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Technology and intermediation: do banks pass the gains to their customers?

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Abstract

A key function of the banking system is to facilitate intermediation between borrowers and lenders. In this paper we single out for attention the money transmission function of banks to test whether intermediation costs have been reduced by technology and passed on to consumers. Using data for the commercial banking sector in Ireland over the period January 1986 to August 1996, we find that the gains from technology in the provision of banking services, provided they exist, have not been passed on to the bank customers in the form of a lower bank interest rate spread. © 2002 Elsevier Science Ltd. All rights reserved.

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1. Introduction

Service industries—most notably banking and financial services—are fast becoming very capital intensive as they invest more and more in computers and in other information technology (IT) (Wyckoff, 1996). The impact of this investment must be significant in the way in which the different services sectors who are making this investment perform. For example, there is widespread agreement that the use of technology by banks is directly responsible for more reliable flexible and convenient banking services (Financial Times, February 20/21, 1999). The rise of ATM networks in the financial and banking sectors has, alone, resulted in substantial, though largely unmeasured, time savings for consumers (Griliches, 1994). There is also a negative side to the use of technology. For example, the inexorable rise of telephone-based financial services has had a serious effect on employment in branch-based banking. This is certainly true of the UK where it has been estimated that the big four UK clearing banks have cut 76,000 jobs and closed many bank branches (Sunday Telegraph, August 18, 1996). A recent estimate is that the branch networks of the banks has been whittled down from a peak of 21,800 branches in 1985 to around 15,000 today (Financial Times, February, 20/21, 1999).

In response to the argument that new banking products and substantial improvements in convenience for bank customers are the tangible proof of the new technology Melvin (1990, p. 733) has this to say "certainly it is true that there is a wider range of banking services available and it is generally agreed that a larger choice makes a consumer better off. At the same time it seems clear that the increase in utility very much depends on how these new products differ from the old. Having twelve brands of cornflakes on the supermarket shelf as opposed to four would generally not be regarded as a great advance". In response to criticisms like this the managers of firms will say that they invest in IT not only to reduce costs but also to improve quality, increase product variety, speed up responsiveness and enhance customer service (Brynjolfsson, 1996). These intangible benefits are largely ignored in conventional output and productivity statistics because they are difficult to measure, aggregate and value. There is a general measurement problem in relation to the services sectors of the economy which has become more critical

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with the growth in importance of services (Griliches, 1994).

The standard issue in relation to services has always been how we might measure the output. A trickier problem is how to measure any improvements in that output or in consumer welfare that might be due to new investment or innovations. The technical issues involved are addressed in Brynjolfsson (1996) and in Bresnahan (1986), and in references therein. This is a topic that can be usefully approached within the framework of intermediation activities and intermediation costs in the economy (Melvin, 1990, pp. 728–729). Intermediation services include all these activities that facilitate market clearing in situations where producers and consumers are separated by either time or space. Transportation intermediates commodities over space and communications intermediate information over space. Banking services intermediate over both time and space. In the activities of accepting deposits and making loans they intermediate over space by bringing together separated borrowers and lenders. Banks also intermediate over time, however, by allowing individuals to transfer consumption from one period to another through savings. Insurance companies intermediate risk over time, and to some extent, over space and government services intermediate by facilitating transfers among individuals. Thus, intermediation is a very significant part of the modern economy. Spulber (1996) has recently suggested that intermediation accounts for over a quarter of the US economy. The impact of technological improvements on the performance of the intermediation sector is clearly an important issue.

A key function of the banking system is to facilitate intermediation between borrowers and lenders (Jayaratne and Strahan, 1996; Spulber, 1996). In this paper we single out for attention the money transmission function of the banks to test whether intermediation costs have been reduced by technology and passed on to consumers. The data and the econometric evidence relate to the commercial banking sector in Ireland over the period January 1986 to August 1996. The paper is organised as follows: Section 2 discusses the intermediation process between borrowers and lenders carried out by banks. Following Melvin (1990), it is shown how the cost of this intermediation, and therefore the value of the output of this service sector, is measured by the difference in the rate charged to borrowers and the rate paid to depositors. Thus, technological progress in this aspect of banking can be determined by how much this rate difference has been reduced. Section 3 introduces a banking model of the determination of the bank spread and estimates the determinants of the spread for the Irish banking system with special emphasis on the technology factor. Finally, Section 4 incorporates our main conclusion.

2. Measuring productivity improvements in intermediation

Following Melvin (1990) we approach the question of defining output and measuring productivity with the help of a trade and transportation model. The discussion of the model follows that found in O'Sullivan (1981). It is assumed throughout the discussion that perfect competition and constant returns to scale apply in both production of the product and in transport. It is standard to describe the demand for transport as a derived demand. Transport is not desired for its own sake; rather, its worth derives from the access it provides to other goods and services. The derived nature of the demand for transport can be seen most clearly if we take the simple example of trade in a good between two regions. Suppose the product is bread, which is produced and consumed in both regions A and B. Without any trade between the two regions the price in each region will be determined by local supply and demand conditions.

The two prices can be defined as P_A and P_B. If a price difference exists between the two regions there is an incentive to buy the product in the low priced region, transport it, and sell it in the high priced region as long as the price difference is greater than the cost of transportation i.e. $P_A - P_B > T_{AB}$, where we assume that price is higher in region A than in region B. Thus, the two prices, P_A and P_B, and the cost of transport, T_{AB}, determine the effective price gap and the likelihood that a certain amount of trade will occur. If the cost of transport between region A and region B decreases, due perhaps to investments in improved facilities or increased efficiency, then the effective price gap between A and B increases and along with it trade and the volume of transport. Furthermore, one would expect trade to persist, increasing price in region B and lowering it in region A, until the price difference just equaled the cost of transport.

To analyse this last result it is useful to first draw excess supply and demand curves for the two markets jointly (Fig. 1). In Fig. 1 the two markets are placed back to back. At every price we can read off how much demand exceeds supply or vice versa in each market and construct the excess supply and excess demand curves, shown as XS and XD in Fig. 1. The equilibrium level of trade between the two regions is now found as the position where the gap between excess supply and demand equals the cost of transportation. We now look at variations in the cost of transport. In the limit, when transport costs are zero, the maximum amount of trade will occur and is given by the intersection of XD and XS corresponding to point R on the quantity axis. If transport costs exceed FH then no trade will occur and the demand for transport will also be zero. If transport costs are C^*, then T^* is the quantity of transport used