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Establishing compatibility between Europe's payment systems

Gottfried Leibbrandt [1]

SWIFT, Brussels, Belgium

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ABSTRACT

A model is introduced to analyze the effect of transaction patterns on the decision by two banks in different countries to make their payment networks compatible. Domestically oriented transaction patterns are found to significantly reduce the attractiveness to banks of establishing compatibility. The model is applied to the case of harmonizing Europe's credit transfer networks.

1. Introduction

Aligning Europe's many national standards and networks is an important challenge in the quest for a common market. Credit transfer payment systems, for example, are still national. Bank customers that want to transfer money domestically can do so through an Automated Clearing House (ACH).[2] This is not the case across borders. European consumers cannot reach counter parties abroad through their ACH. They have to resort to the more costly and cumbersome alternatives such as the international correspondent banking system or payment clubs like Eurogiro and EBA.[3] A consumer in Germany cannot authorize a direct debit by, for example, an Italian electricity company unless he maintains an account in Italy.[4] And Europe is not unique in this respect. Marquardt et al. (1996) and Seldon (1999) reach similar conclusions about the compatibility of US and Canadian retail payment systems.

The lack of standardization in European retail payment systems became highly visible with the introduction of the physical Euro in 2002, which created a single (cash) payment instrument that could be used throughout 12 EU countries. By that time, the European Commission had been urging banks to improve the situation for several years, as it considered the lack of a proper Pan-European payments infrastructure an impediment to the further integration of Europe and a barrier to cross-border banking competition. From 1990 to 2000 a series of white papers and directives urged banks to take action. But, according to the commission, banks made little progress.[5] In 2001 the European Parliament passed Regulation EC 2560/2001 (European Community, 2001). This regulation forces banks to maintain the same tariff structure for domestic and international Euro payments below EUR 12,500, and to implement a common account numbering system (IBAN).

But progress on harmonization has been slow at best. As EU commissioner for internal competition McCreevy recently put it: "it has been four years since promises were made by the banking system to develop, no later than 2010, Europe-wide payments infrastructure, standards and products. I now understand from the industry that this target day is likely to be missed. This is, at least, disappointing news for the users of payments systems and for the EU economy."[6]

E-mail address: Gottfried.Leibbrandt@swift.com.

[1] This paper resulted from research conducted while I was at the University of Maastricht, and does not necessarily reflect the views of SWIFT. Comments and suggestions by Arnout Boot, Robin Cowan, Martin Fase, Leo van Hove, Steven Ongena, Oz Shy and two anonymous reviewers are gratefully acknowledged. All remaining errors are my own.

[2] Most countries have a single national ACH. Some countries, like Germany, have several, but these are generally compatible: a customer can seamlessly address domestic counter parties that are connected to another ACH without extra costs or hassle.

[3] The European Banking Association (EBA) recently adopted a clearing system, called EBA Step2, by which the large European banks can clear European cross-border payments.

[4] Credit transfers are payments where a client instructs his bank to transfer money to the account of someone else, not necessarily with the same bank. The category includes direct debits, where the payor authorizes the payee (generally a company, for example an electrical utility) to directly debit his account.

[5] For an overview, see European Commission (2000).

[6] "The wind has changed", speech by EU commissioner McCreevy to Eurofi, delivered on March 10th, 2005.

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Why do differences between national retail payment systems persist, especially in Europe, where the regulator is applying significant pressure? This paper seeks to answer that question by modeling credit transfer payment systems as economic networks and by formulating the international harmonization of domestic standards as a compatibility issue. It introduces a model to analyze the compatibility decision in a 2-country setting. The model takes into account an essential feature of payment systems: the share of cross-border transactions is very low compared to domestic payments. For most countries, the cross-border share of credit transfers and checks, measured in number of transactions, is around 1–2%.[7]

The main result of the model is that transaction patterns directly affect the attractiveness to banks of establishing compatibility. With random transaction patterns, banks that maintain compatible networks are able to charge higher prices than banks whose payment networks are incompatible. Domestically oriented transaction patterns greatly reduce this 'compatibility premium' to banks. With compatibility only slightly more attractive to banks, it is quite likely that any cost of migrating to a common standard becomes prohibitive.

This paper proceeds as follows. Section 2 analyzes the literature on transaction patterns and network effects. Sections 3 describes the model. Section 4 analyzes welfare effects and Section 5 extends the model to take into account the costs of migrating to another payment network standard. Section 6 discusses the results.

2. Literature

There is ample evidence that standards and in particular payment systems are subject to increasing returns, where each user makes the standard or network more valuable to other (potential) users. For a recent overview of the topic, see the June 2003 issue of the Review of Network Economics, which was entirely dedicated to network effects in payment systems. Empirical studies confirm the existence of network externalities for ATMs (Saloner and Shepard, 1995, and Sharma, 1993), ACH-transfers (Gowrisankaran and Stavins, 2002), and debit and credit cards (Stavins, 2001; Mantel and McHugh, 2001).

A wide body of literature analyzes the adoption and compatibility of such network technologies. Most theoretical models find that competing firms prefer compatible standards. For example the 'Mix & Match' model of Matutes and Regibeau (1988) and Shy's (2001) model of the compatibility decision by firms whose customers face switching costs.

A significant body of literature models credit card networks, most of it focused on the role of interchange in balancing two sides of the market: cardholders and accepting merchants; for example Rochet and Tirole (2002), Schmalensee (2002) and Wright (2004). These models focus on a single network and do not easily lend themselves to analyze the cross-border compatibility decision. Another class of models focuses on access charges between networks, notably Laffont et al. (1998). As the authors note, however, their model is tailored to the telecommunications industry. The focus of this article is credit transfers, an industry without interconnection fees or other network access charges.

Almost all network models assume random transaction patterns: each additional user is equally relevant to the existing customer base. This, however, is not the case for many payment networks. Foreign users are generally less relevant than domestic ones. Such spatial transaction patterns have received relatively little attention. A few models exist, but they focus on unsponsored standards, and they assume homogeneous spatial landscapes without borders.

The next section tries to fill the gap by introducing a model to analyze the effect of domestically oriented transaction patterns on the compatibility decision with sponsored standards.

[7] BIS (2005) and Seldon (1999).

3. The model

Consumers live in two equal sized countries, *A* and *B*. The two countries are served by two banks, one in each country. These banks offer payment accounts, which consumers maintain for the sole purpose of making credit transfers to other consumers. Without loss of generality, each consumer makes one such a transaction per period. Consumers in each country prefer to maintain an account with their domestic bank and experience a disutility t if they bank with the foreign bank. I assume a consumer does not maintain accounts with both banks. Without loss of generality marginal costs are normalized to zero and the global number of consumers to one, i.e. there is half a consumer in each country. Finally, there is no reservation utility, meaning that each consumer must make one transaction each period and therefore maintain an account with at least one bank (i.e. by definition the market is fully served).

Banks charge for transactions implicitly through account maintenance fees and by remunerating low or zero interest on the account balance. Let p_i represent the charges of bank i during one period, then p_i is effectively the price charged for one credit transfer.[8]

Credit transfers are subject to network externalities: a consumer gets a benefit b per transaction if both he and his counterpart use compatible networks. Let n denote the fraction of transactions that a consumer makes with customers of banks whose payment networks are compatible with that of his own bank. Network benefits are then equal to nb: as more consumers use a compatible network, there is a bigger fraction of a consumer's transactions that will get him the benefit b. I assume that bank differentiation has a stronger influence on consumer preferences than the network sizes: $t > \frac{b}{2}$.

Since the two countries are of equal size, random transaction patterns would mean that one half of a consumer's transactions are domestic (with people in his own country) and one half are cross-border. As pointed out in Section 1, however, most payment transactions are domestic. Assume therefore that a consumer interacts most with others in his own country as follows: let $\frac{\delta}{2}$ be the share of his transactions that is 'cross-border', i.e. with users in the other country, and let $1-\frac{\delta}{2}$ be the share of his transactions that is domestic. Parameter δ, with $0 \le \delta \le 1$, represents the 'randomness' of transaction patterns; $\delta = 1$ corresponds to fully random transaction patterns across the two countries, $\delta = 0$ corresponds to full autarky where there is no interaction between the countries.

Banks compete in two stages. In stage 1 each bank decides whether to offer and accept compatibility with the other bank. Compatibility is only established if both banks agree. In stage 2 they compete by their prices p_i and p_j. I first derive equilibrium outcomes of phase 2 if banks have established no compatibility in phase 1.

Consumers from country i maximize their utility U_i, which is equal to the applicable network benefits minus the price and the disutility t if they bank with the foreign bank:

$$U_i \equiv \begin{cases} n_i b - p_i \text{ if the consumer banks with his domestic bank} \\ n_j b - p_j - t \text{ if he banks with the foreign bank.} \end{cases} \quad (1)$$

where n_i is the fraction of a consumer's transactions that can be made through the network of bank i. n_i and n_j are determined by the coverage of both banks, which in turn is determined endogenously by the prices they set.

I assume that there is no coordination failure on the part of consumers: i.e. consumers in a country either all bank with their domestic bank or all switch to the foreign bank. Note that two types of outcomes can occur if networks are incompatible: (1) each bank

[8] In many European countries, transactions are free, and account fees and forgone interest are viewed as the price of payments services. McKinsey (2006), for example, examines bank revenues from payment services. It considers all fees and commissions as well as the interest margin on payment accounts as bank income for providing payment services.