

## Web Appendix A: ATM networks in European countries

This Appendix reviews the ATM networks in 16 European countries. For each country we first review the ATM network developments (number of networks, ownership and coordination), primarily based on periodic reports by RBR (1995, 2000, 2008). We then summarize retail fee practices, mainly based on RBR's (2005) report for the European Commission.<sup>1</sup> In addition to these sources, we also used the period reports of the Bank for International Settlements (B.I.S.) (1999, 2003), the European Central Bank (ECB) (2001, 2007), and Heli Snellman's (2006) international review based on person-to-person information from central banks and banking associations.

Based on this review we constructed Table 1 and we refer to the main text for a summary discussion.

### AUSTRIA

In 1978, the four largest banks started the mutually owned company, GABE, to develop a national ATM network, Bancomat. Other banks were allowed to join, so that almost all banks in Austria now jointly own GABE. (In 1993 GABE was changed into a new company APSS, and in 2007 it became PayLife bank after the take-over by First Data.) For a long time GABE coordinated the ATM investment decisions of the Bancomat network. Nowadays, banks make their own investment decisions, but purchases are still coordinated. There was a second, smaller and only regional network, Spardat, consisting of mainly savings banks. This network also coordinated its investment decisions.

ATM withdrawals have been free of charge both for withdrawals at the own bank's ATMs and at the ATMs of other banks in the same network.

### BELGIUM

Two ATM networks, Bancontact and Mr Cash, were introduced at the end of the 1970s. The networks were made compatible in 1987 and they merged to form one entity Banksys in 1989, under common ownership of the banks.

There have been no retail fees for cash withdrawals.

### DENMARK

In 1975 banks agreed not to install ATMs. In 1981, however, they changed strategy and set up a mutually owned network, Kontanten, which took off in 1984. The network initially coordinated the investment decisions. In 1993, the individual banks took control of the investment decisions, subject to quota decided by the joint network.

Customers pay a fee of €0.70 for withdrawals outside opening hours or at other banks.

### FINLAND

Initially two networks developed. The commercial banks created the first network in the early 80s, POLT. In 1994 this network was sold to a new company, Automatia, under joint ownership of the three largest banks. This move led to a cut-back in the number of ATMs. The savings banks created a parallel second network under their joint ownership in 1984, Samlink. This network was much smaller (about 10 percent); it was gradually integrated in Automatia and eventually ceased to exist in 2004.

<sup>1</sup>Unless otherwise indicated, our description of fees refers to 2001; it is reasonable to assume that fees before were either the same or lower.

Until 2002, there were no charges for ATM cash withdrawals within or between the two networks. In 2002, banks started to charge fees between €0.50-1.28 for withdrawals between the two networks (but this was no longer relevant from 2004 when Samlink disappeared).

#### FRANCE

During the 1970s banks started to develop their own networks with a complicated pattern of agreements, the largest networks being Carte Blue (commercial banks) and Carte Verte (Credit Agricole and Credit Mutuel). By 1986 a national shared network CB (Carte Bancaire) was created. There was no common ownership. The individual banks retained control of their installation plans, but CB had some coordinating role during periodic meetings.

There were generally no charges on ATM withdrawals, with the exception of BNP-Paribas, who charged €0.78 after six free transactions per month.

#### GERMANY

Banks initially invested in their own networks, but then developed a shared national network, the GAA pool. In 1982 about 30 percent of the ATMs and by 1995 all of the ATMs belonged to the pool. Within the pool, three main banking groups emerged: the commercial, savings and co-operative banks.

Banks do not charge fees for cash withdrawals at ATMs within the same banking group (regardless of the bank), but charge high fees of about €3.5-4.5 for cash withdrawals at ATMs of other banking groups.

#### GREECE

ATMs developed slowly in part because salaries were commonly paid in cash. There were initially three competing networks ("reciprocity agreements"). In 1997 a joint network, DIASNET, was created, which was jointly owned by 39 banks.

Up to 2001 there were no retail fees for ATM cash withdrawals. Since 2001, a 1 percent foreign fee for cash withdrawals at other banks was introduced.

#### IRELAND

Banks initially developed their own networks. In 1984, three large banks set up a shared network, IBN. Several other banks joined that network in the late 1980s. There was another, much smaller network, Cashere, established in 1991 by four building societies. Even at its peak it comprised fewer than 100 machines (about 11 percent of total). After a merger between a bank and one of the Cashere members in 2001, the network was dissolved (with some machines integrated in IBN and others removed).

There have always been charges for ATM cash withdrawal services (about €0.20 on average), regardless of whether the transaction takes place at the own bank or at other banks. Most recently, independent ATM deployers wanted to install ATMs based on surcharging; after heavy consumer protest, a regulation was introduced stipulating that the independent deployers should first establish a relationship with an Irish bank.

#### ITALY

Banks initially developed their own networks, in part to increase geographic coverage because of branch entry restrictions at that time. In 1983, the Italian banking association introduced the shared network Bancomat. The network consisted of four different

processing centers, some of which merged in later years. Banks were allowed to deploy ATMs according to a quota system, based on a bank's market share of deposits.

There are no retail fees for cash withdrawals at banks within the same processing center, but there are foreign fees of on average €1.8 for transactions across processing centers.

#### LUXEMBURG

The shared network, Bancomat, was introduced in 1982, to avoid competitive installations. In 1985 CETREL was formed, owned by eleven banks. Since 1989 CETREL has been responsible for the management of the Bancomat network.

Retail fees for cash withdrawals were only introduced in 2002, and only for transactions at other banks. These foreign fees ranged between €0.75-3.00, often after a minimum of free monthly transactions.

#### NETHERLANDS

Banks started to install ATMs slowly, but had increased interest in the mid 1980s because of high labour costs and branch maintenance costs. A first shared network, Interpay, emerged in 1989 and was jointly owned by the eight largest banks. The second network was operated by the Postbank, which later merged with the bank ING. Both networks became fully compatible in 1998 under the name Interpay Nederland.

Retail fees have been zero, but recently some independent ATM deployers entered and started to charge surcharges of €2 per transaction.

#### NORWAY

A shared network, MiniBank, was introduced in 1982. The network consisted of three and subsequently two data centers, owned by groups of savings and/or commercial banks.

Retail fees for ATM cash withdrawals have been free at the customers' own bank ATMs during business hours. In 1999, there was a charge per transaction for withdrawals at own bank's ATMs outside business hours of about €0.4; other bank's ATMs during business hours of about €0.25 and outside business hours of about €0.5 (Norges Bank, 1999, p. 26).

#### PORTUGAL

There is a single shared ATM network, Multibanco, since 1985. It is operated by SIBS and under joint ownership of the member banks. SIBS decides on the number of ATMs and allocates ATMs according to criteria such as their branch and deposit market share.

There are no retail fees for ATM transactions.

#### SPAIN

There were initially three networks, ServiRed, Red 6000 and Telebanco 4B; each network was managed and co-owned by different banks. The networks became interoperable in 1991, but continued to be managed as separate entities.

In 2001 retail fees were €0.11 for cash withdrawals at the own bank; €0.74 for withdrawals at other banks in the own network; and €2.06 for withdrawals at banks of different networks.

## SWEDEN

Sweden was the first country in Europe to introduce ATMs on a large scale. Two networks emerged in the late seventies. The first network, Minuten, consisted of savings banks and had the objective to rationalize branch operations and reduce pressure on tellers. The second network was Bancomat, and consisted of commercial, state-owned and cooperative banks. Both networks became interoperable in 1996.

Banks do not charge retail fees for ATM cash withdrawals within the same network. Recently, two independent ATM deployers entered and impose surcharges on their ATMs.

## UNITED KINGDOM

During the 1980s banks developed three different shared networks: MINT, the “group of four” and LINK. As one of the last countries in Europe, these networks became shared in 1999.

There were no retail fees for ATM withdrawals at the own bank, but fees of about €1.50 for withdrawals at other banks. Furthermore, independent ATM deployers imposed surcharges of between €1.80-2.50

**Web Appendix B: Sensitivity analysis**

Table A1: Parameter estimates and predictions from demand model only: full sample of markets

	demand equation (11)			
$a$	6.36	(0.99)	5.50	(1.11)
$v_B - v_A$	-0.30	(0.33)	-0.48	(0.44)
constant	0.39	(0.12)	1.65	(0.38)
enterprises			0.75	(0.37)
foreign			0.62	(0.33)
young			-5.16	(0.94)
elderly			0.33	(1.02)
unemployment rate			-3.85	(1.72)
Flanders			-0.38	(0.07)
$\sigma_1$	0.44	(0.01)	0.42	(0.01)
	implied demand predictions			
cash withdrawals ( $\bar{Q}$ )	1.47	(0.18)	1.35	(0.20)
share of ATMs ( $s_A$ )	0.62	(0.07)	0.66	(0.10)
ATM elasticity ( $E_A^N$ )	0.73	(0.07)	0.58	(0.07)
price elasticity ( $E_A^P$ )	-1.46	(0.14)	-1.16	(0.14)
number of observations	467		467	

Notes: Standard errors are in parentheses. Implied demand predictions are at sample means.

Table A2: Parameter estimates and predictions from simultaneous demand and entry model: full sample of markets

demand equation (11)				
$\alpha$	2.99	(0.27)	2.70	(0.24)
$v_B - v_A$	-0.08	(0.20)	0.15	(0.21)
constant	0.25	(0.10)	1.49	(0.41)
enterprises			0.93	(0.40)
foreign			0.69	(0.32)
young			-5.55	(1.03)
elderly			1.39	(1.06)
unemployment rate			-1.43	(1.87)
Flanders			-0.30	(0.08)
$\sigma_1$	0.51	(0.01)	0.47	(0.01)
implied demand predictions				
cash withdrawals ( $\bar{Q}$ )	1.28	(0.13)	1.45	(0.17)
share of ATMs ( $s_A$ )	0.55	(0.05)	0.49	(0.05)
ATM elasticity ( $E_A^N$ )	0.43	(0.01)	0.44	(0.01)
price elasticity ( $E_A^P$ )	-0.86	(0.02)	-0.88	(0.02)
investment equation (16)–(17)				
constant	8.10	(0.04)	9.67	(0.55)
enterprises			-1.77	(0.57)
foreign			-2.06	(0.38)
young			1.38	(1.65)
elderly			-8.25	(1.31)
unemployment rate			-5.54	(1.91)
Flanders			-0.24	(0.09)
$\sigma_2$	0.99	(0.04)	0.80	(0.03)
$\sigma_{12}$	-0.39	(0.03)	-0.28	(0.03)
implied cost predictions				
$F/(c_B - c_A)$	3284	(134)	3337	(126)
$R^2$	0.56		0.62	
number of observations	842		842	

Notes: Standard errors are in parentheses. Implied demand and cost predictions are at sample means.

Table A3: Policy counterfactuals: alternative cost per unit of distance

	status quo	first best	subsidies-only	fees-only
	optimal subsidies and fees			
average subsidy per ATM $S$	0	2243 (1.18)	1208 (17.39)	0
average fee $t_B - t_A$	0	0.62 (0.01)	0	0.53 (0.01)
	ATM investment and demand			
total number of ATMs	490 (18.59)	700 (13.47)	711 (20.77)	409 (11.81)
total number of markets without ATM	330 (10.18)	131 (8.21)	234 (10.09)	284 (10.15)
average share of ATM cash withdrawals	0.25 (0.01)	0.83 (0.01)	0.32 (0.01)	0.62 (0.01)
average number of ATM cash withdrawals	0.59 (0.03)	1.75 (0.05)	0.72 (0.03)	1.36 (0.05)
	welfare (in millions of euro)			
change in producer surplus	0	6.54 (0.20)	0.76 (0.02)	5.29 (0.19)
change in consumer surplus	0	-1.96 (0.05)	0.21 (0.01)	-2.74 (0.07)
change in government revenues	0	-1.57 (0.03)	-0.86 (0.02)	0
change in total welfare	0	3.02 (0.15)	0.11 (0.01)	2.55 (0.14)

Notes: Number of observations is 659 markets. 100 simulations draws per market. Standard errors are in parentheses. Cost per unit of distance  $k=\text{€}0.10$ , ATM fixed costs  $F=\text{€}2300$ , as discussed in the text.