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RESEARCH NETWORK COLLABORATION IN ECONOMICS: A SOCIAL NETWORK ANALYSIS FOR IZMIR*

EKONOMİDE ARAŞTIRMA AĞI İŞBİRLİKLERİ: İZMİR İÇİN BİR SOSYAL AĞ ANALİZİ

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Öz

Bilginin üretimi ve aktarılması özellikle bilimsel araştırmalar gibi entellektüel faaliyetlerde önemlidir. Bu bağlamda bu çalışmanın temel amacı, İzmir'deki iktisatçı topluluğu arasındaki araştırma ağı işbirliklerini analiz etmektir. Literatürde bu konuda bildiğimiz kadarıyla bir çalışma yoktur. Bu boşluğu doldurmak için ilk olarak, 2012:Q1 – 2017:Q3 dönemini kapsayan ve İzmir'deki iktisatçıların araştırma ağı işbirliklerini gösteren bir sosyometrik tercihler matrisi oluşturulmuştur. Bununla beraber, toplumsal ve bireysel ağ yoğunluğunu anlatan bir sosyal ağ grafiği çizilmiştir. Sonuçlar İzmir'deki iktisatçılar arasında coğrafi ve bilişsel yakınlık temelinde yerel ağ özelliği olduğunu göstermektedir.

Anahtar Kelimeler: *Araştırma İşbirlikleri, Sosyal Ağ, Ekonomi Topluluğu, İzmir.*

Abstract

Production and transmission of knowledge are especially important in intellectual activities like scientific researches. In this context, the main purpose of this study is to analyse the research network collaboration in economics community in Izmir. To the best of our knowledge, there is no study investigating this topic in the literature for Izmir. To fill this gap, firstly, covering the period of 2012:Q1 – 2017:Q3, a sociometric choices matrix is constructed, for the research collaboration network of economics community in Izmir. Moreover, a social network graph is illustrated in order to analyze social and individual network densities. Results basically show that Izmir economics community exhibits local network properties based on geographical and cognitive distances.

Keywords: *Research collaboration, Social Network, Economics Community, Izmir.*

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1. INTRODUCTION

Simply, a network is 'a structure where number of nodes is related to each other by some specific threads' (Hakansson and Ford, 2002: 133). Networks create social capital in communities; create status and category differences in markets; increase the rate of innovation; increase trust and forbearance; inspire conformity in thought and action; shape the diffusion of knowledge; create individual tastes and preferences; and embed transactions in a social matrix (Owen-Smith and Powell, 2005: 6). Consequently, there is no doubt that networks are critical socio-economic concepts for communities. Since the network term includes a sociological soul, it's important to mention briefly the development of Social Network Theory. In this sense, the first version of Social Network Approach to network analyses was introduced by Radcliffe-Brown. He defined the social relations between two units as a part of a wide social relationships network and he used "social structure" term to describe the social network (Radcliffe - Brown, 1940: 2-3) Then researchers constructed their studies on this "social structure" term.

By following the same framework, Jacob Moreno (1934) developed firstly the use of sociograms in order to identify the structure of relationships around a person, group or organisation. Sociograms were simply the diagrams of nodes and lines used to represent relationships among actors (Scott, 2000: 9). Then, in 1950s, a group of researchers from Manchaster University developed the concept of "social network". Slightly later, a group of researchers from Harvard University introduced two mathematical innovations as the algebraic models of groups using Set Theory and multidimensional scaling. Particularly multidimensional scaling was important since it was a mathematical technique to translate relationships into social distance and to map them in social space (Scott, 2000). These innovations stimulated efforts to map interpersonal and interorganizational relationships (Scott et al., 2008: 11) and nowadays social network phenomenon is still popular in the literature of economics.

Social Network Theory has three basic assumptions. First of all, the relationships of actors in economic and social life exhibit interdependence. Secondly, connections among actors are transmission channels for both tangible (e.g. money) and intangible assets (e.g. knowledge). And finally, social networks are mechanisms that both provide opportunities and bring about restrictions for actors (Wasserman and Galaskiewicz, 1994: xiii). Consequently, it's widely accepted that as the density of relationships in a social network increases, the production of knowledge also increases. Production and transmission of knowledge are especially important in intellectual activities like scientific researches. Since contemporary communities are defined as information societies, knowledge dissemination across social networks has critical importance from now on. In this context, the main purpose of this study is to analyze the research network collaboration of economics community in Izmir. To the best of our knowledge, there is no study investigating this topic in the literature for this region. So this study may contribute to the related literature in the sense of research area. The paper is organized as follows. Following the introduction section, literature review is explained. In the third section, data, empirical model and method are explained. Then, a sociometric choices matrix is constructed for the research collaboration network of academicians in the field of

economics in Izmir. Moreover a social network graph is illustrated in order to analyze social and individual network densities. In the last section, empirical findings are evaluated.

2. LITERATURE REVIEW

After the Second World War, it is observed that research collaboration tends to increase for almost all disciplines in science. Price (1963) describes this circumstance as 'one of the most violent transitions' in science (MacDowell and Melvin; 1983). Within the last decades, research collaboration has become more important for the production of new knowledge in the world. Thus, authors have investigated social network from many perspectives. In this context, MacDowell and Melvin (1983) investigate the determinants of research collaboration in economics. The authors test whether economists collaborate more with each other or not. They find evidences in favor of rising of collaboration in economics. Following MacDowell and Melvin (1983), Barnett et. al. (1988) aims to test that economists tend to specialize or not. In other words, the increase of research collaboration level in economics between the years 1960-1985 is analyzed. For this purpose, numbers of the articles published in American Economic Review have been parsed. Using regression method, they find evidences in favor of the rising of research collaboration level too. Conducting social network analysis, Newman (2001a) investigated the patterns of research collaboration in the fields of physics, biomedical research, and computer science covering the period 1995-1999. Results show that scientists studying in experimental field are more connected than those studying in theoretical field.

Sebestyen and Varga (2013) aim to measure the network from the qualitative perspective in terms of 'knowledge potential, local connectivity, global embeddedness'. In the study, spatial methods have been used to test network measure. Findings suggest that high quality in papers has strong impact on the production of knowledge. Badar et. al (2015) analyzes the relationship between network centrality - which is discussed in terms of degree, closeness and betweenness - and research performance in the fields of chemistry and related departments in Pakistan. Employing social network analysis and Poisson regression, they find inverted U-shaped between the dimensions of centrality and research performance covering the period 2010-2013. Berge (2016) aims to find the impact of network proximity on collaboration structure and also to explore the interaction between proximity and geography, conducting a network proximity measure and gravity model. The authors use the data of chemistry field between the years 2001 and 2005 in terms of the numbers of co-publications in France, United Kingdom, Germany, Italy and, Spain. Findings show that network proximity among regions is a crucial point for both regional collaboration opportunities and international research collaborations[1].

There are few papers analyzing research collaboration for Turkey. Al et. al. (2012) investigates performance of academicians covering the period 1968-2009 for Hacettepe University, employing social network analysis and bibliometric techniques. They find that publications are adequate in terms of quantitative perspective. However, the results show that

[1] For more information regarding literature, see Kumar (2015).

quality of papers is not sufficient. Also, the success levels of the departments are different from each other. Çavuşoğlu and Türker (2013) investigates research collaboration network for the period 1980-2010 in Turkey, using statistical and graphical analysis. Results show that collaboration attempts have been growing in Turkey. Also, researchers tend to make more collaborations with separated papers against 'the opportunity cost of time'. Additionally, the authors find that network shows small network properties. Çavuşoğlu and Türker (2014) analyzes scientific collaboration network among the fields of engineering, mathematics, physics and surgery for the period 1980-2003. Karagöz ve Kozak (2014) analyzes research collaboration network in Anatolia Journal (Anatolia Turizm Araştırmaları Dergisi) for both institutional and individual level. In this context, using the data between the years 1997 and 2010 social network analysis is employed in the study. Results show that the number of interdisciplinary papers is so limited in the field of tourism. Nevertheless, researchers from the field of management, marketing, economics, education, accounting and finance are more connected than tourism. Also, findings show that collaboration level among universities is so low. Dokuz Eylül University and Mersin University have special role in the transmission of knowledge to the other universities. Türker and Çavuşoğlu (2016) reports the general view of Turkish co-authorship network of 33 years through engineering. Data are taken from ISI Web of Science and parsed covering the period 1980-2012. Using degree distribution plots, they find remarkable collaboration among researchers with similar careers. Tunçay et. al. (2016) analyzes the publication from social science quantitatively. Comparing the universities from EU and Turkey, publications in social science citation index have been analyzed in the period of 1980-2015. Basically, the authors recommend increasing the numbers of journals in SSCI and Scopus. Also, published original articles in Turkish must have been published in English. To the best our knowledge, there is no study investigating the research network collaboration in economics community in Izmir. Therefore, the current study likely aims to fill this gap in the literature.

3. DATA, METHOD AND EMPIRICAL ANALYSIS

3.1. Data

In this study, research collaboration network of economics community in Izmir is analysed. In this respect, the studies published in Izmir-originated journals and also published by academicians working in Izmir universities are taken into account. In this context, 6 journals are analyzed for the period of 2012.I – 2017.III. These journals are: Journal of Ege Strategic Research Center (ESAM), Ege Academic Review, Journal of Yaşar University, Dokuz Eylül University Journal of Graduate School of Social Sciences, Dokuz Eylül University Journal of Faculty of Economics and Administrative Sciences (FEAS), Dokuz Eylül University Journal of Business Administration Faculty. Consequently, data covers 303 articles published in these journals and 56 academicians and 10 economists out of academy.

3.2. Method

Graphical illustration is a widely used tool to analyse and show a network's type and properties. Basically, a social network graph consists of a finite set of agents and a finite set of

lines connecting those agents (Degenne and Forse, 1999: 63). In a graphical illustration there can be defined three types of networks as local network, random network and small-world network. As to theory, agents interact only with n most nearest neighbors in local networks. Hence the graph seems like a circle as in Figure 1(a). However in random network, agents set random relationships and network can seem in different types of shapes like in Figure 1(b). Lastly, small-world network consists of properties of both local and random networks and it seems like in Figure 1(c) (Cassar, 2007, 213–214). Small-world networks exist frequently in real life and they are critical for knowledge flows (Berthelemy and Amaral, 1999: 3183)

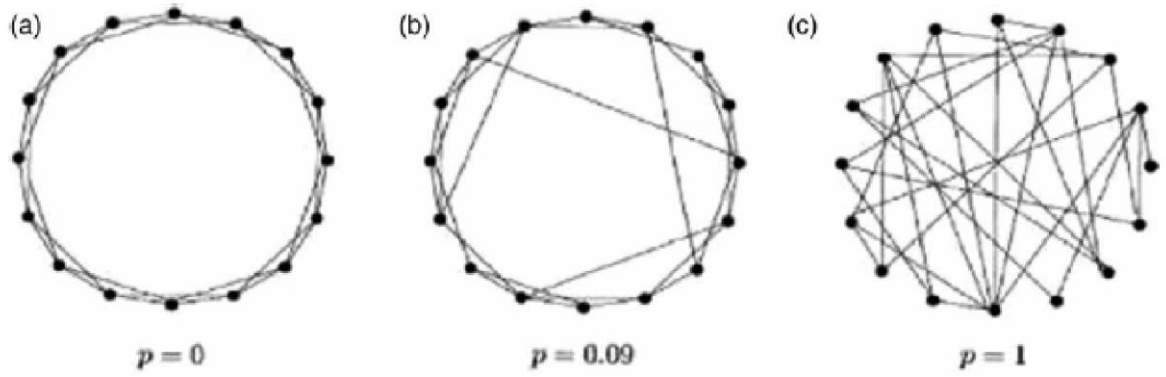

Figure 1: Graphical Illustrations of Three Basic Types of Networks
Source: Cowan and Jonard, 2004: 1560.

3.3. Empirical Findings

Social network graph of economics community in Izmir exhibits local network properties. It seems that academicians go into partnerships with other academicians working in their universities (mainly in their departments). Economists working in other institutions are MA or PhD students and it means they are also near to their supervisors by studying in the same department. Moreover, there exist only one study as interdisciplinary and this research collaboration arises from familial position of authors. All these results indicate that Izmir economics community exhibit local network properties that root in nearest neighbor relationships and exhibit also weak interdisciplinary collaborations. It seems from these results that geographical distance and cognitive distance are deterministic in Izmir economics community.

Figure 2 shows the social network graph of research collaboration in Izmir Economics Community. Network connections expressed in Figure 2 may also be exhibited by matrix notation. Such a matrix is characterized by the existence and absence of relationships and called as ‘sociometric choices matrix’ (Degenne and Forse, 1999: 65). Therefore, Table 1 is the sociometric choices matrix of our sample. It’s seen from Table 1 that this matrix is constructed by 0 and 1. 0 means ‘no connection’ and 1 means ‘connection’. Also this matrix is diagonal and symmetrical.

In Table A1 academicians are codified as to their universities. EGE means Ege University, DEU means Dokuz Eylül University, IEU means Izmir University of Economies, YAS means

Yaşar University, OI means Other Institutions and SIDD means Same Institution Different Department. In the table, both rows and columns show academicians from those institutions. Intersections of rows and columns exhibit the existence or absence of collaborations – 1 in the case of existence and 0 in the case of absence- between those academicians.

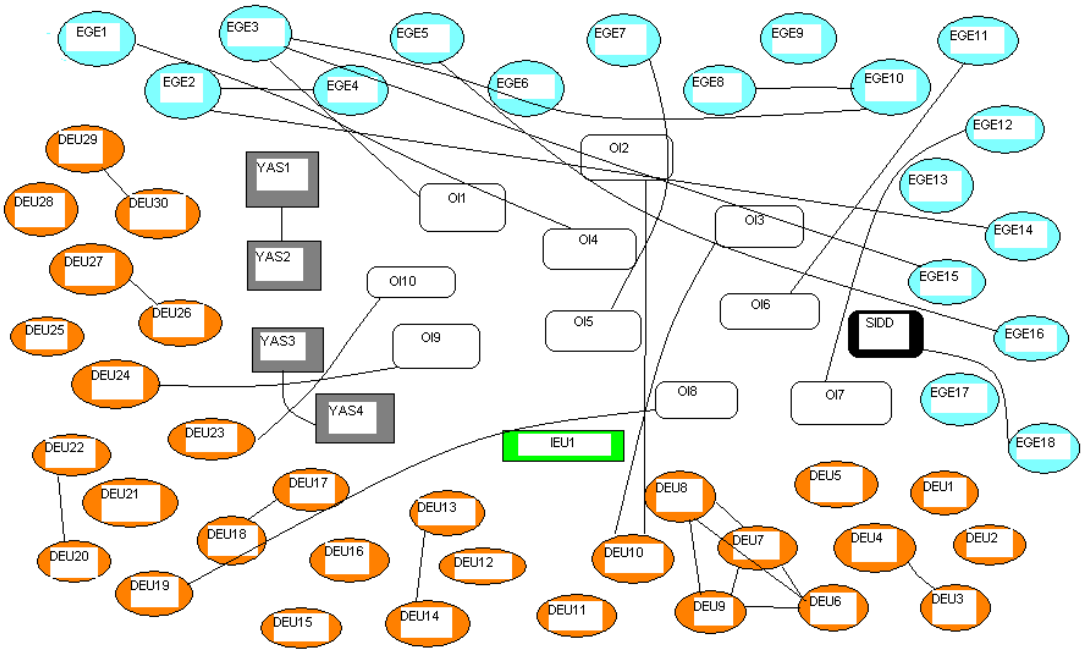

Figure 2: The Social Network Graph of Research Collaboration in Izmir Economics Community

This matrix is a tool to analyze the network density. 'Overall network density' and 'Individual network density' can be calculated with the information in Table A1. Overall network density exhibits the density of whole social network and it's computed by the following formula:

$$Y = \sum \frac{L}{N(N-1)} \quad (1)$$

Here N is the number of agents and L is the number of connections (Birke and Swann, 2005: 10). Consequently, overall network density is 0.0158 for this social network. Since this value is quite close to 0, then it means this social network is not a dense network. Moreover, individual network density can be calculated by using the percentage of connections between an agent and its social partners (Birke and Swann, 2005, 11). In the formula below, n is the number of agents that an academician collaborates with and L represents the number that the number of connections that a researcher makes with others.

$$y = \frac{n(n-1)}{\sum L} \quad (2)$$

Here 5 academicians (EGE3, DEU6, DEU7, DEU8 and DEU9) have the same and highest value in number of connections. They have 3 partnerships in their researches. Since there are 66 connections in whole network, individual network densities of those academicians are

calculated as 0.0909. This result indicates that individual network densities of those people are quite low but instead they exhibit a higher network density than overall network.

4. CONCLUSION

Research collaboration network of Izmir economics community is analyzed in this study. In this context, the studies published in Izmir-originated journals by academicians working in Izmir universities have been taken into account. By parsing these data, sociometric choices matrix and social network graph have been constructed. Overall and individual network densities have also been computed. In this sense, results suggest that Izmir economics community social network exhibits local network properties. Academicians intend to make connections with their colleagues working in the same department and in the same field. This result proves that economics community in Izmir sets their collaborative relationships through geographical and cognitive distances. Moreover, calculated overall and individual network densities imply that social network of economics community in Izmir is not highly dense and networks of academicians are also weak. Although these results are remarkable to analyze social network of researchers in the field of economics in Izmir, further researches likely shed some more light on this issue in more detail. By analyzing all publications of economics community in Izmir, it might be possible to see whole social network and to develop some policy implications to enhance their social network relationships.

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Appendix

Table A1: The Sociometric Choices Matrix of Economics Community in Izmir

	EGE 1	EGE 2	EGE 3	EGE 4	EGE 5	EGE 6	EGE 7	EGE 8	EGE 9	EGE 10	EGE 11	EGE 12	EGE 13	EGE 14	EGE 15	EGE 16	EGE 17	EGE 18	DEU 1	DEU 2	DEU 3	DEU 4
EGE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE2	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
EGE3	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0
EGE4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
EGE6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE8	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
EGE9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE10	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE14	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE15	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE16	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
DEU4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
DEU5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

DEU 17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU 18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU 19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU 21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU 22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU 23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU 25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU 26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU 27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU 28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU 29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU 30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU 31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
YAS1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
YAS2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
YAS3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
YAS4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
İEU1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DK1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DK2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DK3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DK4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DK5	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DK6	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
DK7	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
DK8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DK9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DK10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AKFB 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0

Table A1: The Sociometric Choices Matrix of Economics Community in Izmir (continued)

	DEU5	DEU6	DEU7	DEU8	DEU9	DEU10	DEU11	DEU12	DEU13	DEU14	DEU15	DEU16	DEU17	DEU18	DEU19	DEU20	DEU21	DEU22	DEU23	DEU24	DEU25	DEU26
EGE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU6	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU7	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU8	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU9	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU13	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0

DEU 14	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU 15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU 16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU 17	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
DEU 18	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
DEU 19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
DEU 21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU 22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
DEU 23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU 25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU 26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU 27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
DEU 28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU 29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU 30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU 31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
YAS 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
YAS 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
YAS 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
YAS 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
İEU1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DK1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DK2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DK3	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DK4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DK5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DK6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DK7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DK8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
DK9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
DK10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
AKFB1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table A1: The Sociometric Choices Matrix of Economics Community in Izmir (continued)

	DEU27	DEU28	DEU29	DEU30	DEU31	YAS1	YAS2	YAS3	YAS4	İEU1	DK1	DK2	DK3	DK4	DK5	DK6	DK7	DK8	DK9	DK10	AKFB1
EGE1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
EGE2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
EGE4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
EGE8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
EGE12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
EGE13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EGE18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
DEU1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU10	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
DEU11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
DEU20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

DEU24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
DEU25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU26	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU29	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU30	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEU31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
YAS1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
YAS2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
YAS3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
YAS4	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
İEU1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DK1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DK2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
DK3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
DK4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DK5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DK6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DK7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DK8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DK9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DK10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AKFB1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0