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Linking Turkish Credit Card Market As Two-Sided Market

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Abstract

Credit Card markets are special kind of market which is called as Two-Sided Markets in economics literature. In these markets there are two sides which benefit from the number of subscribers on other sides. Although scholars and economists has given importance and examined two-sided markets since the beginning of 21th century Turkish scholars have not interested much about these markets. We studied Turkish Credit card market by using Two-sided markets approach and also we aimed to contribute literature that is poor about Turkey Two-Sided Markets. We defined actors and competition structure in Turkish credit card markets and explained profit functions of them and set profit maximizing problems.

Keywords: Two-Sided Markets, Competition Between Banks, Credit Card Market, Network Externality

1. Introduction

With the spread of computers and internet we have witnessed a revolution in financial markets. Credit cards became one of the major payment instruments thanks to the IT technology. Credit card market has a unique structure called two-sided network market in economic literature from which both consumers and merchants benefit. In this market, number of consumers and merchants who are willing to use and accept the credit card as a payment instrument is important for other side. Generally speaking, there is a positive network externality in this market which means values of credit cards are dependent on the number of actors using or accepting it.

The article proceeds in three steps: The first step is the review of economic literature on two-sided network markets. Here, we explained structure and general properties of market; strength and weakness of banks in competition. Then, with references to economic literature on the subject we discussed Turkish credit card market and competition. We explained profit functions of actors and set profit maximizing

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problems of them. Lastly, we put forth possible movements of actors and determinants of the competition in Turkish credit card market.

2. Literature Review

Network markets and externalities are becoming challenging subjects with the emergence of new economy term (Top and Dilek, 2011; Dilek and Uluçay, 2011; Top, Dilek and Colakoglu; 2011). According to Katz and Shapiro's (1985) definition, network externality is the effect where utility and value of a good increase as the number of consumers, who use it increases. Thus every user of a product has something on the value of that product for others. This is called positive network externality. Katz and Shapiro (1985) establish three conditions of positive network externality as a) direct effect b) indirect effect and c) availability of post purchase system. Direct effects are valid when the quality of a good depends on network size. For example; telephone becomes more and more useful for consumers as the number of users increases. The higher number of other users, the higher amount and variety of complementary goods and this is called indirect effect. Higher numbers of mobile phone subscribers lead to more software options which are adaptable to mobile phone technology. Third, the availability of post purchase system depends on the number of total users. As the mobile phone users increase, the number and availability of mechanics and other post purchase services increases as well.

Credit card market is special kind of network market that is called two-sided market (Rochet and Tirole, 2003; Roson, 2005: 142). Consumers decide to apply for membership for a credit card according to the number of merchants who accept it as a payment instrument. On the other side, merchants take into consideration the number of consumers who want to use it in payments. In brief, these markets consist of two distinct types of users who provide benefits from transaction and interaction with opposite sides (Bolt and Tieman, 2005: 3). Other most common examples of two-sided markets in economic literature are video games, browsers, operating systems, portals, newspapers, (charge free) TV networks, shopping malls, dating clubs (Rochet and Tirole, 2003: 993-994) and scholar journals (Schonfeld, 2008). According to Roson (2005, 143), Interest for two-sided and multi-sided markets has been increased after the popular studies of Rochet and Tirole (2002 and 2003) and Armstrong (2004).

Another aspect of two-sided markets is that platforms should decide not only according to the amount of price but also according to the type of price. A platform trying to maximize its profit may price one part of market above marginal cost while pricing the other part under marginal cost (Bolt and Tieman, 2005a: 3; Armstrong and Wright, 2007: 355; Economides and Tag, 2007: 8). It is even possible like in the examples of internet search engines and TV channels that one part of market even is not given a price (Argentasi and Filisstrucchi, 2005: 2), firms can use skewed pricing (Bolt and Tieman, 2005b). Parker and Alystne (2005) investigated which part of market should a firm seeking to maximize its profit subsidize while making profit on the other side. Schindler and Schjelderup (2010) found under no tax circumstances network externality between two groups cause a different price than marginal cost. Scholar studying the subject with a focus on industrial economics and micro economics analyze credit card markets and the competition in these markets in their studies. (Chakravorti and Emmons, 2001; Rochet and Tirole, 2008; Schmalensee, 2002).

Although much theoretical progress has been made about network economics and multi-sided markets in international industrial and micro economics area, Turkish economists and scholars did not show enough interest. So, in literature the studies that investigate Turkish credit card market by looking through networks and platform economics are scant. The aim of this study is to encourage scholars about studies about two-sided markets and also form a basic model about Turkish credit card market.

3. Credit Card Market As Two-Sided Market Approach

Baxter's (1983) study inspired Rochet and Tirole (2003) to investigate credit card market as an example of two-sided market. Rochet and Tirole (2003: 550) studied credit card market by using two sided-market approach. They explain three rules in their study: first is interchange fee determined by platform management and paid to the issuer by acquirer. Second rule is Honor-all-cards rule that all affiliated merchant and issuing consumer's obligation to accept the cards they are using. No-Surcharge is the third rule which means no merchant can charge any additional costs to the consumer for paying with credit card.

Rochet and Tirole (2002: 554) analyzed classical payment card market and draw the figure that summarizes the structure of market. We will use this figure for analyzing Turkish Credit card market later.

Figure 1. Credit Card and Payment Card Market
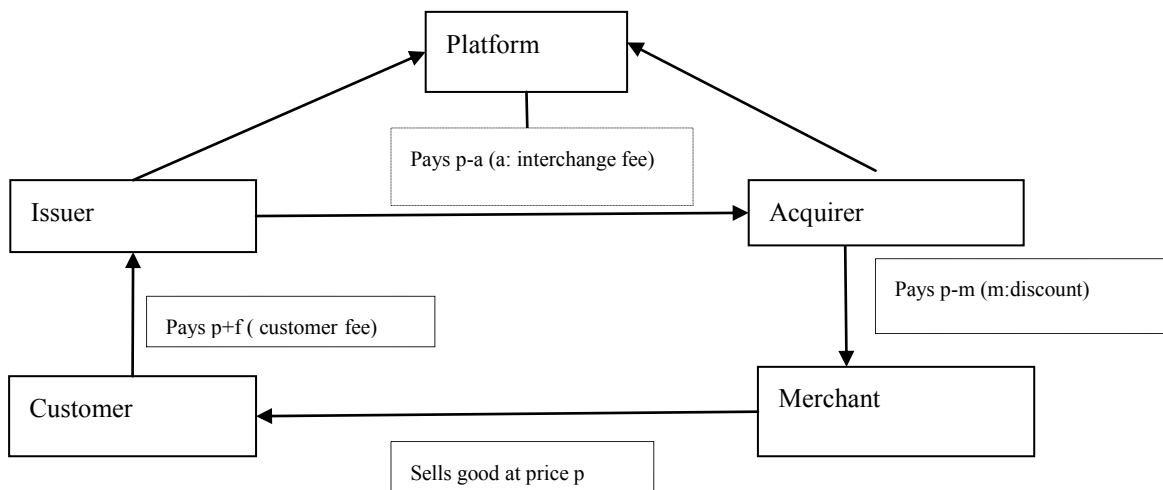
Source: Rochet and Tirole (2002: 554).

As it is seen in Figure 1, there are five actors in credit card markets. Relations between customer and merchant are conducted by two financial institutions called issuer and acquirer. While these financial instutions are not banks abroad in Turkey they are all banks. In two-sided markets some actors may not prefer to settle for one network. For example cardholders can use more than one credit card or users can

install multiple Internet browsers in their computers etc. This is called multihoming in literature. If market actors on contrary prefer just one platform this is called singlehoming (Roson, 2005: 151).

4. Actors of Turkish Credit Card Market

Turkey's credit card market is developing bigger and use of credit cards as payment method instead of cash is becoming widespread. Due to this development new regulations are necessary for Turkey's credit card markets. To meet this necessities new Bank Cards and Credit Cards Law no:5464 put into force on 1 March 2006. (Karahan, 2011: 100). On consumer's side use of credit cards as payment instrument have some opportunities like paying in installment, bonus points, slow payment etc. Number of credit card transactions and their amounts according to BKM are given in Table1. Because date of the last published data is January 2012 we chose January. For not to take into consideration time effect, January data are taken into consideration for all the years.

Table1. Number and amount of credit card transactions.

Period	Number of Transactions			Amount of Transactions (milion TL)		
	Shopping	Withdrawing cash	Total	Shopping	Withdrawing cash	Total
2002 January	39.534.289	3.197.071	42.731.360	1.225,03	181,99	1.407,03
2003 January	55.155.126	3.173.185	58.328.311	2.216,52	225,49	2.442,01
2004 January	78.073.924	3.885.111	81.959.035	3.687,06	417,41	4.104,48
2005 January	95.424.405	4.653.734	100.078.139	5.204,46	548,15	5.752,61
2006 January	103.987.310	4.326.947	108.314.257	6.604,48	658,19	7.262,68
2007 January	96.705.023	5.366.332	102.071.355	8.241,80	987,72	9.229,52
2008 January	120.230.131	7.090.029	127.320.160	11.709,09	1.393,40	13.102,50
2009 January	132.325.698	8.021.090	140.346.788	13.273,11	1.765,47	15.038,58
2010 January	150.162.575	7.152.159	157.314.734	15.161,55	1.542,69	16.704,25
2011 January	168.145.427	7.430.520	175.575.947	18.369,29	1.880,72	20.250,02
2012 January	188.403.478	7.563.272	195.966.750	23.606,75	2.087,86	25.694,62

Source: http://www.bkm.com.tr/istatistik/kredikarti_yurtici_issuer_islemleri.asp (date:23.02.2012)

It can be seen in the Table 1 amount of shopping transactions are growing every year and annual growth rates are usually above %20. Until 2005 growing rates were higher than %40. However growing rates have been decreased to %20 since 2005. The similar results are valid for withdrawing cash amounts except 2010. Because in 2010 withdrawing cash amounts decreased according to 2009. In shortly, usage of credit card both as a shopping and withdrawing cash tool usually have been increased since 2002. For that reason Turkish credit card market became more important search area for scholars.

A) Platforms: They are institutions which coordinates interactions and set interchange fees. In US, MasterCard and Visa are non-profit associations owned by more than 6000 financial institutions. However American Exprees is a for profit closed system that works similar to Visa and MasterCard (Rochet and Tirole, 2002). Platforms compete with each other on interest rates, billing cycles, credit terms or cardholders and merchants mark preferences (Chakravorti and Roson, 2004).

Contrary to USA, in Turkey the amount of interchange fee paid to issuer by acquirer is determined by BKM. BKM was found by 13 private and state banks in 1990 to establish credit card standards and rules. Clearance of debts and receivables from to Cardholder's shopping are realized by BKM. Thus, activities like developing procedures between banks, making domestic regulations and decisions to obtain standardization are performed in one place. Domestic credit card market of Turkey is not competitive but a monopolistic one. (http://www.bkm.com.tr/kurulus.aspx, date: 14.11.2011).

Visa, MasterCard, JCB, Diners Club etc are used as international payment systems in Turkey. BKM mediates member banks' pricing and clearance with these International institutions. According to BKM (Interbank Card Center) five platforms in Turkey are Visa, MasterCard, AMEX, JCB and Diners Club (http://www.bkm.com.tr/odeme-sistemleri.aspx).

Table 2. Visa and MasterCard Subscription Numbers

	2003	2004	2005	2006	2007	2008	2009	2010
Visa	9.572.460	13.202.147	15.989.986	17.800.385	20.878.744	24.332.198	25.201.351	27.378.115
MasterCard	10.255.667	13.450.664	13.963.095	14.623.148	16.416.829	18.824.985	18.712.739	19.125.697
Others	35.040	28.317	25.162	9.800	39.606	236.842	478.524	452.312

Source: http://www.bkm.com.tr/yillara-gore-istatistiki-bilgiler.aspx (Date: 05.01.2012)

However Visa and MasterCard systems have market power and have got most of the market share. Table 2 shows data about the competition between Visa and MasterCard. In 2003 the market share of MasterCard was higher than Visa. First Visa catched MasterCard in 2004 and then passed it. The market share of Visa has been higher than MasterCard since 2005. According to 2010 data Visa has approximately % 58 market shares in Turkish credit card market.

B) Issuers and Acquirers: Merchant and cardholders are joint with each other by financial institutions that are called as issuers and acquirers. In this market cardholder's bank is called as issuer and merchant's bank is called as acquirer. The fee that is paid by acquirer to issuer is called interchange fee and it is set by BKM in Turkey. Interchange fees are determined in some countries by networks (Master-Visa), while in some countries institutions like banks association determine these fees. (Gür ve Küçükbıçakçı, 2011: 180). If one institution is both, an issuer and an acquirer at the same time, then transaction costs will be minimum.

From Table 3 we can see first three don't change since 2004 and Yapı ve Kredi Bankası is the market leader. Garantibank is following Yapı ve Kredi Bank and the third bank is Akbank. Finansbank passed İş Bankası and rose to number forth in 2010. Total market share of first four issuer fell to 67.4 in 2008 from 69.5 in 2007 and then again it fell to 65.4 in 2010. (According to the m-firm concentration ratio which measures competition in the market m firms total market share is taken into consideration although there is no rule m generally accepted is four in scientific studies) (Tirole, 1989: 221)). We can deduce from the falling of market shares of the first four banks that competition in the credit card market has grown. According to studies issuer institutions don't lower interests rates in Turkey for competitiveness; instead

they prefer to increase the number of installment payments, increase advertising expenses, etc (Karahan, 2011: 108).

Table.3 Market shares of banks in Credit Card Market according to the amounts.

Rank	2004	%	2007	%	2008	%	2010	%
1	Yapı ve Kredi	22,4	Yapı ve Kredi	23,6	Yapı ve Kredi	21,0	Yapı ve Kredi	18,7
2	Garanti	20,4	Garanti	20,1	Garanti	19,7	Garanti	17,5
3	Akbank	13,7	Akbank	13,8	Akbank	13,9	Akbank	15,1
4	T.İşBankası	11,8	T.İşBankası	12	T.İşBankası	12,8	Finansbank	14,1
5	HSBC	7,2	Finans	9	Finans	9,9	T.İşBankası	12,1
6	Finans	6,7	HSBC	6,9	HSBC	6,7	HSBC	5,4
7	Vakıflar	4,3	Fortis	2,2	Citibank	2,5	Vakıflar	3,2
8	Fortis	3,1	Vakıfbank	2	Vakıfbank	2,2	Ziraat	2,7
9	Deniz	2,1	Citibank	1,9	Ziraat	2	Denizbank	2,3
10	Ziraat	2	Denizbank	1,7	Fortis	1,9	Citibank	1,6

Source : Bankacılıkta Yapısal Gelişmeler Sayı :5, BDDK, December, 2010.

http://www.bddk.org.tr/WebSitesi/turkce/Raporlar/Bankacilikta_Yapisal_Gelismeler/9886bankacilikta_yapisal_gelismeler_sayi5.pdf

Issuers get customer fee, limit access fee and if the customers exceed payment period also interest revenues from cardholders. They also get Interchange fee from acquirer instutions. In return they carry transaction cost and fraudulency risk. Because of the increase in the outstanding credit card debts after 2005, in 2006 law no.5464 put into force in Turkey and gave authority of determining ceiling interest rates for credit cards to the TCMB. (Aysan, 2011: 10).

While in some countries acquirer and issuer institutions exists independently of each other in credit card markets we find banks give both issuer and acquirer services to the customer in Turkish credit card market. Thus transaction costs of banks fall. When issuer and acquirer is the same bank, BKM's intermediation operations stop. This is called On-Us operations in banking literature (Aysan, 2011: 12).

C) Cardholders : Chakravorti (2003: 52) investigated cardholders in two main groups. First consumer group is called revolver, this group don't pay card debt in time and prefer to use it as a long term credit tool. Second group, pays it debts in time and called convenience user.

In Turkey, credit cards have no collateral and credit card debts are unsecured. Thus they are riskier compared to other type of credits. Generally rate of past due loans are higher in this credit segment. Consequently credit cards' delayed debts' interest rates are higher than other credits (Aysan, 2011: 17). Due to the rise in the number of credit card defaults in 2006 following law no 5464 an amnesty put in force and users under execution by creditors got a once easy payment for their credit card debts (Karahan, 2011: 104). Maximum interest rates for revolver consumers are announced by Central Bank of the republic of Turkey.

D) Merchant: Chakravorti and To (2007), claims when with the accept of credit card membership, sales increase member merchants bear higher discounts lightly. Rochet and Tirole (2003) claims when numbers of member merchants are high enough cardholders benefit from their cards more. When there aren't enough cardholders and merchants system won't work efficiently.

5. Actors' Profit Functions

In this section we are going to take hypothetical market model similar to Turkey's credit card market and reveal market actors profit functions. We already mentioned two types of card holders first of which is revolvers, cardholders using their credit cards as long term credit tools and convenience users who use their cards for shopping without advantage of credit. Therefore we are assuming two types of cardholders. Let one of the cardholders be a revolver who bought something n period ago from price p_1 and a convenience user who has just bought from price p_2. While market interest rate is i first consumer's payment will be $p_1(1+i)^n$. Because second cardholder is not defaulted his price will only be p_2. Both cardholders expect a utility from their purchase. Let's assume first cardholder's utility is U_1 and second cardholder's utility is U_2. And let's accept both cardholders as singlehome, namely using only one credit card. Cardholders profit function is (1). Of course both of them want to maximize their profits.

$$Max\{U_1 - [p_1(1+i)^n + f]\}$$
$$Max\{U_2 - [p_2 + f]\} \qquad (1)$$

Because in Turkey banks are both issuer and acquirer, transaction costs and interchange fees disappear and institutions like BKM that determine interchange fees become unnecessary. Thus, bank gets from first cardholder $p_1(1+i)^n - p_1$ interest rate revenue and from both cardholder membership charge (f) and from merchant discount (m) revenue and profit function will be sum of them. If we assume that public authority limit interest rate with i_0 then we will have a constraint. If m is fixed, independent from prices then profit function of banks will be (2a)

$$\max[m + 2f + p_1(1+i)^n - p_1]$$
$$(2a)$$

Constraint: $i <= i_0$

If m is determined as percentage of prices (advalorem) then profit function of banks will differ and be (2b).

$$\max[m(p_1 + p_2) + 2f + p_1(1+i)^n - p_1]$$
$$(2b)$$

Constraint: $i <= i_0$

Merchant will get price of good p_1 he has sold to first cardholder and p_2 from the second cardholder and he will pay m discount rate to the bank. If m is determined advalorem, as percentage then merchant's profit function will be (3a).

$$Max[(1-m)(p_1 + p_2)]$$
$$(3a)$$

If m is fixed, independent from prices then merchant's profit function will be (3b)

$$Max[(p_1 + p_2) - m] \qquad (3b)$$

As a result (1), (2a), (2b), (3a) and (3b) are profit functions of market actors in Turkish credit card market.

Conclusion:

Two-sided markets and network externalities have been studied since the beginning of 2000's by micro economists and market researchers. Credit card markets are one example of two-sided markets and studying them as a two-sided market became interesting subjects in the economics literature. Although there are many studies about foreign credit card markets in literature, finding studies that search Turkish credit card market as a two-sided market approach is hard.

Turkey's credit card markets show some peculiarities. While issuer and acquirer are generally two independent institutions in the world, banks undertake both functions in Turkey. Thus interchange fee and instutions determining this fee become unnecessary in the market. By the same reason discounts in the transaction costs are seen in the market. It is observed that studies on the Turkish credit card markets are usually macro based. In this article after revealing Turkey's credit card markets structure we showed the profit functions of actors when issuer and acquirer are same institutions. Thus we paved the way for micro-based further advanced studies that will investigate Turkish credit card market as a two sided market approach in detail.

References :

Armstrong, Mark and Wright, Julien (2007), Two-Sided Markets Competitive Bottlenecks and Exclusive Contracts, Economic Theory (32), 353-380.

Armstrong, Mark (2004), Competition In Two-Sided Markets, Rand Journal Of Economics, 37(3), Autumn, pp.668-691.

Aysan, Ahmet Faruk (2011), Türkiye'de Kredi Kartı Piyasası: Sorular Sorunlar, Türkiye'de Kredi Kartı Piyasası, TCMB, http://www.tcmb.gov.tr/yeni/evds/yayin/kitaplar/kk_piyasa.pdf (date: 01.02.2012).

Argentasi, Elena and Filistrucchi, Filip (2005), "Estimating Market Power in A Two-Sided Market: The Case of Newspapers", EUI Working Papers, Eco no. 2005/7.

Bolt, Wilko and Tieman, Alexandre (2005a), Social Welfare and Cost Recovery In Two-sided Markets, *IMF Working Paper*, WP/05/94, 2-13.

Bolt, Wilko and Tieman, Alexandre (2005b), Skewed Pricing In Two-Sided Markets An IO Approach, Money Macro and Finance (MMF) Group Conference, http://repec.org/mmfc05/paper75.pdf (date: 20.01.2012)

Chakravorti, Sujit and To, Ted (2007), A Theory of Credit Cards, *International Journal of Industrial Organization*, 25, pp.583-595.

Chakravorti, Sujit and Roson, Roberto (2004), Platform Competition In Two-Sided Markets: The Case of Payment Networks, *FRB of Chicago Working Paper*, no.2004-09,

Chakravorti, Sujit (2003), Theory of Credit Card Networks: A Survey of The Literature, *Review of Network Economics*, 2(2), pp.50-68.

Chakravorti, Sujit and Emmons, William (2001), "Who Pays for Credit Cards", Emerging Payments Occasional Paper Series

Dilek, Serkan ve Uluçay, Korkmaz (2011), "Network Wars In New Economy", *II.International Vocational Schools Symposium,* Adnan Menderes University Aydın MYO, 27-29 May

Economides, Nicolas and Tag, Joachim (2007), "Net Neutrality on The Internet: A Two-Sided Market Analysis", *Net Institute Working Paper*, 07-45.

Güngör, Gülcan Yıldırım and Yıldırım, Ahmet (2011), Kredi Kartı Faiz Oranlarını Belirleyen Faktörlerin Tespiti, Türkiye'de Kredi Kartı Piyasası, TCMB, http://www.tcmb.gov.tr/yeni/evds/yayin/kitaplar/kk-_piyasa.pdf (date: 01.02.2012).

Güngör, Gülcan Yıldırım (2011), Kredi Kartları Taksitli ve Peşin İşlemlerinde Bankalar Tarafından Üye İşyerlerine Uygulanan İSkonto Oranları", http://www.tcmb.gov.tr/yeni/evds/yayin/kitaplar/kk-_piyasa.pdf (date: 01.02.2012).

Gür, Ekin and Küçükbıçakçı, Ramazan (2011), "Kredi Kartı Sektöründe Ülke Bazında Gelişmeler: Azami Faiz Oranı Uygulamaları ve Kredi Kartı Ücret ve Komisyonları", *Türkiye'de Kredi Kartı Piyasası*, TCMB.

Katz, Micheal and Shapiro, Carl (1985), Network Externalities Competition and Compatibility, *American Economic Review*, 75(3), pp.424-440.

Karahan, Gülfem (2011), "Kredi Kartı Düzenlemeleri ve Düzenlemelerin Kredi Kartı Faiz Oranları Üzerindeki Etkisi", *Türkiye'de Kredi Kartı Piyasası*, TCMB

Karahan, Gülfem and Çakmak, Bahadır (2011), "Türkiye Kredi Kartı Sektöründeki Gelişmeler", *Türkiye'de Kredi Kartı Piyasası*, TCMB

Parker, Geofrey and Alstyne, Marshal Van (2005), Two-Sided Network Effects: A Theory of Information Product, Management Science, 51(10), pp.1494-1504

Rochet, Jean Charles and Tirole, Jean (2008), Tying In Two-Sided Markets and Honor All Cards Rule, International Journal of Industrial Organization, 26, pp.1333-1347

Rochet, Jean Charles and Tirole, Jean (2003), Platform Competition In Two-Sided Markets, Journal of The European Economic Association, 1(4), pp.990-1029.

Rochet, Jean Charles and Tirole, Jean (2002), Cooperation Among Competitors: The Economics of Payment Card Associations, RAND journal of Economics, 33(4), Winter, pp.549-570.

Roson, Robert (2005), Two-Sided Markets: A Tentative Survey, Review of Network Economics, 4(2), 142-160.

Schindler, Dirk and Schjelderup, Guttorm (2010), Profit Shifting In Economics of Business, International Journal of The Economics of Business, 17(3), pp.373-383.

Schmalensee, Richard (2002), Payment Systems and Interchange Fees, Journal of Industrial Economics, 50, pp.103-122.

Schonfeld, Roger (2008), The Value of Scholarly Journals In a Two-Sided Market, The Serials Librarian, 54(1), pp.121-126.

Tirole, Jean (1989), The Theory of Modern Industrial Organizations, MIT Press.

Top, Seyfi and Dilek, Serkan (2011), "Competition Between Networks", *Procedia Social and Behavioral Sciences,* 24, 1585-1595

Top, Seyfi; Dilek, Serkan and Çolakoğlu, Nurdan (2011), "Perceptions Of Network Effects: Positive or Negative Externalities?", *Procedia Social and Behavioral Sciences*, 24, 1574-1584

Weyl, Glen (2010), A Price Theory of Multi Sided Platforms, American Economic Review, 100(4), pp.1642-1672.

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