.008
17	.536	CONSTANT	2.735	2.364	1.157	.253
	DW	q/l	2.462E-02	.185	.133	.894
	.446	W	-1.861E-02	.166	-.112	.911
		Er	-.151	.049	-3.066	.004
19	.216	CONSTANT	-4.915	1.603	-3.066	.004
	DW	q/l	.485	.152	3.181	.003
	1.059	W	-.427	.136	-3.130	.003
		Er	6.502E-02	.046	1.428	.160
25	.129	CONSTANT	-4.453	2.150	-2.071	.044
	DW	q/l	.339	.197	1.724	.091
	.766	W	-.288	.180	-1.602	.116
		Er	9.751E-02	.047	2.072	.044
26	.433	CONSTANT	2.798	1.497	1.869	.068
	DW	q/l	-.201	.119	-1.684	.099
	1.113	W	.246	.112	2.193	.033
		Er	.122	.030	4.014	.000
27	.295	CONSTANT	-1.971	1.075	-1.833	.073
	DW	q/l	.197	.084	2.345	.023
	1.112	W	-.139	.074	-1.891	.065
		Er	4.294E-02	.033	1.317	.194
36	.495	CONSTANT	-4.335	.886	-4.895	.000
	DW	q/l	.825	.280	2.948	.005
	.927	W	-.733	.249	-2.947	.005
		Er	.128	.041	3.166	.003

### LESS - COMPETITIVE SECTORS

SECTOR	R Square	VARIABLE	COEFF	STD ERROR	t	SIGNIFICANCE
22	.155	CONSTANT	-9.641	2.829	-3.408	.001
	DW	q/l	.790	.278	2.841	.007
	2.322	W	-.748	.263	-2.846	.006
		Er	6.452E-02	.058	1.119	.269
23	.527	CONSTANT	-6.345	4.717	-1.345	.185
	DW	q/l	.593	.358	1.659	.104
	1.514	W	-.609	.314	-1.937	.059
		Er	-.248	.113	-2.198	.033

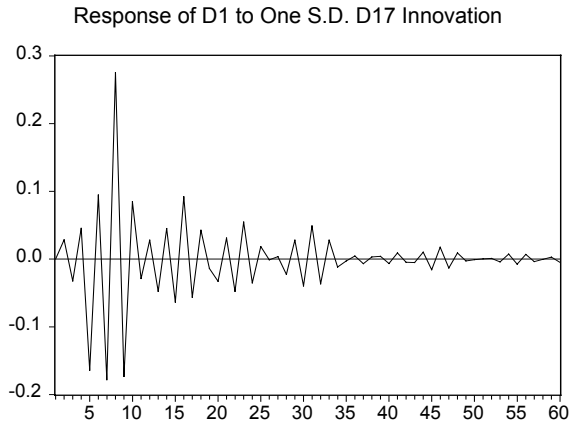
<b>SECTOR 24</b>	<b>R Square</b>	<b>VARIABLE</b>	<b>COEFF</b>	<b>STD ERROR</b>	<b>t</b>	<b>SIGNIFICANCE</b>
	.794	CONSTANT	-5.623	1.011	-5.561	.000
	DW	q/l	.425	.080	5.342	.000
	1.410	W	-.393	.070	-5.599	.000
		Er	-6.210E-02	.025	-2.454	.018
<b>SECTOR 30</b>	<b>R Square</b>	<b>VARIABLE</b>	<b>COEFF</b>	<b>STD ERROR</b>	<b>t</b>	<b>SIGNIFICANCE</b>
	.349	CONSTANT	-7.232	.737	-9.818	.000
	DW	q/l	.256	.092	2.789	.008
	.669	W	-9.301E-02	.093	-1.000	.322
		Er	.377	.102	3.705	.001
<b>SECTOR 31</b>	<b>R Square</b>	<b>VARIABLE</b>	<b>COEFF</b>	<b>STD ERROR</b>	<b>t</b>	<b>SIGNIFICANCE</b>
	.426	CONSTANT	-1.908	2.647	-.721	.475
	DW	q/l	-2.915E-02	.242	-.121	.905
	.468	W	-1.101E-02	.221	-.050	.960
		Er	5.600E-02	.046	1.223	.227
<b>SECTOR 32</b>	<b>R Square</b>	<b>VARIABLE</b>	<b>COEFF</b>	<b>STD ERROR</b>	<b>t</b>	<b>SIGNIFICANCE</b>
	.223	CONSTANT	-4.766	1.440	-3.309	.002
	DW	q/l	.258	.115	2.250	.029
	1.015	W	-.213	.116	-1.837	.072
		Er	.120	.034	3.559	.001
<b>SECTOR 33</b>	<b>R Square</b>	<b>VARIABLE</b>	<b>COEFF</b>	<b>STD ERROR</b>	<b>t</b>	<b>SIGNIFICANCE</b>
	.408	CONSTANT	-2.497	1.389	-1.798	.078
	DW	q/l	-.228	.159	-1.439	.157
	2.000	W	.202	.152	1.325	.191
		Er	8.551E-02	.040	2.126	.039
<b>SECTOR 34</b>	<b>R Square</b>	<b>VARIABLE</b>	<b>COEFF</b>	<b>STD ERROR</b>	<b>t</b>	<b>SIGNIFICANCE</b>
	.248	CONSTANT	4.794	2.480	1.933	.059
	DW	q/l	-.580	.202	-2.878	.006
	.679	W	.498	.191	2.601	.012
		Er	-4.609E-02	.059	-.781	.438



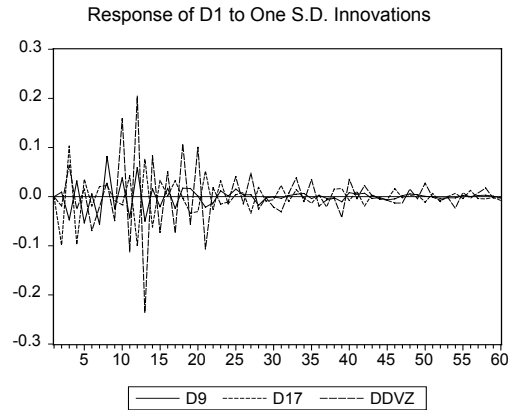
## APPENDIX 2

### IMPULSE RESPONSE FUNCTIONS OF LESS COMPETITIVE SECTORS

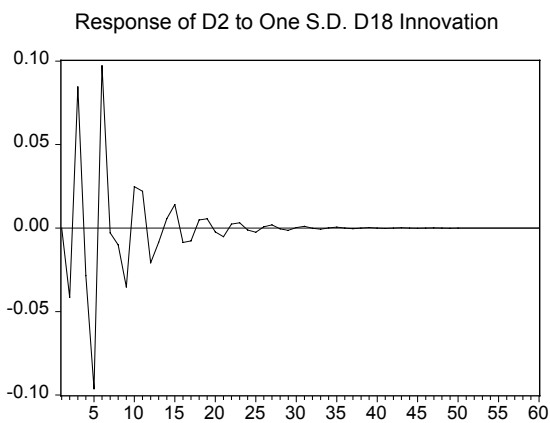
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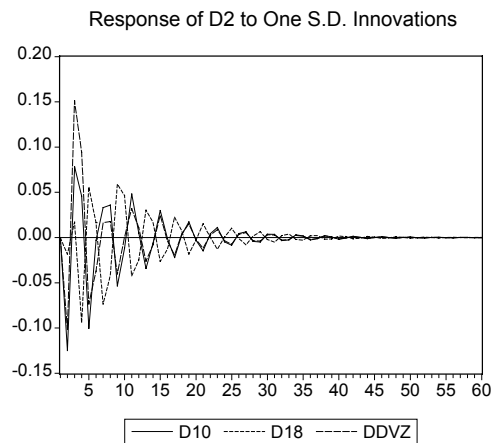
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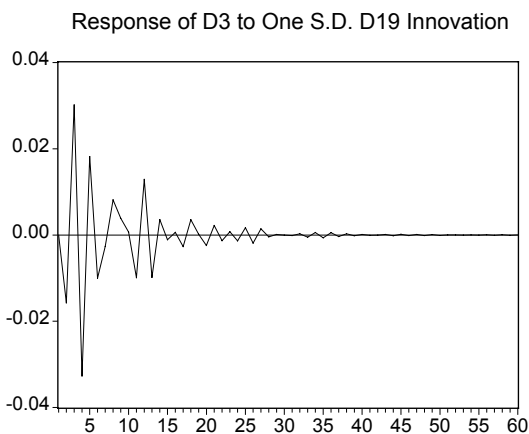
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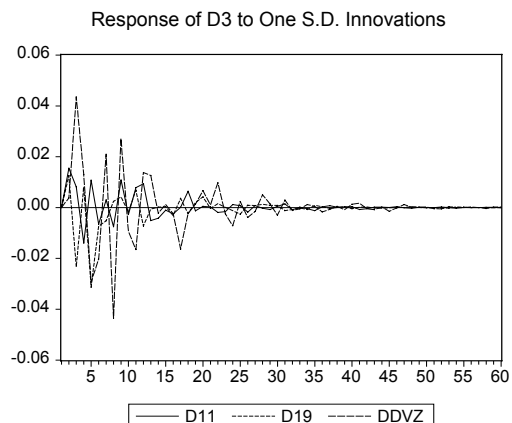
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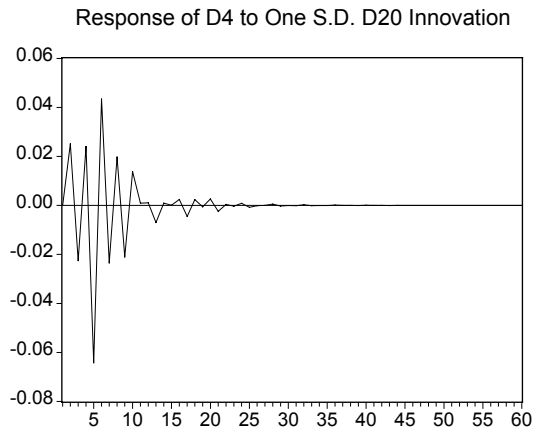
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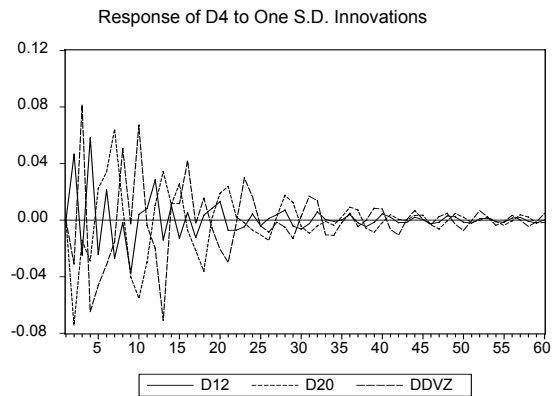
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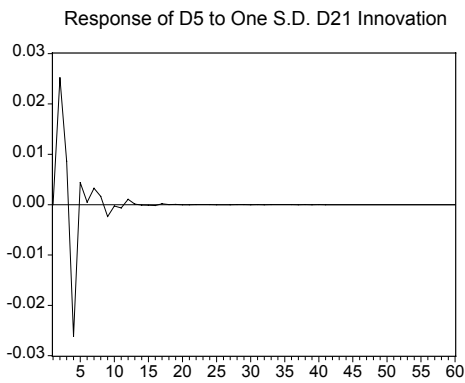
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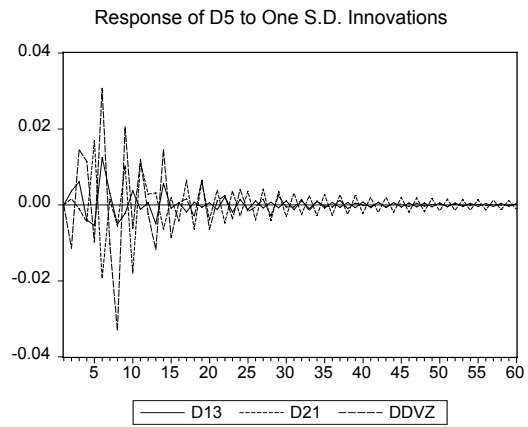
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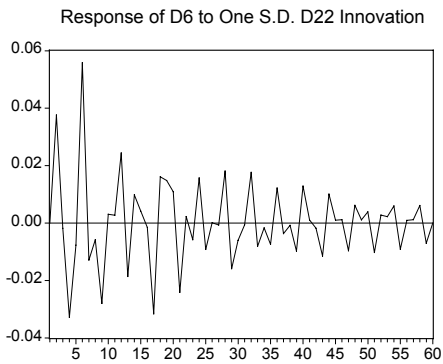
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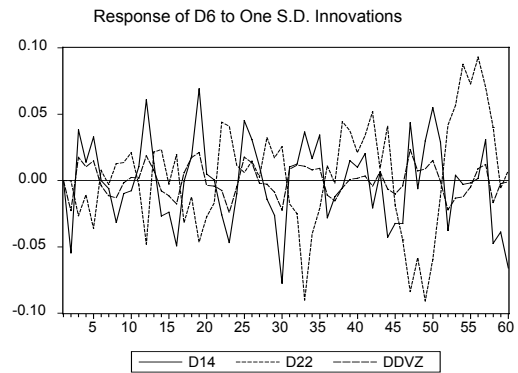
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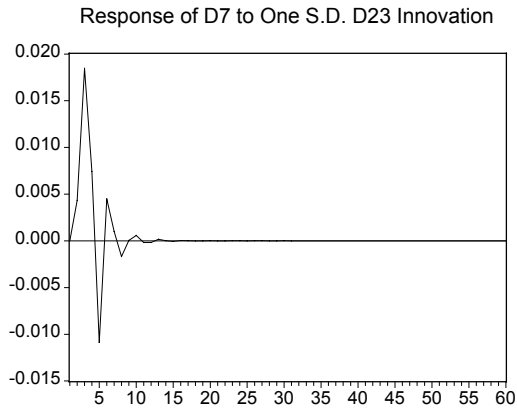
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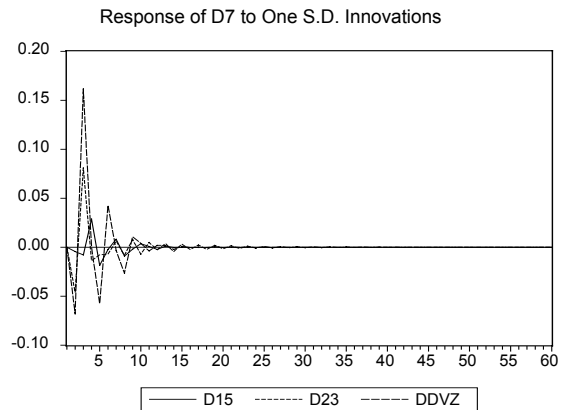
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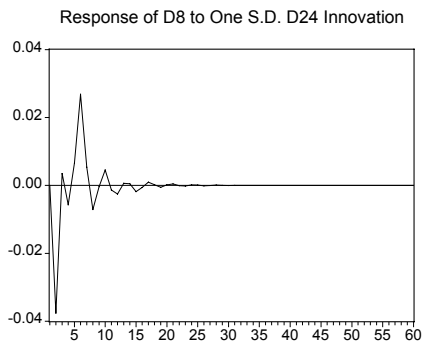
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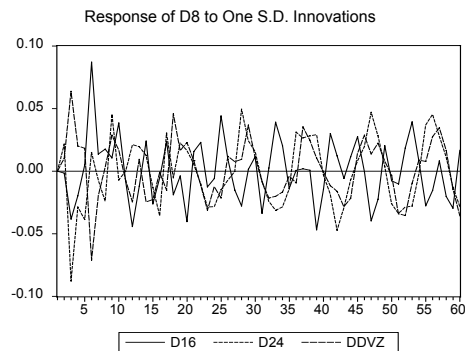
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**34. th sector w innovation on x/m**

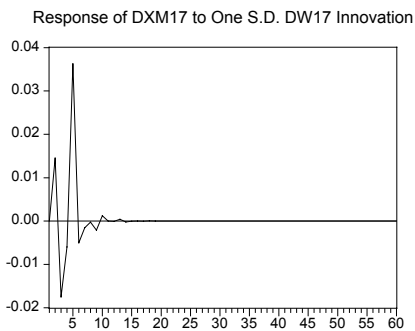


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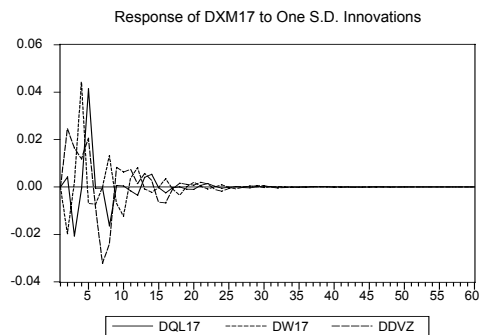


**IMPULSE RESPONSE FUNCTIONS OF OVERALL COMPETITIVE SECTORS**

**w innovation on x/m**

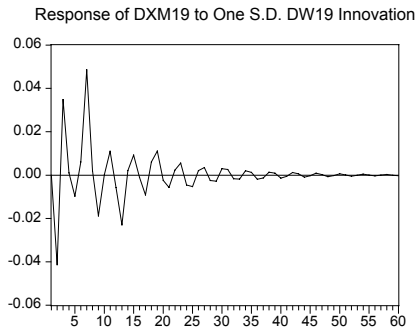


**q/l, w and er innovation on x/m**

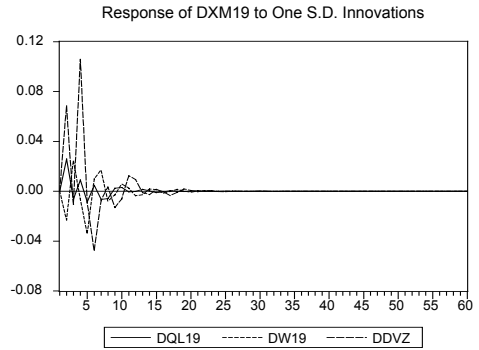


## IMPULSE RESPONSE FUNCTIONS OF OVERALL LESS-COMPETITIVE SECTORS

### w innovation on x/m

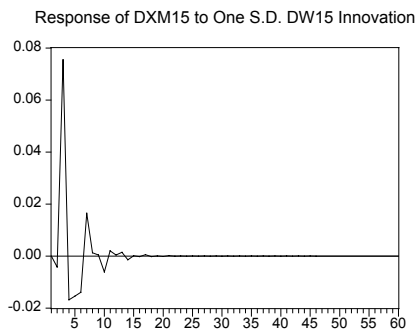


### q/l, w and er innovation on x/m

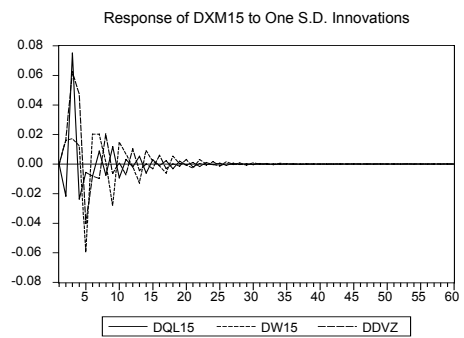


## IMPULSE RESPONSE FUNCTIONS OF COMPETITIVE SECTORS

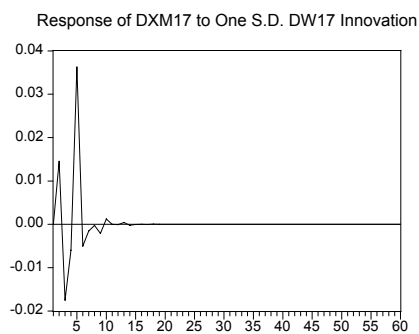
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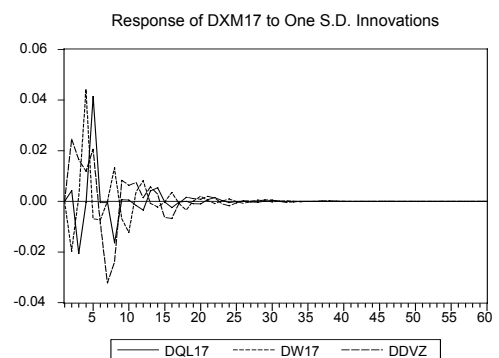
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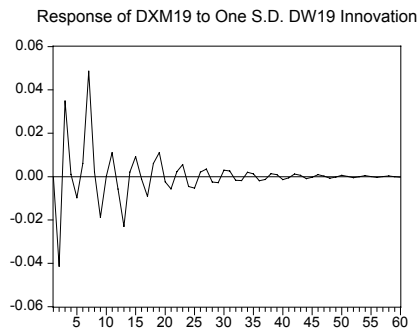
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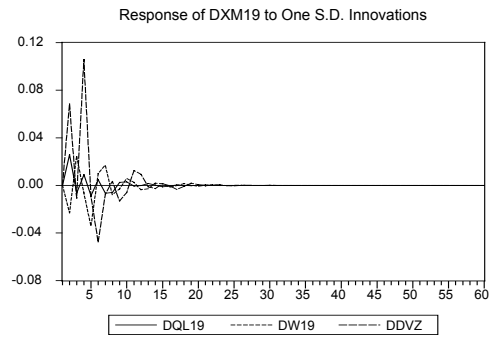
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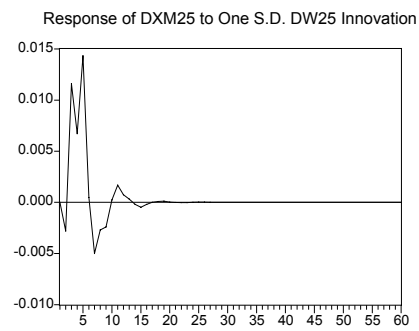
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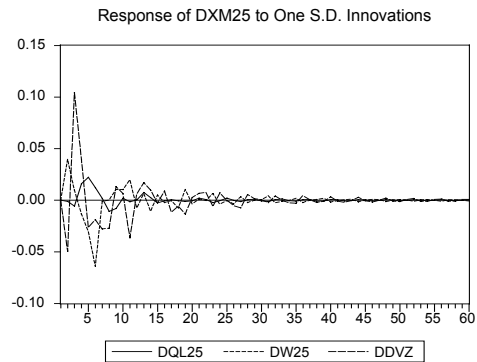
### 19. th sector q/l, w and er innovation on x/m



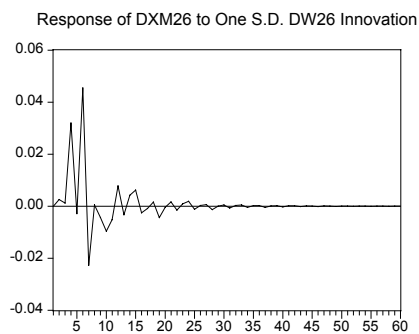
### 25. th sector w innovation on x/m



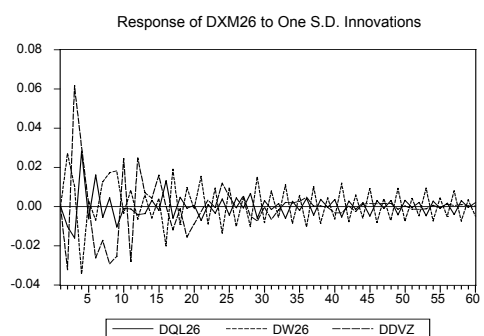
### 25. th sector q/l, w and er innovation on x/m



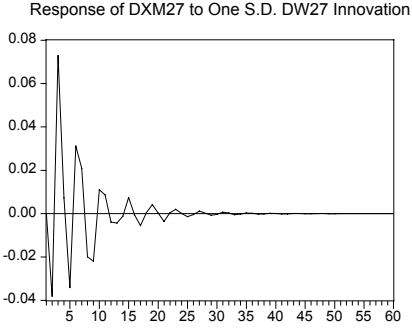
### 26. th sector w innovation on x/m



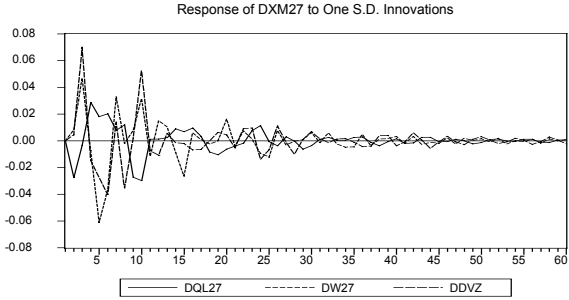
### 26. th sector q/l, w and er innovation on x/m



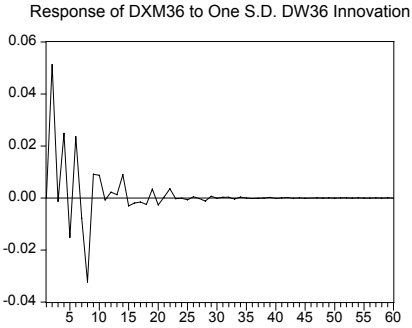
**27. th sector w innovation on x/m**



**27. th sector q/l, w and er innovation on x/m**



**36. th sector w innovation on x/m**



**Appendix 3**  
**US –97 ISIC, Rev.3**  
**Manufacturing Sector**

- 15. Food products and soft drinks**
- 16. Tobacco products**
- 17. Textile products**
- 18. Apparel**
- 19. Leather products**
- 20. Lumber products excluding furniture**
- 21. Paper and paper products**
- 22. Printing**
- 23. Coal and refined petroleum products**
- 24. Chemical products**
- 25. Plastic and rubber products**
- 26. Non-metallic minerals**
- 27. Core metal industry**
- 28. Metal industry**
- 29. Machine and tool industry**
- 30. Office and computer industry**
- 31. Electrical machine and tool industry**
- 32. Radio, TV and communication tools**
- 33. Medical equipment**
- 34. Transport vehicles**
- 35. Other transport equipment**
- 36. Furniture manufacturing**

## **Appendix 4**

### **Export / Import Performance of Turkish Manufacturing Sector**

#### **Competitive Sectors**

- 17. Textile products**
- 26. Non-metallic minerals**
- 16. Tobacco products**
- 15. Food products and soft drinks**
- 27. Core metal industry**
- 19. Leather products**
- 25. Plastic and rubber products**
- 36. Furniture manufacturing**

#### **Less Competitive Sectors**

- 23. Coal and refined petroleum products**
- 31. Electrical machine and tool industry**
- 34. Transport vehicles**
- 22. Printing**
- 32. Radio, TV and communication tools**
- 24. Chemical products**
- 33. Medical equipment**
- 30. Office and computer industry**