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The role of taxation and banking systems in the adoption of ICTs: a theoretical approach

El papel de los sistemas tributarios y bancarios en la adopción de las TIC: un enfoque teórico

Abstract | The aim of this paper is to present a theoretical review of the role of taxation and banking systems in the adoption of ICTs as part of a broader research study of which the objective is to empirically analyse that role in small and medium enterprises (SMEs) in the northern part of Mexico. The analytical framework which is used suggests that the emergence of technological innovations of the magnitude of ICTs makes it essential to have effective taxation and banking systems in order to take full advantage of the new technology and thus facilitate its adoption. We conclude that more research is needed in order to expose the institutional constraints which impede the construction of effective taxation and banking systems in relation to ICTs, especially in developing countries, where the influence of international and domestic elites is superior.
Keywords | institutions | taxation system | banking system | ICTs | finance.

Resumen | El objetivo de este trabajo es presentar una revisión teórica del papel de los sistemas tributarios y bancarios en la adopción de las TIC como parte de un estudio de investigación más amplio cuyo objetivo es analizar empíricamente ese papel en las pequeñas y medianas empresas (PYMEs) en la parte norte de México. El marco analítico utilizado sugiere que el surgimiento de innovaciones tecnológicas de la magnitud de las TIC hace que sea esencial contar con sistemas fiscales y bancarios efectivos para aprovechar al máximo la nueva tecnología y así facilitar su adopción. Concluimos que se necesita más investigación para exponer las restricciones institucionales que impiden la construcción de sistemas tributarios y bancarios efectivos en relación con las TIC, especialmente en los países en desarrollo, donde la influencia de las élites internacionales y nacionales es superior.
Palabras clave | instituciones | sistema tributario | sistema bancario | TIC | finanzas.

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Introduction

THE RELATIONSHIP BETWEEN finance and technology has always been close, but the importance of the relationship has always been taken for granted. The increasing range of technological innovations in weaponry, shipbuilding and navigation, for instance, pushed importantly the replacement of feudalism between the sixteenth and seventeenth centuries forcing the creation of the modern state (Calorimis & Haber 2014). In order to build a capitalist state, however, in addition to technology and territory, a population is needed, and funds to sustain the operation of a government.

The development first of the steam engine and later electricity brought about revolutions in different industries which have subsequently marked the course of human development, especially in transportation and communications (steam ships, railroads and streetcars, among others), which accelerated both trade and war since people and goods could be moved quickly on a massive scale (Pérez 2013). Scholars have similarly found that higher levels of financial development produce faster technological progress, rapid job creation, social mobility and better levels of economic growth (Cetorelli & Strahan 2006; Correa 2008; Beck *et al*. 2008). Despite this, however, the reasons for the impediments faced by developing countries to make the same achievements that have been made in other parts of the world regarding the adoption of technology have not been fully explained.

As part of a broader research study of which the objective is to empirically analyse the role of taxation and banking systems in the adoption of Information and Communication Technologies (ICTs) in small and medium enterprises (SMEs) in the northern part of Mexico, the aim of this article is to present a theoretical approach to the subject. This paper is divided into four sections. In the first section, we present a reflection on the importance of taxation and banking systems in the adoption of technology. In the second, we review the relationship between the taxation system and the adoption of technology. In the third, we review the link between the banking system and the adoption of technology and in the fourth section, the conclusions are presented.

The importance of taxation and banking systems in the adoption of technology

Pérez (1983) argued that the capitalist system has been divided into stages delineated by specific technologies around which productivity and growth occur within and between companies, economic sectors and countries. Accordingly, five techno–economic paradigms have been identified: the mechanization of industry based on steel; steam engines; electricity; mass production with oil deri-

vatives; and ICTs. What makes these five techno–economic paradigms important is that their appearance impacted every sector of the economy and transformed the routines of society (Freeman & Pérez 1988; Ristuccia & Solomou 2010).

The introduction of new technologies, then, has such strong effects on the economy that it must be accompanied by structural adjustments which include institutional and social changes at the national and local levels to achieve a balance between the new technology and the current socio–economic regime (Freeman & Pérez 1988). In this line of thinking, the adoption of technologies of the magnitude of the ICTs or electricity can be considered as a set of routines or technological practices shared by organizations (public and private) and by people, which establish patterns of human behavior which, if adopted on a large scale, become institutions (Saviotti 2005). It is difficult, however, to know what types of institutions are required or to what extent they can change the routines or practices of people or organizations through the adoption, use, and appropriation of ICT.

Saviotti (2005) suggested that the creation of the institutions required to underpin the development of technology has to be studied throughout the advancement of the technology itself. This is mainly due to the fact that when technology reshapes society, it is not the result of a single invention, but of complementary technological innovations which appear both in the countries which created it and in the importing countries (Pérez 1983; Simon 1987). During the first Industrial Revolution in the nineteenth century, as a result of the invention of steam engines in England, structural changes occurred both at the national level and internationally, encouraged by developing countries which sought to make the most of the newly introduced technology (North 1994).

The problem was, as Polanyi (2001) argued, that the British government opted for the establishment of a free–market capitalist system which implied that the most vulnerable strata of the population bore the costs of market failures, that is, workers, peasants and SMEs became vulnerable to the shocks of the economy. In this sense, for Polanyi (2001), the main problem with such an economic system was that the state no longer coordinated the economy, causing it to lose its strength to react in favour of society when the market fails. This caused a climate of economic instability which endangered the social order since each group acted on its own to protect its interests.

The Great Depression in the late 1920s was one of the consequences of this market model. The impoverishment of a large part of the UK population and of most of the most industrialized countries during that time reached such a point that various social groups organized in order to demand social rights, such as economic well — and social security (Marshall & Bottomore 1992). Consequently, the twentieth century was marked by development strategies dominated by na-

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tion-states, which expanded considerably, especially through the provision of social rights for poor or vulnerable people which culminated in the creation of the welfare state.

The formation of the welfare state through the taxation and banking systems would enable, to a certain extent, governments not only to reduce the inequalities that the introduction of the steam engines had left in conjunction with the liberalization of the economy, but would also encourage the adoption, worldwide, of new technologies. As a matter of fact, during this era two technological revolutions occurred around the world. The first was electricity, which was quickly shown to be a less expensive source of energy than steam engines. Almost simultaneously, the two world wars accelerated the development of technologies to exploit oil (internal combustion engines, petrochemicals, among others), which also had a massive impact on all sectors of the economy. However, unlike what had happened during the first Industrial Revolution, the welfare state allowed, among other things, the creation of different mechanisms for planning and managing the demand for new technology, both directly through spending on infrastructure, weaponry and public services and indirectly through massive governmental employment (Pérez 1983).

In most of the developing countries, the weakness of their taxation and banking systems forced them to rely on international loans and the export of commodities such as oil and minerals to sustain their spending on their welfare state. Yet, they were unable to adopt and appropriate either the technology which developed around oil or previous technologies to compete internationally, or to develop financial sustainability (Moreno-Brid *et al.* 2009). In consequence, when oil prices fell during the late 1970s, these countries suffered one of the worst crises in history, which caused major devaluations and high levels of inflation, which in turn triggered a huge increase in levels of unemployment, income inequality and poverty all over the world.

The 1970s also saw the arrival of another techno–economic paradigm around the world. The invention of the microchip at the beginning of the decade enabled the development of ICTs such as computers, tablets and cell phones, among others, which would also have an impact on all sectors of the economy and on routines in homes across the entire world. This new paradigm, along with the economic crisis which also began during this decade, would completely change the configuration of the world to the point that it was thought that a new type of society was about to start: the information and knowledge society (Crovi 2008).

Centeno and Cohen (2012) pointed out that the size of the welfare state was blamed for the crisis reason why the US and the UK pushed for the liberalization of the economy, which would provide nations with a clear appreciation of the advantages of ICTs, thus facilitating its adoption (Corrales & Westhoff 2006; Qiu

& Cantwell 2016). Accordingly, developing countries across the world were persuaded to liberalize their economies by international organizations such as the World Bank and the International Monetary Fund. The reform basically comprised two main strategies: to reduce the size of the state and to open the different economic sectors so that the markets could adjust, in their own dynamics, to the new world order. These reforms would help to achieve macro-economic stability, generate employment and reduce socio-economic inequalities and poverty (Robertson 2007).

Ironically, the well-being of citizens deteriorated throughout this period mainly because of the profound cuts in social spending, which meant a reversion of the improvement of social rights which had been accomplished during the formation of the welfare state in the first half of the twentieth century. According to Pérez (1983), perhaps the most important institutional changes which occurred in this new paradigm in developing countries were in the labour market because of the shortage of skilled labour for the adoption, use and appropriation of ICTs. Among them, we can mention flexible working hours, digital literacy, the creation of an infrastructure to increase access to and the use of ICTs, among others. However, as Pérez (1983) herself pointed out, they appeared to be only minor changes since a large–scale institutional adjustment was required to match the advance and development of the ICT industry with the current political regime.

The problem is that, as Robinson (2004) has stated, the opening of the economy once again led to a development project guided by the privare sector, in which the social, economic and political relations between the different social actors came to be controlled by those with greater economic power. In Latin America, for example, multi–nationals took control of high–tech sectors whilst national business groups appropriated low-tech ones (Schneider 2009). In this regard, Wacquant (2017) commented that the problem with a neo–liberal state is that it operates following the precepts of economic liberalism, but only in favour of economic and political elites, while being strongly authoritarian when it comes to dealing with the negative consequences of the economic opening on the most vulnerable groups (workers, peasants and SMEs).

Furthermore, the problem is not only economic volatility but also the fact that the opening up of the economy during the 1980s brought about a tacit agreement by which, instead of being taxed, the private sector would lend governments money to finance deficits (Centeno & Cohen 2012). Moreover, as noted by Quaden (2003), the move to a more liberalized financial system along with the creation of new products increased risks for the financial sector bringing about banking crises during the first two decades of the new (neo–)liberal system. As a matter of fact, Reinhart and Rogoff (2009) showed that financial globalization

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and banking crises coincided almost perfectly all over the world. What is, then, the role of taxation and banking systems in the adoption of ICTs?

The taxation system and the adoption of technology

The institutional framework of a state is basically divided into two important capacities. On the one hand, it requires a rational rule of law operated by a body of professional bureaucratic organizations in charge of discovering, first, what the state can do properly and correctly and second, how it should do it as efficiently as possible and with the least possible expenditure of both public finance and energy, using, if necessary, force (Waldo 1967). This will enable them to achieve their economic development goals (Weber 1964).

On the other hand, the institutional framework also requires fiscal and banking systems which will help them to fulfil important functions such as social development or the equalization of the socio–economic conditions of the population (Schumpeter 1991). The latter are the main focus of this paper. Pre-modern states had three main problems from which they did not survive: 1. the financial expenses of warfare; 2. the lack of trade networks; and 3. the distrust of people of the methods employed to raise and use funds (Schumpeter 1991; Calomiris & Haber 2014).

Accordingly, fiscal systems were built even before the formation of the modern state. War expenses, lack of commercial networks, and people's mistrust of the methods of raising and using funds led monarchs, mainly in Europe, to apply direct taxes to the elites of their societies, which brought about, on the one hand, the creation of parliaments and, on the other, the development of the state's fiscal or taxation systems. In order to be able to uncover the way in which the taxation system affects the adoption of technology, we have to draw on the varieties of capitalism and the welfare state literature (Esping-Andersen 1990; Hall & Gingerich 2009; Schneider 2013).

According to Hall and Gingerich (2009), in the developed world there are two different varieties of capitalism. In the first, also known as liberal market economies (LMEs), state intervention in the economy is minimal since citizens are understood as social actors who must look after their own well–being in the market. Accordingly, the principal objective of social protection is social and political stability, which is the reason why social policy is restricted to the poorest when the market fails.

Consequently, the main strategy for employment generation is the deregulation of the labour market which usually brings high levels of informal labour since wage–setting is negotiated individually between workers and employers. In addition, workers invest heavily in skills which can be used in other jobs due to the

high rotation brought about by the labour market deregulation and the weak unions. Accordingly, the private sector participates actively in social spending and the process of technology transfer is negotiated between companies or between companies and expert personnel (Hall & Gingerich 2009). Conventional examples of this type are Canada, the US, Australia, the UK, Ireland and New Zealand.

On the other hand, there is a different vision centered on the provision of economic security so that individuals are able to participate in public decisions and fully develop their capabilities (Esping-Andersen 1990). Better known as co–ordinated market economies (CMEs), these states are characterized by having a progressive taxation system which allows them to allocate resources effectively to fufil their social development functions. This enables them to redistribute income through universal social security benefits such as maternity and old age payments, unemployment insurance and anti–poverty policies. Accordingly, these countries open access for people to the design of public policies and focus on encouraging full employment (Huo *et al*. 2008).

According to Hall and Gingerich (2009), a welfare system allows firms to develop a more strategic interaction with unions and creditors especially because firms are organized in employers' associations which enables them to provide workers with industry–specific skills so that they can have permanent posts and also to access external sources of finance. Additionally, labour markets are regulated in terms of hiring, firing and wage-setting and workers have access to education, health and training, and can constantly improve their skills and their human development.

Technology transfer therefore takes place through inter–firm collaboration in coordination with the state. Some examples are Austria, Japan, South Korea, Sweden, Norway, Finland, Denmark, Belgium, the Netherlands and Switzerland. Finland, for example, is one of the countries with the highest rates of economic growth, poverty reduction and technology appropriation due to, among other things, the fact that the Finnish government built a welfare state which allowed it to decrease considerably the high socio–economic inequality which it had suffered during the first part of the twentieth century. In terms of technology, the intervention of the state in the expansion of its telecommunications infrastructure enabled it to achieve almost 100% coverage in internet access and fixed and mobile telephony (Reygadas 2008).

Likewise, in the last four decades, Finland has invested heavily in research and development and technological skills and has created public institutions and organizations which specialize in ICTs, thus increasing the opportunities for the population to face the challenges presented by the most recent technological revolution. More than that, the Finnish state has managed to capture significant percentages of the profits derived from multi–national technology companies

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such as Nokia and to distribute it among its population, especially through educational, training and social security policies (Reygadas 2008).

Hall and Gingerich (2009) argued that when a new technological revolution occurs, LMEs can offer higher returns than those found in CMEs, which are better at incremental innovation. However, these returns may be at the cost of high inequalities in the access to and the use and appropriation of technology. As Reygadas (2008) put it, technological innovations are normally seen as legitimate monopolies because of the benefits which they bring. Even so, they are still a monopoly which can freely set prices and impede competition, so what is important is how the state can intervene to promote technological innovation by spreading its benefits among the various social actors but distributing the profits which they generate equitably.

Denmark is another example of how an effective taxation system which allows the construction of a welfare state can also encourage technological inovation. Denmark, like most of the Scandinavian countries, has a very equal income distribution largely, in part, to its progressive taxation system. However, it was not always like that. As in most developing countries, the oil crisis in 1973-1974 brought about inflation, unemployment and economic stagnation. Among other important macro-economic reforms which helped Denmark to reduce the socio–economic problems, they introduced flexicurity with the intention of creating a flexible economy to adjust to globalization without undermining the economic security provided by the welfare state (Daemmrich & Kramarz 2012).

In the broadest terms, firing, hiring and wage–setting regulations were reduced in agreement with the unions, which educated their members about the importance of flexibilizing the labour market to generate employment; wage insurance was extended beyond the worker's current job but was conditional on participating in training programmes, and the government committed to maintaining macro–economic stability and to investing in infrastructure and welfare. As a result, foreign employers were attracted and new firms were established, bringing about employment generation.

Taking advantage of this context, Danish companies managed to succeed internationally since they were able to outsource the manufacturing of their products to eastern Europe and to retain in Denmark the specialized and skills-related manufacturing rather than sending the manufacturing to China as many other European companies did. This enabled Danish companies to strengthen their innovative capacity and to respond more quickly to the demands of their clients.

A similar situation occurred with a German multi–national company which implemented a lean production programme in one of its facilities in Germany and in another in the US. Lean production is intended to boost a firm's competitiveness by allowing it to reduce production and development times, thereby

enabling it to respond to transformations in the global market (Friel 2005). The importance of this system is the participation of workers in finding ways to reduce costs and speed up production processes.

A key point, then, is the skills levels of workers, since they can provide more important feedback if they have adequate skills. To implement lean production programmes, companies normally create teams of workers with broad-based skills in a flat organizational structure to execute numerous functions and they can either manufacture a component or build a whole product. According to Friel (2005), apart from their skill levels, workers' turnover rate was a key point in the failure or success of these programs in the US and in Germany, respectively.

Labour market regulations and the strong unions in Germany meant that the facility had more permanent workers who received constant training allowing them to perform effectively the activities required by the lean production program (Friel 2005). In addition, the workers' relationship with the company was very strong because of the significant benefits which they received. The facility in the US, on the other hand, found problems in keeping workers for long periods of time because of the deregulated labour market. For instance, employees could not contest contract terminations on a massive scale, which pushed them to be constantly looking for new jobs. All of this undermined the commitment of workers towards the company since they realized that they could be easily replaced. Moreover, the managers of the US facility were unwilling to provide training for their workers because of the high turnover, which impeded the effective functioning of the program since workers did not have the required skills (Friel 2005).

Furthermore, at the beginning of globalization, many American brands sent their manufacturing production to China looking for cheap labour. Recently, however, some of the most important American brands such as Whirlpool, Otis and General Electric (GE) had to bring their manufacturing production back from China when they realized not only that salaries in China had been increasing —at least five times— in the last two years, as well as other costs such as shipping, but also that offshoring limited their technological innovation and consequently their ability to respond quickly to consumer demands. Accordingly, American unions had to flexibilize their demands in exchange for the creation of more jobs and greater investment in research and development (R&D) (Fishman 2012).

The taxation system and the adoption of technology in developing countries

Schneider (2013) stated that the onset of globalization brought about the formation of two different forms of capitalism in the developing word: hierarchical market economies (HMEs) and network market economies (NMEs). In terms of

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technology adoption, in the HMEs the weakening of the developing countries after the Washington consensus reforms brought about the strenghtening of the private sector since MNCs took over high–tech and advanced manufacturing and local business groups focused on low–technology services, natural resources and commodities. Latin American and sub–Saharan countries are examples of this type of capitalism.

As argued above, the type of welfare state contributes importantly to the outcomes of the adoption of technology. In most of the countries in sub–Saharan Africa, on the one hand, the welfare regime which has developed is called an insecurity regime (Wood & Gough 2006). In these insecurity regimes, their weak taxation systems prevent them from taking full advantage of the interests of the different actors of the social structure in pursuit of the general interest, which causes conflicts and political instability, which in turn generates great economic insecurity, among other perverse effects (Wood & Gough 2006).

As a consequence, there is great dependence on international aid to finance their welfare systems since they cannot create ties with the different actors of the social structure to extract resources from them (Wood & Gough 2006). In recent years, for example, the African continent has been closing the digital divide between developed and developing countries and, in some cases such as mobile financial services, they have taken the lead. However, they have done that relying mainly on international donors.

For instance, in 2010 most of the sub-Saharan countries were not connected to the internet through a fibre–optic infrastructure. The African governments therefore had to rely importantly on development finance institutions to deploy a fibre–optic cable infrastructure. Kenya, for example, is one of the most advanced African countries in the adoption of ICTs, but this has been primarily carried out with the financial support of international institutions which have chosen this country as their African base (World Bank 2014).

In Latin America, on the other hand, the welfare state which was formed during the twentieth century was based on social insurance, which applied only to the formal sector (the private and governmental sectors) and left the informal sector workers unprotected (Barrientos 2004). In addition, in order to improve the human capital of the workforce, quasi–universal education and health services were provided. Altimir (1998) commented that the model was quite successful since it allowed the region to grow annually around 4% between 1940 and the early 1970s and reduced income inequality and poverty.

However, the regressivenes of their taxation systems forced them to demolish their welfare states when the oil prices fell at the beginning of the 1980s since most of the countries depended on natural resources for the revenue to invest in social spending and to pay for their external loans. The international

organizations from which they had borrowed money, such as the IMF and the World Bank, therefore agreed to keep on lending them money on condition that they opened up their economies and reduced the size of their welfare states. In the broadest terms, it was argued that the institutional structure of welfare states was huge in order to address the challenges which globalization would present, and social spending would privilege compensatory policies directed only at the poorest (Barrientos 2004).

As a result, MNCs and business groups have mainly been the ones which have taken advantage of the large tax exemptions on technological equipment which the developing states have granted in order to attract foreign investment (Alvarez 2009; Teichman 2012). In contrast, the SMEs which are the ones which generate most of the employment have lagged behind in the adoption of technology. As a consequence, SMEs have been forced to decrease their production costs and sacrifice the workers' wages and rights (Teichman 2012).

NMEs, on the other hand, are based on informal networks and relations of trust and reciprocity between the different actors of society, namely employees, banks, government and business groups, which allows them to channel national and international initiatives into areas of priority for society. Formal associations work as mediators with the support of the government. The approach to technological innovation is incremental, closer to the CMEs than to the LMEs. The main examples of this type are Korea and China.

The strong intervention of the East Asian states in their NMEs through their taxation systems have enabled them to take advantage of the interests of the different societal actors in pursuit of the general interest. As a result, among the late industrializers, they are the ones which have been able to move more easily to the technological frontier, with Japan at the helm (Amsdem & Hinkino 1994). South Korea, for instance, has become a leader in the adoption of ICTs and technological innovation which has allowed it to achieve high rates of economic growth (International Telecommunications Union 2016; Boncheva *et al.* 2016).

China is another clear example; it opened up its economy to attract foreign manufacturing production offering mainly low wages (Amsden & Hinkino 1994). But, as time has gone by, China has become a technological leader not only because it learnt how to manufacture technology but also because manufacturing was an engine of technological innovation which enabled Chinese companies to compete internationally. As a matter of fact, as argued above, some important American and British brands were forced to bring back their manufacturing processes from China to their home countries when they realized that they were losing their innovative capacity and subsequently their ability to respond swiftly to market changes (Fishman 2012).

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East Asian states have, however, subordinated social policy to maintaining high rates of economic growth as a development objective, concentrating social spending only on health, access to ICT and education, rather than on social protection (Wood & Gough 2006). As a consequence, the private sector had to step in to fill in this gap (Schneider 2013). Gunnar *et al*. (2012) analysed the cases of three different multi–national corporations which had manufacturing companies in China —General Electric (US), Siemens (Germany) and ABB (Switzerland)— and found that ABB has been far more successful than the other two companies to the point that GE decided to take its facilities back to the US.[1]

Gunnar *et al*. (2012) argued that the main differences were that whereas GE and Siemens had regarded China as an export platform, ABB saw it as a huge market and invested strongly in R&D and in improving its production capacities. Also, in order to wholly understand the Chinese market, it had developed technological innovations in partnership with Chinese companies in spite of the weak enforcement there of intellectual property rights. Perhaps ABB's most important strategy was to earn the loyalty and trust of its employees and of the Chinese government when in the financial crisis of 2008, rather than starting to fire its employees, it reduced supply costs, productivity gains and administrative overheads. The Chinese government responded with protectionist measures to promote technological innovation and investment in infrastructure, which benefited mostly those companies which worked in the same way as ABB. In this context, what other sources of finance do the enterprises have?

The banking system and the adoption of technology

As argued above, the importance of the banking system for the adoption of technology relies on the fact that it is the most important source of finance for enterprises and entrepreneurs, particularly in times of economic instability (Polanyi 2001). The institutional structure of this system therefore started to be created, as well, before the formation of the modern state (Calomiris & Haber 2014). Polanyi (2001) argued that when market–led development was implemented in England during the nineteeth century, modern banking had to be created as a device for offering protection to businesses and entrepreneurs so that they would not be destroyed.

According to Polanyi (2001), the problem is that when economic shocks occur, businesses might be destroyed if there is no adequate supply of credit. This is because although prices and costs tend to find an equilibrium point in the long run, in the short run there must be a time lag to allow businesses to adjust their

1 Siemens focuses mainly on industrial, energy, health and infrastructure sectors and cities; ABB and GE on technologies in electric power generation and industrial automatio.

already contractually fixed costs, such as labour. Polanyi (2001) argued that the increase in production and trade alone without any expansion of the amount of credit might bring about deflation.

Banking, especially if it is centralized, can mitigate this negative effect by absorbing the shock and spreading the problem over the whole country. As Polanyi (2001) put it, profitable business brings about employment generation and high wages, but that profitability depends on stable exchanges and comprehensive credit circumstances. Calorimis and Haber (2014) argued that banks are more essential to statehood than armies or even taxes because they bring together the three fundamental elite groups of a state: the government, the private sector (debtors and depositors) and the financiers (bankers and minority share holders).

The roles of all the players are quite clear. The government is in charge of enforcing contracts, the financiers design and administer the essential financial instruments to carry out trade, and the private sector builds the commercial networks which put the state in economic operation so that citizens generate revenues and pay the taxes which finance the functions of the state (Calorimis & Haber 2014). So, in order to build a robust banking system, a strong government/banker partnership is needed, which is the reason why there will always be a conflict of interest which needs to be mitigated by political institutions. Calorimis and Haber (2014) explained that governments regulate banks but at the same time regard them as a source of finance; governments enforce contracts which discipline debtors, but they rely on debtors for political support; governments allocate losses among creditors when there are bank failures, but they rely on those creditors for political support as well.

Political institutions determine which groups are included and which are not; they also determine the flow of credit and its terms, the approved activities of banks and the allocation of losses when banks fail (Calorimis & Haber 2014). In this line of thinking, the basic outputs and inputs of a bank are debt contracts. The first are payable to the banks whereas the second are payable to the depositors. In other words, banks borrow money from depositors and lend it to debtors.

The logic of banking is therefore simple: banks need to have an appropriate amount of deposits and equity capital to finance their operations and they lend money to people who are able to repay those loans. Nevertheless, it is the government which states the privileges and requirements, and also decides the number of banks allowed to function. There are therefore three property–rights challenges of banking:

1. Banks' expropriation must be prevent or compensated;
2. Outside investments' and deposits' expropriation must be prevented or compensated; and

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3. Loan contracts must be enforced and some compensation mechanisms must be created in favour of bank insiders, minority shareholders and depositors (Calorimis & Haber 2014).

In short, the government must enforce laws (against tunnelling, fraud and loan) and create accounting standards and regulatory and supervisory agencies to facilitate the evaluation of the banks and mechanisms for deposit insurance and/or bank bailouts. These deals are now arranged and enforced within the institutional structure of the state and determine the distribution of the burden of taxes, the allocation of public resources, the number of banks, the chartering of banks, the supervision of the system and the flow of credit and its terms.

Democracies, populists and autocracies

As argued above, modern banking had to be created as a device for offering protection to businesses and entrepreneurs so that they would not be destroyed and to enable governments to control their national economies in the case of an economic crisis (Polanyi 2001; Iversen & Soskice 2019). This was what happened after the perverse consequences brought about by the market-led development which was implemented in England and in most of the advanced countries during the nineteeth century, to take advantage of the new technology (the steam engine) which had been developed.

Correspondingly, different banking systems were developed all over the world. Taking into account the degree of democratization and the fulfilment of the rights of the citizenry, Calomiris and Haber (2014) developed a typology of banking systems. According to them, commercial banking was principally developed in full-fledged democracies where the rights of the citizens were widely recognized. Canada is the best example of this type. Since 1840, Canada has not had any major banking crises, not even during the Great Depression, in contrast with the US, a populist country, which has had twelve.

According to Calomiris and Haber (2014), the primary advantage of the Canadian banking system is the country's political institutions, which have enabled Canada to have a small and centralized banking system with nationwide branches, as Polanyi (2001) suggested. That structure has enabled Canada's banks to diversify their loan portfolios and to transfer funds in order to support banks in any region affected by economic shocks. Congruently, the Canadian parliament carries out periodic legislative reviews and rechartering of its banks every five years in order to limit them from earning monopoly profits.

Calomiris and Haber (2014) argued that, unlike the US, since Canada remained a British colony, the British created a federal system which allowed the

central government which they had left in charge to have the monopoly in economic policy–making, including the right to charter banks. This enabled Canada's central government to bargain with the different players taking into account the interests of the nation as a whole avoiding, in consequence, clientelism. Moreover, the private sector saw it positively to have a nationwide baking system because Canada's size meant that they needed to be able to transact in both international and domectic bills of exchange over long distances.

This system allowed the Canadian banking system to respond to the increased demand for access to credit after the Great Depression and the two world wars. Iversen and Soskice (2019) argued that the onset of globalization was more or less similar to the market–led development established during the nineteenth century to take advantage of the steam engine which had been developed in England. The banking sector therefore became essential, again, for the development of the so–called information and knowledge society not only to avoid the destruction of SMEs but also to take advantage of the ICT revolution.

The Canadian banking system allowed banks to respond to the demands of firms for access to credit. In 2017, the Canadian government carried out a survey of the financing and growth of SMEs. It was found that 47% of SMEs requested external financing and 53% did not. Out of the 53% that did not request external financing 91% answered that they did not require it, 2% stated that applying for financing would be time consuming, 1% believed that their request would be rejected, 1% did not now about the available sources of financing, 1% assumed that financing would be too costly, and the rest did not answer (Government of Canada 2018).

Of the total amount of financing requested by SMEs 93% was authorized, 70% of SMEs obtained it from chartered banks and the rest of SMEs obtained financing from credit unions, government and different lenders. In terms of innovation activity and technology adoption, 31% of SMEs introduced at least one type of innovation and 46% of SMEs adopted at least one type of technology (cloud computing, data analytics, management softwares, application programming interface and resource planning software) between 2015 and 2017 (Government of Canada, 2018).[2] These data clearly show the importance of the banking credit received by SMEs in a full–fledged democracy like Canada.

Autocracies, on the other hand, differ from democracies because 1. the risk of expropriation is higher; 2. inflation taxes are common; and 3. debtors vote. More precisely, autocracies normally constrain credit for firms and households which causes the economy to grow slowly and when the state needs a source of

2 The sample for this survey was 17,323 entreprises. The estimates were generated from the responses obtained from 9,115 SMEs (Government of Canada 2018).

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private credit, that is, when its fiscal needs surpass tax incomes, it has strong motivations to expropriate private possessions (Calomiris & Haber 2014).[3] The state therefore has to compensate bankers for the probability of being expropriated. The usual way to do this is to restrict the number of bank charters in order to minimize competition, although this normally brings a high interest rate.

The main problem, however, is that law enforcement is almost non-existent, which makes the system very unstable because of the lack of constraints on the autocrat's decisions and also because of the lack of restrictions on lending to the non–financial enterprises of the bank insiders, especially in times of crisis (Haber *et al*. 2008b; Calorimis & Haber 2014). As a result, there is a very high probability that banks will expropriate shareholders and depositors and that the autocrat will expropriate banks through instruments such as inflation taxes.

A clear example of an autocratic banking system is Mexico (Haber *et al*. 2008a). Historically, the Mexican banking system's risk of expropriation has been very high. For instance, the fall in oil prices at the beginning of the 1980s forced President López Portillo (1976-1982) to announce that it was not possible to continue paying Mexico's external debt (Sánchez 2006). As a consequence, Mexico was shut off from international markets which brought about a decline in the peso exchange rate. López Portillo then blamed the bankers for the peso crisis and finally expropriated the banks in 1982, compensating them only minimally (Haber *et al*. 2008a).

During that decade, therefore, credit was almost non-existent. In the early 1990s, following the Washington consensus reforms, the banks were privatized again. In order to convince the private sector to participate, bidders were assured that they would not face a competitive environment —four banks controlled 70% of the bank assets— and that foreign banks would not participate either in bank auctions or in the Mexican market (Haber *et al*. 2008a). Furthermore, the government allowed bankers to finance their purchases with a loan from the same bank which they were buying.

The principal problem, however, has been the weak enforcement of contracts which has made banks unwilling to offer credit to private companies or loans on residential property (Haber *et al*. 2008a). According to Haber *et al*. (2008b), to write financial contracts, bankers must be able to enforce them. To do this, they have to be able to rely on institutions which allow them to define who owns particular types of assets which would enable them to repossess that asset if the borrower fails to repay the loan. These institutions emerge, on the one had, because

3 Norberto Bobbio (1998) defined an autocracy as an anti-democratic regime distinguished by a marked concentration of power and by the transmission of political authority from top to bottom.

individuals and firms have a strong interest in having protection of their property rights against other individuals and friends.

Some of those institutions are a property register, systems of law, and courts and a police force with the power to coerce. The problem is, Haber *et al.* (2008b) argued, that under the rule of an authoritarian government, those same institutions make assets easier for the government to expropriate. So, under authoritarian governments, those institutions tend to be weak, especially because individuals and firms will not demand effective institutions in order to avoid the expropriation of their assets.

In the case of Mexico, during the early 1990s, there was no accurate real–property register and physical collateral was very difficult to repossess. In 1997, foreign banks were allowed to own banks in order to decrease the probability of expropriation. The problem was that foreign banks now controlled the banking system. By 1996, foreign banks controlled barely 7% of total bank assets, 20% by 1999, 83% by 2004 and 82% by 2015 (Haber *et al.* 2008a; Bravo 2017). This, along with the weak enforcement of contracts, meant that commercial banking did not have as a main target the productive sector (industry, services and housing) which barely received around 20% of the total credit given by the commercial banks (Bravo 2017).

The principal target of the commercial banks in the last two decades has therefore been consumer credit which has varied around 30% of the total credit given by commercial banks. Morever, the problem of having a banking system controlled by foreign banks with subsidiaries abroad is the possibility of transmitting a crisis to them, as happened in 2008. All this led to very weak adoption of technology by private companies, especially SMEs, since scarce credit prevented them from investing in new technology (Haber *et al.* 2008a; Bravo 2017).

Finally, there is the populist banking system. According to Calomiris and Haber (2014), the US is a very clear example. They stated that the American banking system has been crippled by populism because since its birth it has been controlled by coalitions composed of political elites, financiers and small groups of the private sector. Actually, between 1810 and 1980, the American banking system was composed of thousands of small banks —with no branches— and farmers which controlled the system under a complacent government which required in return lendings to state and federal governments. The problem with the lack of branches was, according to Calomiris and Haber (2014), that banks could not spread risks across the country or move funds quickly. The system was therefore volatile, uncompetitive and inefficient in credit allocation.

During the 1980s, the American banking system collapsed, which forced the government to allow the formation of banks with branches all over the country, bringing down the coalition between the unit banks and the populist agrarians. Af-

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ter a quick series of mergers and acquisitions, large banks such as J. P. Morgan and The Bank of America started to be created, building a similar banking system to the Canadian one (Calomiris & Haber 2014). However, the 2007-2009 financial crisis led to the formation of a different coalition which took over the banking system.

Calomiris and Haber (2014) argued that the probability of a bank collapsing increases when two conditions are present simultaneously. First, banks take high risks in their loans and investments, and second, they do not have adequate capital to absorb the costs associated with those risky loans and investments. The US banking system presented both of these problems simultaneously. According to Calomiris and Haber (2014), megabanks and activist groups —which had encouraged the expansion of risky mortgage lending to poor and metropolitan borrowers— allied and took over the banking system.

Activist groups then put heavy pressure on the government to force government–sponsored enterprises (GSEs) to repurchase mortage loans to targeted groups (income poverty groups) during the 1990s and early 2000s. As time went by, riskier mortage loans were purchased by the GSEs, allowing banks to resell mortages on favourable terms and the activist groups to receive more credit. Consequently, along with the vulnerable groups, the middle class was drawn in to the easy-credit trap (Calomiris & Haber 2014).

Activist organizations received monetary commitments from banks in two different forms. On the one hand, banks supplied credit and mortages to people known by the activist organizations. On the other hand, banks paid fees to activist groups to administer or direct credit to the vulnerable groups. As time passed, the mortage industry grew to such an extent that it influenced importantly the government to support subsidiarization of mortage risk (Calomiris & Haber 2014). In the broadest terms, all these problems brought about the eruption of the financial crisis of 2008.

Christophers (2018) commented that ever since the financial crisis of 2008, the populist legacies of the US banking system have continued to limit competition, bringing about a sustained irregular profitability. Some may ask how the US had been able to become the leader in technological innovation, especially after the great depression, in comparison with other countries which had more stable banking systems, such as Canada. There are two main reasons. On the one hand, the two world wars —which saw the development of the two technological revolutions which arose during the first part of the twentieth century, namely, electricity and oil-related technology— caused the US government to direct an important part of its tax revenue to military and technological development (Iversen & Soskice 2019). On the other hand, a special bank was created to support the growth of the ICTs since regular banks were not prepared to finance technology–based start–ups.

As we already know, the ICTs revolution started in 1971 with the invention of the microchip in the US state of California. Ever since, many ICTs have been created in California's famous Silicon Valley, which has become the most important technological innovation area in the world. According to Sturgeon (2000), Silicon Valley's development is closely entwined with the industrialization and innovation of San Francisco, California where, for example, the Federal Telegraph Company was founded in 1909.

The beginning, however, was not easy since most of the technological companies created were start-ups which had neither assets nor cash-flows because banks in the US were not prepared to finance them. Robert Medearis, a Professor of Construction Management at Stanford University, found that technological innovators were constantly rejected by banks since they had only intellectual property assets, so they joined with other important bankers to establish the Silicon Valley Bank (SVB) in 1982 (Nguyen 2020).

Nguyen (2020) stated that the SVB not only accomplished its goal and became one of the most important banks in the US, but also, contrary to their expectations, its founders eventually found that real–estate lending is riskier than technology lending. One of the most important points is that the bank has remained as a state–chartered bank separate from the federal banking system since state laws in California are more favourable to banks than federal laws. Even so, perhaps the most important point to highlight is that the SVB involved technology leaders and researchers from the universities of Stanford, California and Berkeley. This enabled it not only to decide properly which proposals to support and which not to finance, but it has also been able to help innovators to better develop their ideas.

Conclusions

The analytical framework which we have presented in this paper suggests that the emergence of technological innovations of the magnitude of ICTs made it essential to have effective taxation and banking systems in order to take full advantage of the new technology and thus facilitate its adoption. We have shown that the main challenge to achieving this was harnessing the interests of the different societal actors into areas of public interest. In order to do this, it was necessary to have impartial and impersonal political institutions which would treat the different groups in society equally, preventing powerful actors from manipulating the political system in order to pursue their own economic interests. The path which we followed in order to uncover the importance of political institutions in encouraging the adoption of technology was to review the varieties of capitalism and the welfare state literature.

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We have argued, for example, that in the CMEs, the taxation system allows them to maximize the advantages of the ICTs by equalizing opportunities for the access to and the use and adoption of technology, which legitimizes the imposition of a progressive high-tax system. Moreover, commercial credit is more abundant in democratic countries with strong political institutions which prevent coalitions of elite actors from controlling the banking system and pursuing their own interests. More research is needed in order to expose the institutional constraints which impede the construction of effective taxation and banking systems, especially in developing countries where the influence of international and domestic elites is superior. ID

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