

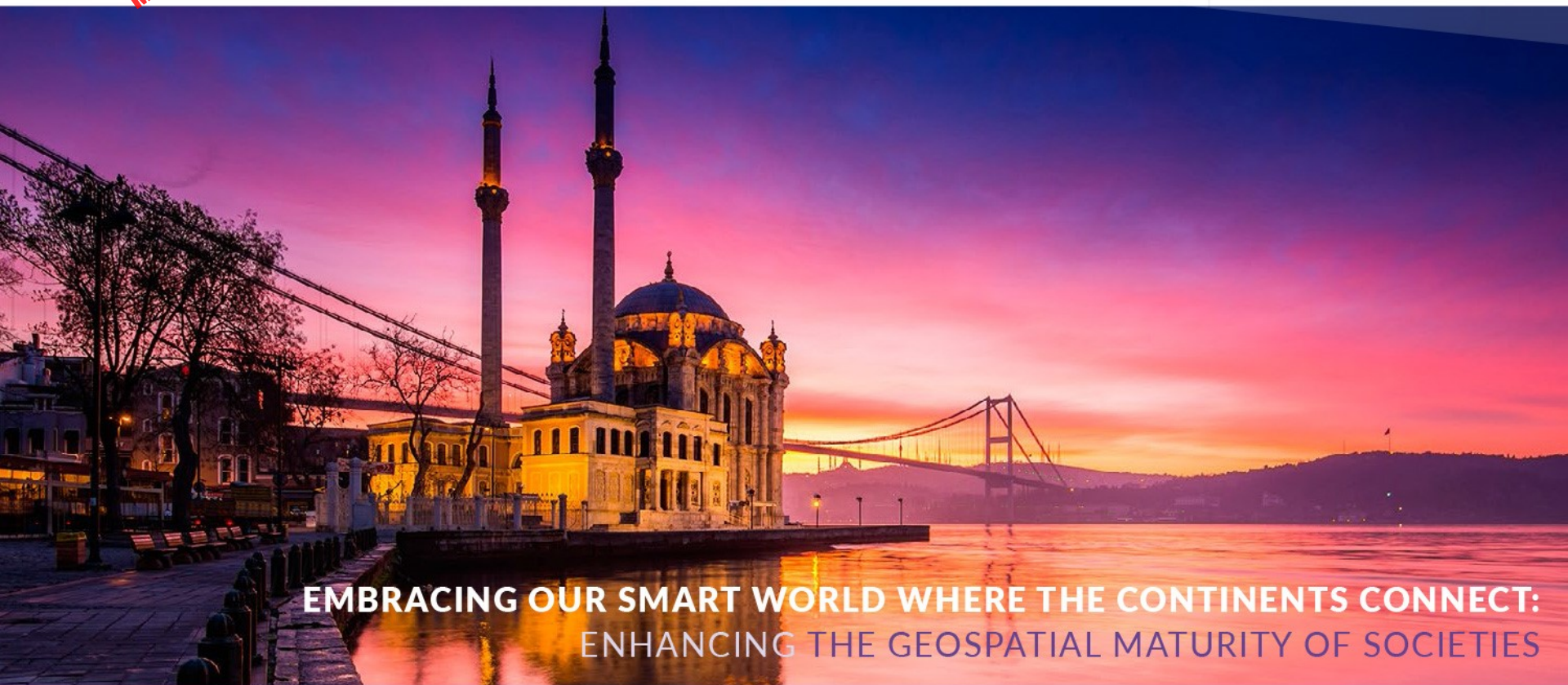


Presented at the FIG Congress 2018,  
May 6-11, 2018 in Istanbul, Turkey

6-11 May 2018

ISTANBUL

# XVI FIG Congress 2018



EMBRACING OUR SMART WORLD WHERE THE CONTINENTS CONNECT:  
ENHANCING THE GEOSPATIAL MATURITY OF SOCIETIES

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## Introduction 1

- ❑ Real estate and construction sectors have been influenced positively from economic growth and a favorable investment climate as the other sectors over the past fifteen years.
- ❑ With the growing share of these sectors in national economies, the construction and real estate sectors are considered providing a vital contribution for economic development.
- ❑ In fact, the share of these two sectors in the whole economy is correlated with certain structural and socio-economic dimensions.

## Introduction 2

- ❑ As it is in the advanced countries, the construction and real estate sectors are among the most important sectors in the Turkish economy based upon the main indicators.
- ❑ Due to limited comparable data, the economic indicators of construction and real estate sectors are hard to compare between different countries.
- ❑ But Supply and Use table recently is used to analyses sectorial relation and cause-affect results.

## Research Question

- The main objective of this paper is to explore the quantitative interdependence amongst the real estate and construction sectors and other industries in Turkey by using input-output analysis
- Based on the recently published official data and input – output dataset in Turkey and (OECD), the analysis focuses on the construction and real estate’s escalating role in terms of shares in gross output, value added and gross national product.
- This study also examined the relationship between the gross domestic product (GDP) and construction activities

## Methods

- This study examines the construction sector of Turkey with using IO analysis
- The comparison of the construction sector in Turkey and selected OECD member countries is analyzed using IO tables issued by OECD and TurkStat databases for the years 1998 and 2016.
- The Granger (1969) is accustomed to seeing how much of the currents can be explained with past values, and whether later addition of delayed values can improve the clarification.
- Granger test is used for two variables time series to test null hypothesis "X (GDP output value) does not granger cause Y(Construction output value)" and vice verse. The basic equation could be written as (i)

$$Y_t = \alpha_1 Y_{t-1} + \beta_1 X_{t-1} + \mu_t$$

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<b>Branches of economic activity Turkey</b>		<b>Production Value (Thousand TL)</b>	<b>Order</b>
A	Agriculture, forestry and fisheries	195 194 647	5
B	Mining and quarrying	29 639 350	17
C	Manufacturing industry	886 548 486	1
D	Electricity, gas, steam and ventilation system production and distribution	121 466 976	7
E	Water supply; sewerage, waste management and improvement activities	29 423 137	18
<b>F</b>	<b>Construction</b>	<b>308 217 935</b>	<b>2</b>
G	Wholesale and retail trade	295 592 811	3
H	Transport, storage	269 145 976	4
I	Accommodation and food service activities	84 136 721	9
J	Information and communication	64 012 296	13
K	Finance and insurance activities	73 906 858	10
<b>L</b>	<b>Real estate activities</b>	<b>167 417 066</b>	<b>6</b>
M	Professional, scientific and technical activities	59 181 800	15
N	Administrative and support service activities	59 514 500	14
O	Public administration and defense; compulsory social security	112 917 241	8
P	Education	73 882 469	11
Q	Human health and social service activities	71 560 668	12
R	Culture, art, entertainment, leisure and sports	22 512 728	19
S	Other service activities	31 708 694	16
T	Activities of households as employers	781 733	20
<b>Total production</b>		<b>2 956 762 095</b>	

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**Products**

## Turkey Use of products for construction sector, at current prices, 2012

	Usage Value (Thousand TL)	Share (%)
Manufacturing products	116 961 243	61,31%
Constructions and construction works	47 213 371	24,75%
Professional, scientific and technical services	7 717 251	4,05%
Mining and quarrying	6 116 891	3,21%
Administrative and support services	3 496 569	1,83%
Finance and insurance services	3 106 002	1,63%
Transportation and storage services	1 469 656	0,77%
Wholesale and retail trade; repair services of motor vehicles and motorcycles	1 270 327	0,67%
Real estate services	1 155 191	0,61%
Electricity, gas, steam and air conditioning	642 661	0,34%
Information and communication services	547 848	0,29%
Accommodation and food services	405 485	0,21%
Public administration and defense services; compulsory social security services	218 920	0,11%
Agriculture, forestry and fishing products	211 134	0,11%
Water supply; sewerage, waste management and improvement activities	159 975	0,08%
Other services	77 140	0,04%
Education services	12 166	0,01%
Culture, art, entertainment, litigation and sports services	2 963	0,00%
Human health and social services	-	0,00%
Services as an employer of households; goods and services provided by individuals for their own use	-	0,00%
<b>Total</b>	<b>190 784 794</b>	<b>100,0%</b>

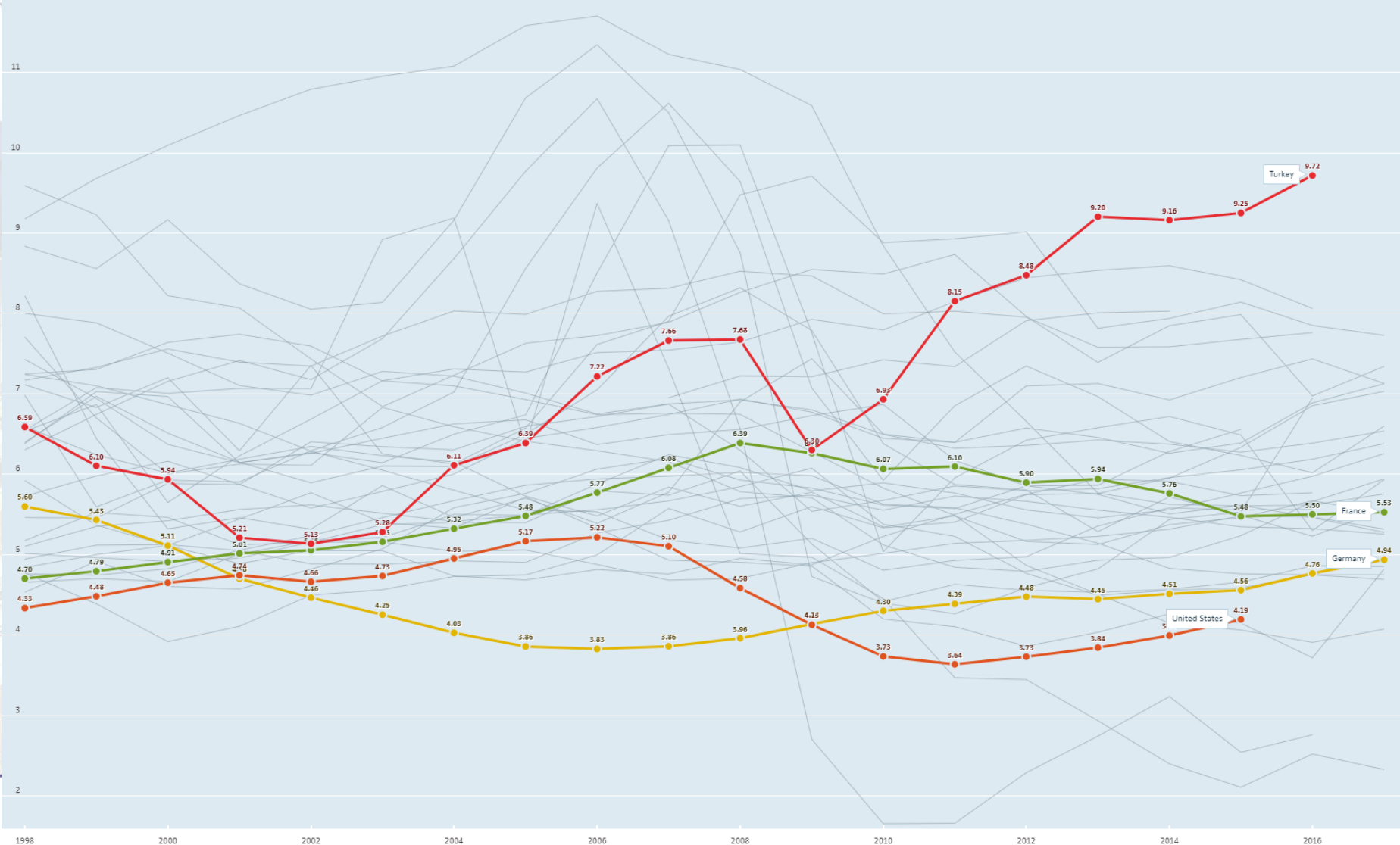
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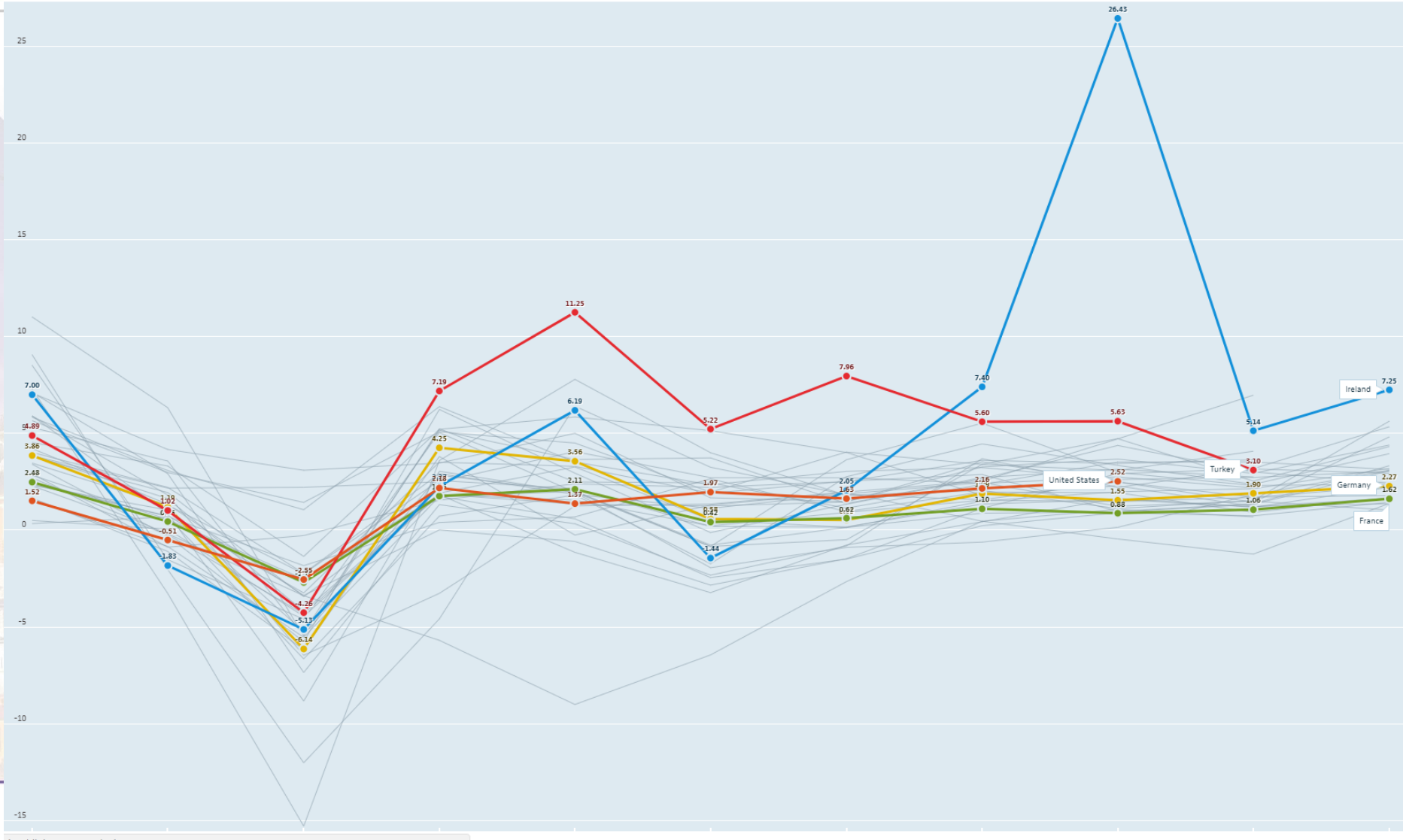
Value added by activity

Construction, % of value added, 1998 - 2017





Total, Annual growth rate (%), 2007 - 2017

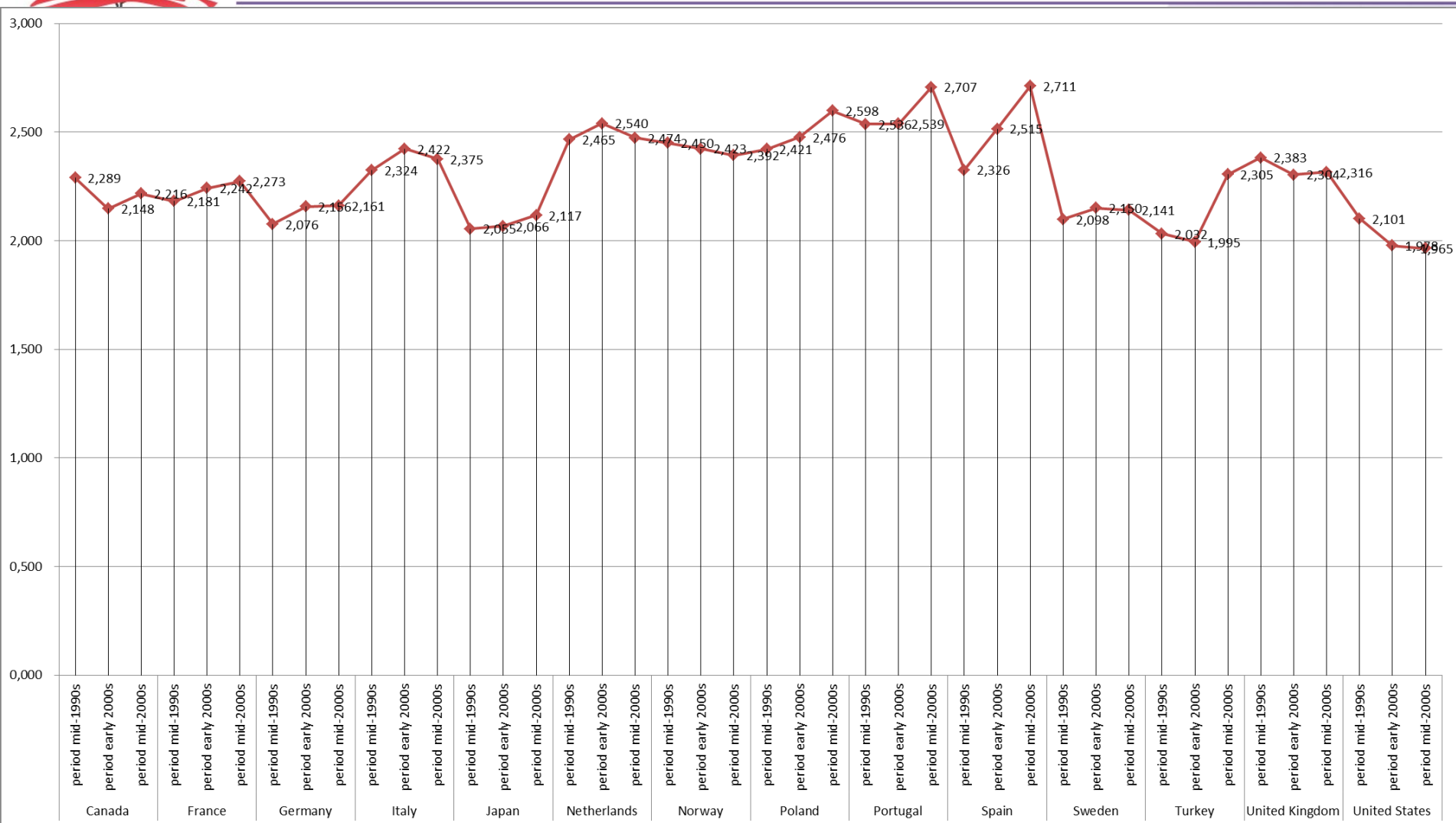




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## Denmark GDP-Construction sector granger causality tests Denmark GDP-Construction Stepwise Regression

Pairwise Granger Causality Tests

Date: 05/06/18 Time: 19:34

Sample: 1968 2017

Lags: 4

Null Hypothesis:	Obs	F-Statistic	Prob.
CONSTR does not Granger Cause GDP	46	3.09190	0.0272
GDP does not Granger Cause CONSTR		4.00783	0.0085

Dependent Variable: GDP

Method: Stepwise Regression

Date: 05/06/18 Time: 22:35

Sample: 1968 2017

Included observations: 50

Number of always included regressors: 2

No search regressors

Selection method: Stepwise forwards

Stopping criterion: p-value forwards/backwards = 0.5/0.5

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CONSTR	23.87133	0.615193	38.80299	0.0000
C	-61836.52	31918.84	-1.937305	0.0586

R-squared	0.969105	Mean dependent var	1007111.
Adjusted R-squared	0.968462	S.D. dependent var	641922.5
S.E. of regression	113999.0	Akaike info criterion	26.16494
Sum squared resid	6.24E+11	Schwarz criterion	26.24143
Log likelihood	-652.1236	Hannan-Quinn criter.	26.19407
F-statistic	1505.672	Durbin-Watson stat	0.519106
Prob(F-statistic)	0.000000		

## Conclusion

- The share of the Gross Domestic Product for the year 2016 is 8.6%. It ranks third among all sectors in GDP (2016 Annual GDP).
- The production value of the sector for 2012 is 308.217.935.000 TL.
- It ranks 2nd in all sectors according to production value (2012 Supply Table). 61.3% of the products used for construction sector production are covered by manufactured products (2012 Use Table).
- The Input / Output (I/O) ratio for the construction sector is 0.62. (The sector uses 62 inputs for production of 100 units 2012 Supply and Use Tables)

## Conclusion

- On the other hand, we calculate the average construction-GDP ratio of OECD database is % 6, but in some academic studies it has been calculated about %10.
- The other result is that backward linkage ratio is varied between about 2 and 2.5 for all OECD countries.
- Also the results showed that backward linkage is changing over time and countries economic conditions.
- **G**ranger test results showed that GDP and Construction output values have been cointegrated. The research results represent that there is a causal relationship between construction activities and economic development.

FIG  
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**Thank you for your patience!**

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