The Role of ICTs in Small and Medium-Size Businesses

Jose Enrique Galdon-Sanchez, UPNA
Ricard Gil, Queen’s University
Guillermo Uriz-Uharte, UCL

JEL Codes: G20, L20, L80, M15, O32, O33
Keywords: ICT, adoption, retailing, small and medium-size business.

Extended Abstract

Information and communication technologies are responsible for major increases in productivity in the last half century. Technology may improve communication and coordination of resources within firms (Bloom et al, 2013; Mohnen et al., 2018), but it may also provide information about the competitive environment to streamline resources used in the marketplace (Bloom et al., 2012; Einav et al, 2017). While part of literature on IT has focused on the former using large corporations as empirical context, the study of the latter and the role of IT on small and medium-size businesses is scant (Viollaz, 2017). This distinction is important because in most countries the median firm is small with 0 or 1 employees, despite the median employee works in medium-sized firms with up to 250 employees. This is also the norm in the country of origin of our data. We contribute to the literature by evaluating the impact of an information technology diffused and promoted by a large bank in Southern Europe among its clientele, namely, small and medium-size businesses.

The bank is a major player in the credit card market both as credit card issuer and credit card point of sale provider (POS hereafter). Amidst its prevalence and salience in the marketplace, the bank started a program for its POS clients. This program aimed to bring “big data” to small and medium-size business owners that used the bank credit card POS. For every adopter, the bank generated a monthly customer-specific report containing summary statistics regarding the number of credit card transactions in the current month as well as

1 The usual disclaimer applies.
comparing this information to previous months and current statistics of competitors of the business in the same geographical zipcode. The report also includes information on average transaction per demographic group by sex and age, and zipcode in the store’s city, as well as the number of new customers, both for the store and its direct competition. The bank provided this program for free, and adoption was voluntary. In fact, in conversations with bank executives we learned that bank employees were not compensated for the diffusion of the program. If anything, bank employees would offer the adoption of the program as a source of value added to an already existing business relationship with the client. Regardless of when a customer signs up for the program, the first report is always produced during the first week of the following calendar month. Yet, when clients sign up for this service, they must go online and acknowledge a waiver on their liability with the program.

The data in its raw format includes all credit card transactions from 2014 to 2018, either originated at a bank’s POS or for a bank’s issued credit card. These are transactions taking place in all provinces of the bank’s country in more than half a million retail stores.

Our main specification runs OLS regressions such that,

$$\ln(y_{ijst}) = \alpha + \beta ICT_{ijst} + \gamma X_{ijst} + \delta_i + \theta_{jst} + u_{ijst},$$

where $y_{ijst}$ is the outcome variable such as number of transactions, revenues, or number of new customers for business $i$ located in zipcode $j$ operating in sector $s$ in period $t$. Our main variable of interest is $ICT_{ijst}$, which is a dummy variable that takes value 1 if business $i$ has adopted the ICT technology in or before period $t$. This variable varies within business over time for adopters, and remains at 0 for non-adopters. Our regressions specification also includes time-varying controls $X_{ijst}$ at the business level as well as business outlet fixed effects $\delta_i$ and zipcode-sector-period specific fixed effects $\theta_{jst}$. We assume that $u_{ijst}$ is iid distributed as customary. Our interest lies on estimating $\beta$.

A valid concern that is pervasive in the technology adoption literature, and elsewhere in the empirical economics literature, is the endogenous self-selection of businesses into the technology adoption (Sadun and Van Reenen, 2005). This is especially problematic if those stores that adopt the technology are about to realize episodes of growth or increases in store revenue. If so, the OLS regression above may erroneously attribute increases in productivity to technology adoption. To correct for this problem, we look for exogenous changes in a store’s environment that may increase the probability of adoption and are orthogonal demand
driven shocks. With this goal in mind, we run our main specification in first differences, and instrument for adoption with the number of contemporaneous adopters in the bank branch of the store’s account. Note that the number of contemporaneous adopters will include clients from all sectors and parts of the city, and that different stores within the same zipcode-sector will have their accounts in different bank branches. These two factors ensure that variation in adoption is orthogonal to sector-zipcode specific demand or productivity shocks. Our preliminary findings show that adoption of the technology is associated with a 20% increase in credit card revenues and a similar increase in the number of transactions. The average transaction does not seem to be sensitive to the adoption of this technology.

References


