FOR ENSURING RAPID-GROWTH RISK-FREE DIGITAL-BANKING IN GREEK-ECONOMY: AN APPLICATION OF AKIM'S MODEL

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ABSTRACT

In 21st-Century business-mentality technology-driven-world, banking-services are carried-out in competitive manner that has resulted usage of digital-banking. Bank Laws in Greece contains multi-faucets provisions. Under bank-operation provisions, bank-deposits, bank-accounts are covered by Hellenic Deposit & Investment Guarantee Fund (TEKE). But bank-deposits are not insured. But in practice government intervenes to ensure that depositors do not suffer a loss. Despites rapid growth of digital-banking globally, no country has insurance in practice to cover digital-transaction. But it faces serious pitfalls being it riskiness. Customers don't read terms & conditions of services. These weaknesses cause abuses. Customer faces perceived-risk-factors. Application of Akim's model - *Voluntary Insurance* (VI), a new product in banking-services, can be impetus in meeting the challenges. Welfare Analyses are used as guidance for ensuring efficiency-cost of competitive pricing of insurance. Thus VI becomes appealing to parties-involved. In case of bank-service-provider, adverse selection in insurance

market, welfare cost of inefficient pricing is quantitatively small and advantageous selection results the opposite.

Keywords: On-the-Go banking, Digital-banking, Perceived-risk, Adverse and Advantageous selections in insurance market

JEL Classification: B12, D61, D71, D78, D81 and D83

Introduction

The 21st-Century-humankind lives in world of business-mentality and technology-driven lifestyles where services are carried out in multifaceted, competitive and rationality manner. Time values in this modern-world are counted more than ever before no matter where we reside. Thus, decision-factors mainly expediency and cost-effectiveness have led individuals or businesses welcoming usages of ICT in multi-faucets. As a result, in technology-driven world-economy country-wise, service sector like banking has been modernized. Similarly customers compete for comparative time-saving-option(s) marginalizing its operating costs. Greece-economy is no exception where besides traditional banking, Holvi, Bunq and Paysend etc are new ways financial services.

Since the risk-free digital-baking in Greece-economy can ensure further rapid-growth of usages local-banking services domestically & globally, the Hellenic Government's prompt efforts can be instrumental. The progression of today's digitized life-style of Greece can be an example to neighboring countries such as Albania, Bulgaria, Turkey, Republic of Macedonia etc. Thus, today's risk-free On-the-go is an important product in financial sector country-wise such as Greek.

However, it is characterized by evolving many factors that are often unpredictable. It faces serious pitfalls being it riskiness. Customers compete for time-saving options. Banks compete for marginalizing its operating costs then enhance generating revenues. Most cases, customers don't read terms & conditions of services and they don't save contract-copy. These weaknesses cause abuses. Customer faces perceived-risk such as hidden charges, extra fees, account hacked etc.

Although National Bank of Greece (NBG) has adopted very strict security measures to all channels with expectation of good results, it recently proceeded to the establishment of a new two-factor authentication to strengthen the security of Internet & Phone Banking transactions (Marinakis and Karanikolas, 2007). Underpinning NBG's main strategy on digital-banking, the Branch remains the

main service point, with the alternative channels offering complementary services. Moreover, it is a strategic decision for the Bank to develop and enhance alternative channels in order to offer a wide variety of services to its customers. However, in practice, approaches of branches are being questionable in multi-faucets, which have led a slower growth of digital-banking, that it was expected (Marinakis and Karanikolas, 2007).

Strict laws & its fullest application can marginalize the magnitudes of "perceived risk". On this matter, developed countries are doing better and ahead of developing countries. But it does not guarantee an absolute risk-free digital-banking even in developed countries, which might have led a slower growth of digital banking in world-economy country-wise such as Greece.

Addressing the issues, Voluntary Insurance as a new product in digital-banking-world was first proposed in literatures by Akim Rahman (Rahman, 2018). Underpinning Akim's model, relevant policy designs including reasonable cost or price setting of insurance can ensure risk-free digital-banking. On the same token, it can open up doors for entrepreneurs having new insurance companies in operation. The future digital finance will lead important changes in business arenas as well as in human behaviors no matter where we reside. Thus policy design including setting cost or price(s) of Voluntary Insurance can be a crucial sooner or later, which warrants for policymakers' attentions now in world-economy country-wise such as Greece.

Literature Review

It is well recognized in literature that the "perceived risk" is having a significant negative and direct effect on consumers' adoptions of digital-banking (Lee, 2009; Kuisma et al., 2007). Addressing the digital dilemmas in financial sector globally, the application of Akim's model – Voluntary Insurance as a product of banks sector in operation (Rahman, 2018a) can be win-win to parties involved. This addition to behavioral intention theories in literature, especially, literature in subject area of entrepreneurship and innovation management is now well recognized (Rahman, 2019).

However, relying on extensive Website-navigations as of today, it would not be overstated claiming that no bank or banks sector of a country or countries globally has yet introduced Voluntary Insurance protecting digital-banking services. In this aspect, Greece is no different. Despite its recent "fiscal woes" (IMF, 2019), based on ongoing progression such as per capita income, which was $19582.54 in year 2019, higher life expectancy rate and living standard etc, today most economists classify Greece as a developed country (Lexology, 2019).

In today's world, governments in almost all countries want to see effective utilization of technology facilitation in multi-faucets within its nation and beyond for greater interest of human society globally. Since year 2015, major European banks were openly appearing to be ready to embrace digital as a potential solution for maintaining and shoring up both revenues and relevance. In fact, Accenture research has demonstrated that they would need to work a lot harder to close the gap between aspiration and application (Accenture, 2017).

Based on digital accelerators lever, it was evident that Greek banks were lagging behind their European peers, suggesting that the market conditions and business environment in Greece today was severely limiting the companies' digitalization. This progression was appeared to be like poor "Ease of doing business", Greek banks score were almost 4 points below their European peers. To overcome this dilemma and make the county digitized, the government's prioritization of digital transformation was inspirational. Finally, by analyzing the digital accelerators lever, it is evident that Greek banks are lagging behind their European peers, suggesting that the market conditions and business environment in Greece today is severely limiting the companies' digitalization. While the government's prioritization of digital is considerable, it is not high enough to improve the overall accelerators score. Driven down by additional inhibitors that decelerate banks' digital transformation and contribute to the low maturity score like the poor "Ease of doing business", Greek banks score almost 4 points below their European peers.

Faced with a set of digital challenges, major European banks appear to be ready to embrace digital as a potential solution for maintaining and shoring up both revenues and relevance. In fact, Accenture research demonstrates they will need to work a lot harder to close the gap between aspiration and application. On top of this, the ongoing pandemic crises globally have triggered further this demand. Like many other countries, recently the government of Greece decided to restructure government in aim to have a government that is faster in decision-making and is more update with changes for better making decision in multi-faucets (Accenture Research). There is no specific customer protection rule for the banking sector in Greece (Lexology, 2019).

Customers' bank accounts in many countries are insured by nation's Central Bank. For example, in Bangladesh, bank depositors' deposits are insured under "Bank Deposit Insurance Law, 2000". However, this kind of provision country-wise does not cover banking transactions no matter whether they are big banks, regional and community banks, commercial banks, credit unions and credit cards (FinTech Magazine, 2020). On this issue, banking provisions of Greece is no different. There

is no specific customer protection rule for the banking sector in the UAE. However, any complaint against a bank can be made by a consumer to the Central Bank Greece under Law 3869/2010, "Katseli Law" (Lexology, 2019).

This raises question: how can policymakers of each country globally be inspired designing public policies so that banks sector of each country become obligated adopting Voluntary Insurance policy in digital banking services for ensuing risk-free digital-transaction?

This study takes on the challenges to layout the foundations of adopting the model – Voluntary Insurance for risk-free digital-banking in economy country-wise such as Greece. Thus under NBG provisions, banks are obligated adopting Voluntary Insurance policy in digital banking services for ensuing risk-free digital-transaction within Greece and beyond?

Why Greece?

Banks play a predominant and interventional role in the Greek economy and its decisive input in payment-systems and in money and capital markets is evidence of a growing and smoothly operating economy. Here the development of the economy is dependent on the stability of the banking and financial system like any other countries.

In recent years the EU and Greek banking systems have experienced significant changes, such as the establishment of the monetary union and the European Central Bank (ECB), the common currency and developments in IT. The past decades have witnessed a string of regulatory changes, mergers and technological advances that have all re-shaped Europe's banking markets (Bos and Schmiedel, 2007). These changes were caused by modifications that occurred mainly in the external environment, especially as a result of the increasing monetary and fiscal integration. More specifically, the liberalization of capital flows, the rapid pace of developments in IT, the product/service innovation in financial markets, the introduction to the euro, the internationalization of banking activities and the phenomenon of disintermediation are undoubtedly some of the most prominent structural features characterizing the European banking system (Staikouras et al., 2008).

Specifically on Greek banking issues, over last 30 years, it witnessed significant changes. Until mid 1980s, the Greek banking system was operating under strict state control, with numerous legislations and a very bureaucratic framework (Chatzoglou et al., 2010). This led to inefficiency and serious distortions in

functioning of the country's financial system (Christopoulos et al., 2002). However, it was needed for a modern, flexible and market-oriented financial system. This led to a gradual and substantial deregulation of the Greek banking system (Kosmidou and Zopounidis, 2008). At the end of the 1990s and prior to the accession in the EMU, the Greek banking system had the form of perfect competition.

Here banking supervision is regulated by the Single Supervisory Mechanism (SSM), established under the EU Single Banking Single Supervisory Mechanism Regulation (1024/2013), which conferred powers on the European Central Bank (ECB) Supervisory for the prudential supervision of banks. The EU Single Supervisory Mechanism Operational Frame work for Regulation (468/2014) establishes the framework for cooperation among the ECB, national competent authorities and national designated authorities within the SSM (Lexology, 2019). Bank Laws in Greece contains multi-faucets provisions. Under bank operation-provisions, bank-deposits, bank-accounts are covered by Hellenic Deposit & Investment Guarantee Fund (TEKE). However, unlike many countries, under Bank Laws in Greece, bank-deposits are not insured. But in practice government intervenes on occasions to ensure that depositors do not suffer a loss.

Complaints to the Bank of Greece regarding the credit and financial institutions it supervises can be sent through the Bank's website. Complaints outside the authority of the Bank of Greece underpinning many provisions under the law of Law-3869/2010 ("Katseli Law") can be addressed by the banks involved (Giordani, 2012; www.bankofgreece.gr, 2021). Disputes such as fraud, breach of contractual terms etc with supervised institutions can be resolved either through out-of-court intermediation bodies or by the competent courts. A request to the Bank of Greece to intervene so that any damage incurred by a debtor will be made good (www.bankofgreece.gr, 2021).

Digital Transformation is no longer a buzzword in world-economy country-wise. It's the profound transformation of business processes, competencies and models to fully leverage the changes and opportunities of digital technologies and their impact across society, in a strategic and prioritized way. Accordingly, national Digital Strategy has been recently designed in Greece. Although it wasn't one of the government's priorities up to now, the private sector has been trying to get on the train of digitalization and cultural shift as soon as possible. Succeeding in this task is far more than crucial. It is the only way to future development.

The Hellenic and Foreign Credit Institutions that offer e-banking services (ATM services and Internet Banking/Telephone Banking) in Greece are the following:

National Bank of Greece, Alpha Bank, Emporiki Bank, EFG Eurobank, Piraeus Bank, Geniki Bank, Agricultural Bank of Greece, Marfin Egnatia Bank, Bank of Attica, Millenium Bank, Proton Bank, Probank, Panellinia Bank, Aspis Bank, First Business Bank, Postbank, HSBC, Citibank, Bank of Cyprus and Intesa Sanpaolo S.P.A. All banks that offer electronic banking services have user friendly and simple standardized websites. The majority of banks in Greece offer advanced as well as basic services. Basic services include viewing of account balance, transfer of funds, and payment of utility bills while advanced services include buying/selling of shares in real time, provision of extra pin generators and applications for mortgages and loans.

In 2006, Greece introduced its new digital strategy and incorporated the European Electronic communication framework within its legislation (Giordani, 2012). Since then, Greece has made significant progress in the Information and Communication Technologies (ICT) field and more specifically, in the growth rates of broadband technology. In 2009, new initiatives were taken in Greece for the extension of the connectivity, as well as the acceleration of the adoption of new technologies by SMEs and public administration (Giordani, 2012).

However, bank-deposits are not insured. But in practice government intervenes to ensure that depositors do not suffer a loss. Despite rapid growth of digital-banking globally, no country has insurance in place to cover digital-transaction. But digital-banking face serious pitfalls being it riskiness. Customers don't read terms & conditions of services. These weaknesses cause abuses. Customer faces perceived-risk-factors. Dealing with determinant "perceived risk", the current author proposed in literature Voluntary-Insurance (Rahman, 2018b) for world-economy country-wise. Adoption of the model "voluntary insurance" in digital-banking of Greek-economy deserves policymakers' attention that requires policy guidance; this study takes on challenges using welfare analysis in multi-faucets.

Objectives of the Study

This study continues with two specific objectives. They are

a) To apply Akim's model – Voluntary Insurance for ensuring growth of total risk-free digital-banking in Greek-economy.

b) To examine the profitability of adopting voluntary insurance policy in digital-banking using welfare analysis.

c) To hint on setting amount of cost or price for insurance that ensures the efficiency cost of competitive pricing under welfare analysis.

Methodology

In aim to establish the basis of the model – Voluntary Insurance (VI) in Greek-economy, this study uses the Theory of Consumer Choice & Behaviors (Rahman, 2019). For guidance in policy design–adoption of VI policies including assessing amount of cost or prices for insurance, this study carries out Welfare Analysis of the application of VI model.

Elaboration of the Concepts

For further clarity in the subject area, this section incorporates elaboration of concepts including the proposal "voluntary insurance" as follows

On-the-Go or Digital-banking: What is it?

Bank-led transaction or mobile-led transaction or a combination of the two is known as "On-the-Go or digital banking in today's world-economy of business-mentality where people behave rationally without emotion.

For further clarity, by using a computer or mobile device, On-the-Go banking involves managing bank accounts, transferring funds, depositing checks and paying bills etc. Most banks and credit unions, beside traditional services, let customers access their bank accounts via the internet. Online bank branch, on the other hand, is typically one that customer access only through the internet, which may facilitate all services or a portion depends on where it is located. Online bank branches mostly seen in most developed countries.

Like in many other countries, Mobile-only banks in Greece are revolutionizing personal banking, offering an alternative to traditional brick-and-mortar banks with fast, secure and easy to use apps for iOS and Android. Mobile banks offer competitive banking services such as current accounts, savings accounts, loans, insurance, and debit/credit cards, often at a cheaper rate than traditional banks. These mobile-only banks, also known as challenger banks should not be confused with an online account from traditional bank. It is 100% app-based, offering more transparency and convenience with fewer restrictions and waiting times than your common bank.

On the same token, mobile banking typically operates across major mobile providers in a country through one of two ways: SMS messaging and mobile web. It is similar to online account access from a home-based computer. This option allows for checking balances, bill payment and account transfers simply by logging into the user's account via a mobile web browser or by dialing targeted phone numbers.

Skrill, World Remit and Azimo: Few names that help new way financial services in Greece

Like in many countries, today world-economy, especially, banks sector is operated providing services in multi-faucets meeting customers' needs. Besides bank branches, Skrill, WorldRemit and Azimo etc. in Greece are the latest of the progression where customers use them for banking-services no matter where they reside. These financial-service providers here act as a catalyst for economic development of unbanked population by providing prompt, fast and safe banking products and services. Customers here enjoy user-friendly setup compare to that of other kind digital-banking option.

What is *Voluntary Insurance*? How does it Work?

Addressing issues, especially, perceived risk-factors that undermine the growth of digital-banking in world-economy country-wise, Voluntary Insurance as a product of digital-banking has been proposed by Akim Rahman in literature (Rahman, 2018a). The financial sector can introduce it as a product in operation where bank or third-party can collect premium ensuring secured services. The way it would work is that customer's participation will be absolutely voluntary. Insurance will be attached to customer's account, if and only if, customer wants it for digital services. Since the program will be designed in a way of transferring the risk away from its premium-payers, it will ensure premium-payers with a sense of certainty. Here premium-receivers will take extra measures for ensuring risk-free digital-banking services. For example, ATM Card or Credit Cards, Bank Cards etc. can be protected by setting two identifications such as password and a finger-scan. Suppose, a customer wants to use ATM card where in order to access his account, the customer will have to use two identifications namely own setup password and previously chosen finger-scan say his thump or forefinger scan. Here finger scan in addition to password can be connected to the ATM system, which will make digital-banking to be enhanced secure. Overcoming the risk of heist or hacker's access to bank accounts, under the proposal, similar own set up identifications can be used. In global banking cases such as remittances, the program can ensure risk-free on-the-go or digital banking services.

Voluntary Insurance

It is clear now perceived-risk factor plays an influential role in setting the stage for the proposal, Voluntary Insurance Option in On-the-Go banking services. It is palatable to assume that On-the-Go banking-customers are risk-averse, i.e., they prefer certainty to uncertainty when it come banking. Figure 1 illustrates the risk preferences of a risk-averse banking-customer.

In a world of uncertainty, a customer's actual utility that he receives from digital services will never fall on the TU (X) but rather on the chord (the bold line) as shown in Figure 1. Xg, in Figure 1, represents a service outcome in which customer may use a certain level of service X while Xf represents a negative outcome in which customer may use less of service X. As long as there is a level of uncertainty that a customer may not use Xg units of service X, the utility that this customer receives will lie somewhere on the chord (the bold line). The chord represents the expected utility (EU) of using service X, which lies in the concavity of the curve because it is the average probability that the customer will use service X or not. As a result, an individual will never receive TU (Xa) but rather EU (Xa).
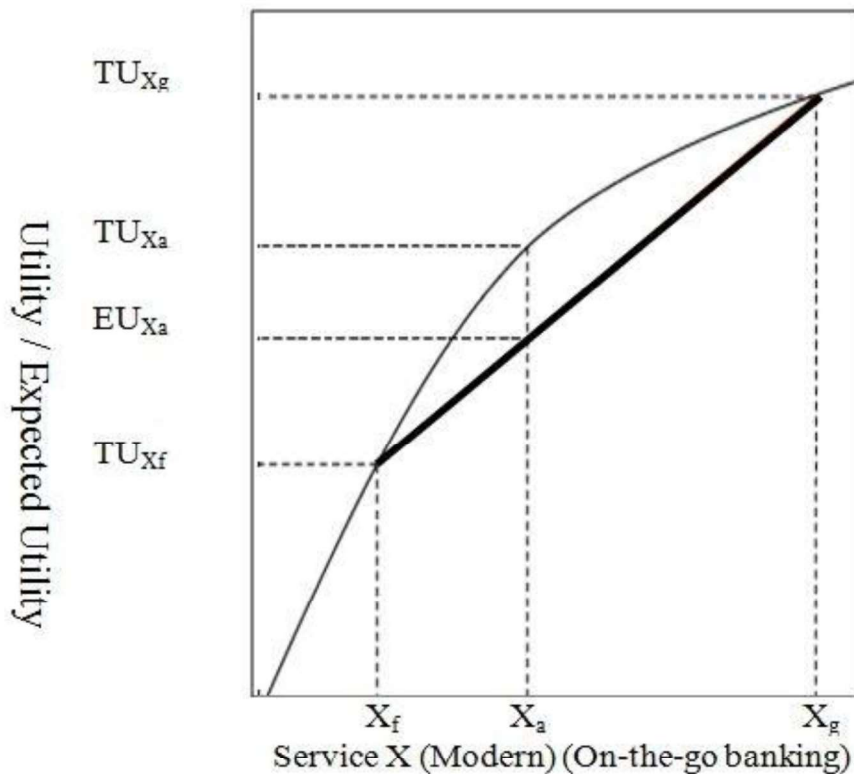
Figure 1: Risk Aversion Scenario
Source: Rahman, 2018a

Policy Adoption: Application of Akim's Model and Outcome under Welfare Analysis

In aim to examine benefits or profitability of bank(s) that adopts Voluntary Insurance (VI) in economy country-wise such as Greece, this section is designed as follows:

It is important for customers as well as for banks to get full information about the economic benefits of adopting VI in digital banking-services. This is because the insurance premium will go out from customer's pockets. In returns, it ensures a safe & secured digital-transaction where VI destabilizes all risk including perceived risk factors, thus customers can be absolutely risk-free. Since money is going out from pocket, risk-adverse may not choose insurance in his or her preference. It is like some people may not choose even traditional banking because of bank-account fees bank charges in general no matter where we reside in the globe.

Theoretical framework for effective cost or price of insurance: Justification of the model

Model

Setup & notation: First this study considers a situation in which customers of digital-banking are faced with choices: signing up for insurance contract or not where signing up offers high coverage (say contract H) that ensures absolute risk-free digital-banking. And not signing up for insurance offers no coverage (contract L) but the contract facilitates digital-banking services.

To further simplify the exposition, we assume that contract L is no insurance but customers are facilitated for free access to digital-banking. And contract H is full insurance and customers are facilitated digital-banking services. These are merely normalizations and straightforward to relax where once Voluntary Insurance (VI) policy is in place, bank (s) can handle the insurance matter just like it handles its customer account fees.

Another important assumption is that we take the characteristics of the contracts as given where premium of insurance to be determined endogenously. It is a reasonable characterization of many insurance markets with variation across individuals only in the pricing of the contracts and not in offered coverage. This analysis is therefore in the spirit of Akerlof (1970) rather than Rothschild and Stiglitz (1976) who endogenous the level of coverage.

Demand for insurance: It is assumed that each customer of digital-banking makes a discrete choice of whether to buy insurance or not. Since we take as given that there are only two available contracts for digital-banking services and their associated coverage, demand is only a function of the relative price p. It is assumed that banks cannot offer different prices to different customers. To the extent that banks can make prices depend on observed characteristics. It is assumed that if customers choose to buy insurance they buy it at the lowest price at which it is available. So, it is sufficient to characterize demand for insurance as a function of the lowest premium *i.e.* price p. *Mathematically*, $D = f(p)$ where D = demand for insurance and p = premium amount or price for insurance services. Since it will be mostly digital services, the price or premium amount will be very small no matter where what economy we talk about.

Supply and equilibrium: It is assumed that there are $N \geq 2$ identical risk neutral insurance service-providers or banks in digital-banking cases that set prices in a Nash Equilibrium. There might have both imperfect and perfect competitions in

market. But we choose to focus on the case of perfect competition as it represents a natural benchmark for welfare analysis of the efficiency cost of selection (Mankiw, 2008).

We further assume that when multiple banks set the same price, individuals who decide to purchase insurance at this price choose a bank randomly. It can also be assumed that the only costs of providing contract H to individuals i are insurable total cost is say TC. Here average cost (AC) curve is determined by the costs of the sample of individuals choose contract H. *Symbolically*, AC = TC / i where AC reduces as i increases.

In order to straightforwardly characterize equilibrium, we make two further assumptions. First, we assume that there exists a price $\bar{p}$ such that $D(\bar{p}) > 0$ and $MC(p) < p$ for every $p > \bar{p}$. In other words, we assume that it is profitable (and efficient) to provide insurance to those with the highest willingness to pay for it. Second, we assume that if there exists $\underline{p}$ such that $MC(\underline{p}) > \underline{p}$ then $MC(p) > p$ for all $p < \underline{p}$. That is, we assume that $MC(p)$ crosses the demand curve at most once. It is easy to verify that these assumptions guarantee the existence and uniqueness of equilibrium. In particular, the equilibrium is characterized by the lowest break-even price $P^* = AC(P)$.

Measuring Welfare

We measure consumer surplus (CS) by the certainty equivalent. The certainty equivalent of an uncertain outcome is the amount that would make an individual indifferent between obtaining this amount for sure and obtaining the uncertain outcome. An outcome with a higher certainty equivalent thus provides higher utility to the individual. This welfare measure is attractive as it can be measured in monetary units. Total surplus in the market is the sum of certainty equivalents for consumers and profits of the firm or bank that provided insurance. Throughout we ignore any income effects associated with price changes.

Graphical Representation

With above framework, a graphical representation of adverse and advantageous selection are shown as follows

This presentation can be helpful understanding the efficiency costs or prices of different types of selection of the insurance for ensuring risk-free digital banking in global economy such as Greek-economy.

Adverse selection: In Figure 2, y-axis represents price or cost of contract H and x-axis represents quantity i.e. share of individuals in the market with contract H where maximum possible quantity is denoted by Q_{max}. The demand curve denotes demand for contract H. Similarly, average cost (*AC*) curve and marginal cost (*MC*) curve denote average and marginal incremental costs to the insurer from coverage with contract H relative to contract L.

The key feature of adverse selection is that individuals who have the highest willingness to pay for insurance are those who, on average, have the highest expected costs. This is shown in Figure 2 by drawing a downward sloping MC curve, which indicates MC is increasing in price and decreasing in quantity. As price falls, the marginal individuals who select contract H have lower expected cost than infra-marginal individuals, leading to lower average costs. The essence of the private information problem is that the bank cannot charge individuals based on its privately known MC, but are instead restricted to charging a uniform price, which in equilibrium implies average cost pricing. Since average costs are always higher than marginal costs, adverse selection creates underinsurance, a familiar result first pointed out by Akerlof (1970). This under-insurance is shown in Figure 2. The equilibrium share of individuals who buy contract H is Q_{eqm} (AC curve intersects DD curve at point C). And accordingly, efficient number is ($Q_{eff} > Q_{eqm}$), this is because MC curve intersects DD curve.

In Figure 2, shaded area CDE shows the welfare loss due to adverse selection. This represents a loss of consumer surplus from individuals who are not insured in equilibrium because their willingness to pay is less than the average cost of the insured population. But it would be efficient to them to insure because their willingness to pay exceeds their marginal cost.

Let us evaluate and compare welfare under a different *scenario*. Suppose digital-baking customers are mandated to sign up for contract H. It would generate welfare = ΔABE − ΔEGH. This can be compared to welfare at competitive equilibrium ΔABCD. In this scenario, welfare at efficient allocation is ΔABE and welfare from mandating everyone to sign up contract L (normalized to zero) or the policies subsidies or tax the equilibrium price. The relative welfare ranking of these alternatives is an open empirical question, which can be studied to assess welfare under alternative policy interventions (including no intervention option).
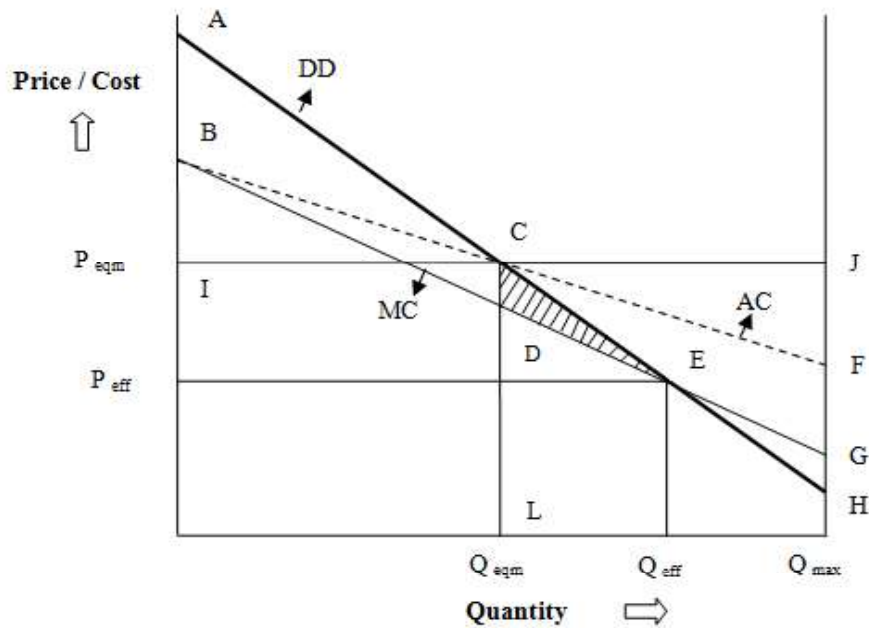
Figure 2: Efficiency Cost of Adverse Selection

Advantageous selection: The initial theory of selection in insurance markets emphasized the possibility of adverse selection, and the resultant efficiency loss from underinsurance (Akerlof, 1970; Rothschild and Stiglitz, 1976). Consistent with this theory, many empirical analyses suggest that insurance markets such as health, the insured have higher average costs than uninsured (Cutler et al., 2008). However, in life insurance market, there exists "advantageous selection". Those with more insurance have lower average costs than those with less or no insurance. Cutler et al. (2008) provide a review of the evidence of adverse and advantageous selection in different insurance markets.

The framework in this study, graphical presentation in Fig 3, makes it easy to describe the nature and consequences of advantageous selection. Here in *contrast* to adverse selection, with advantageous selection individuals who value insurance the most are those who have, on average, the *least* expected costs. This translates to upward sloping *MC* and *AC* curves (Figure 3). Here source of market inefficiency arises because here i) Consumers vary in their marginal cost ii) Banks are restricted to uniform pricing and iii) Equilibrium price is based on average cost.

However, with advantageous selection, the resultant market failure is one of over-insurance rather than under-insurance (i.e. $Q_{eff} < Q_{eqm}$ in Figure 3), as pointed out by De Meza and Webb (2001) in their study. In general, insurance providers have an additional incentive to reduce price, as the infra-marginal customers whom they acquire as a result are relatively good risks. The consequential welfare loss is given by the shaded area Δ CDE. It is resulted because of excess of *MC* over willingness

to pay for individuals whose willingness to pay exceeds the average costs of the insured population. In Fig. 3, welfare can also be evaluated in other situations i) mandating contract H (Δ ABE - ΔEGH) ii) mandating contract L (normalized to zero) and iii) competitive equilibrium (Δ ABE - Δ CDE) and efficient allocation (Δ ABE).
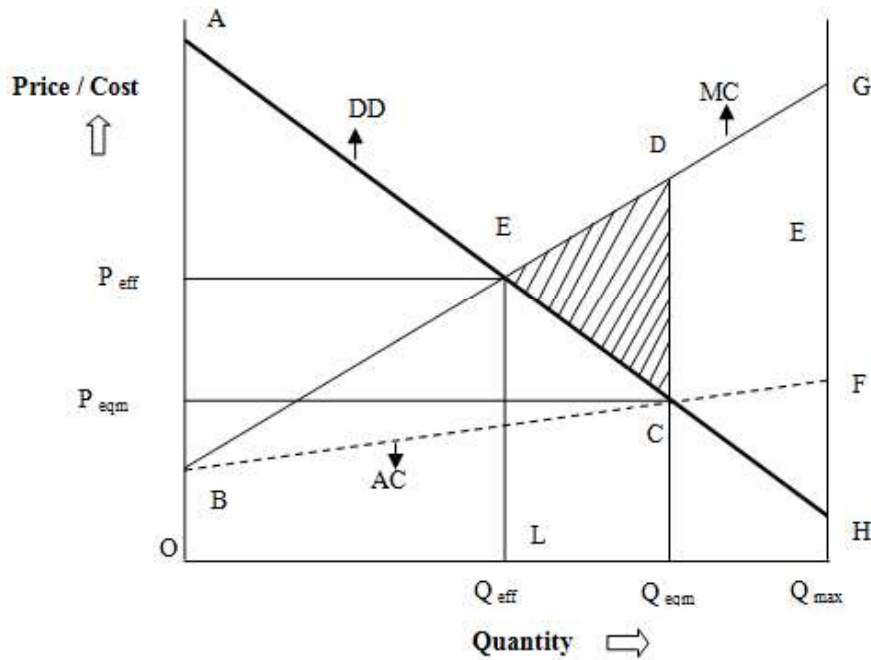

Figure 3: Efficiency Cost of Advantageous Selection

Graphical presentation summary and future study direction: Analyses relate to Figure 2 & Figure 3 illustrate that the demand and cost curves are sufficient information for welfare analysis of equilibrium and non equilibrium pricing of existing contracts. In other words, cases of different preferences & private information can have the same welfare implications if they generate similar demand and cost curves. This is essential for carrying out empirical approach under welfare analysis, which can be a direction for future research in this study. Also, a test whether insurance premium has any impact on the probability of VI policy adoption that influences digital-banking adoption in Greece, can be conducted as a future study.

Potential Moral Hazard and Future Study

Thus far any potential moral hazard effects of the proposal "voluntary insurance" have not been discussed. Underpinning our setup of welfare analysis in this study, moral hazard does not fundamentally change the analysis but it can only

complicate the presentation. We have defined contract H to be full coverage and contract L to be no coverage but signup for using digital-banking services on his or her own risk. Here, moral hazard has no effect on the welfare analysis.

Future study on moral hazard issue can be conducted by making slight modification allowing contract L to include some partial coverage.

Goal of Current Effort: How can it be Instrumental?

The goal of the current effort is to bring the issue to policymakers' attentions so that proposed new product can be introduced in digital-banking operation in countries such as Greece. This raises questions: how can this new product be instrumental to bank-sector and to society?

Answering the questions posed, it is palatable to say, transferring risk away from customers will directly benefit both banking sector and bank-customers. It can further attract new customers who were on the brink using digital banking but just felt it was risky. The model can facilitate the customers with incentives for increasing usages of digital services while maintaining optimal utility of it. Furthermore, any new product, *obviously* legal one, is the life-blood of business companies and societies. It can facilitate many ways such as: ensured new value for customers, improved society and continued existence of the company in competitive market.

Voluntary Insurance in place can ensure risk-free On-the-Go-banking, which can guarantee elevated self-service-banking activities in world-economy country-wise such as Greece. This can be beneficial to customers because it can ensure savings in the form of cost and time. Thus customers will flock to it when they use banking services. By extra advancement of ICT usages, banking sector can be further competent cutting off its operating costs, meeting customers' needs and keeping up with global changes.

With this *win-win* setting for producer & user of the product in *digital-banking,* financial sector globally is no exception. In order to sail through tough competition and to sustain revenues, financial sector in many countries such as Greece are engaging more than that of other kinds bank on adoption of IT in its operation (Giordani, 2012). However, it warrants for effective efforts on attracting more customers meeting challenges in case Greece is moving for being "cashless society" in the future.

Conclusion

Now adding the *Voluntary Insurance*, a new product in digital services, can be impetus meeting the 21st Century challenges. This new and increasing value that can keep banks or firms be growing, which can facilitate economy further booming in Greece. If there is no new value to offer customer, banks or firms wilts and eventually dies. Thus policymakers of Greek nation can play role for better-ness of its modern-society when it come On-the-Go or digital-banking services. Bank Laws in Greece contains multi-faucets provisions. Under bank operation-provisions, bank-deposits, bank-accounts are covered by Hellenic Deposit & Investment Guarantee Fund (TEKE), however, bank-deposits are not insured. But in practice government intervenes to ensure that depositors do not suffer a loss. Despite rapid growth of digital-banking globally, no country has insurance in place to cover digital-transaction. But digital-banking face serious pitfalls being it riskiness. Customers don't read terms & conditions of services. These weaknesses cause abuses. Customer faces perceived-risk-factors. Application of Akim's model - Voluntary Insurance (VI), a new product in banking-services, can be impetus for policy-design meeting the challenges. Welfare Analyses are used as guidance for ensuring efficiency cost of competitive pricing of insurance so that VI becomes appealing to parties involved. In case of bank-provider, adverse selection in insurance market, welfare cost of inefficient pricing is quantitatively small and advantageous selection results the opposite.

References

Accenture, 2017, Digital Greece: The Path to Growth Banking Industry Detailed View,https://www.sev.org.gr/Uploads/Documents/50550/6_10_Banking_Industry.pdf.

Akerlof, G. A., 1970, The market for "lemons": Quality uncertainty and the market mechanism, *Quarterly Journal of Economics* 84: 488–500.

Bos, J. W. and Schmiedel, H., 2007, Is there a single frontier in a single European banking market?, *Journal of Banking & Finance* 31 (7): 2081-2102.

Chatzoglou, P. D., Diamantidis, A.D., Vraimaki, E., Polychrou, E. and Chatzitheodorou, K., 2010, Banking productivity: an overview of the Greek banking system, *Managerial Finance* 36 (12): 1007-1027.

Christopoulos, D. K., Lolos, S. E. and Tsionas, E. G., 2002, Efficiency of the Greek banking system in view of the EMU: a heteroscedastic stochastic frontier approach, *Journal of Policy Modeling* 24 (9): 813-829.

Cutler, D. M., Finkelstein, A. and McGarry, K., 2008, Preference heterogeneity and insurance markets: Explaining a puzzle of insurance, *American Economic Review* 98 (2): 157-162.

De Meza, D. and Webb, D. C., 2001, Advantageous selection in insurance markets. *RAND Journal of Economics* 249-262.

FinTech Magazine, 2020, Future Digital Finance 2020, https://fintechmagazine.com/events/future-digital-finance-2020.

Giordani, G., 2012, Essays on the Econometric Analysis of Electronic Banking in Greece, *Ph.D. Thesis*, University of Portsmouth.

International Monetary Fund (IMF), 2019, Greece: Article IV Consultation-Press Release; Staff Report; and Statement by the Executive Director for Greece, https://www.imf.org/en/Publications/CR/Issues/2019/11/14/Greece-2019-Article-IV-Consultation-Press-Release-Staff-Report-and-Statement-by-the-48806.

Kuisma, T., Laukkanen, T. and Hiltunen, M., 2007, Mapping the reasons for resistance to Internet banking: A means-end approach, *International Journal of Information Management* 27 (2): 75-85.

Kosmidou, K. and Zopounidis, C., 2008, Measurement of bank performance in Greece, *South-Eastern Europe Journal of Economics* 1 (1): 79-95.

Lee, M. C., 2009, Factors influencing the adoption of internet banking: An integration of TAM and TPB with perceived risk and perceived benefit, *Electronic commerce research and applications* 8 (3): 130-141.

Lexology, 2019, Banking Regulation in Greece, https://www.lexology.com/library/detail.aspx?g=969ac231-f416-49de-8fe8-ef6d45c83155.

Mankiw, N. G., 2008, Principles of Microeconomics, Harvard University, 5th Edition, South-Western Cengage Learning, USA.

Marinakis, C. J. and Karanikolas, N. N., 2007, Strengthening the security of e-banking transactions: the case of NBG, *Current Trends in Informatics* 5: 18-20.

Rahman, A. M., 2018a, Voluntary insurance for ensuring risk-free on-the-go banking services in market competition: A proposal for Bangladesh, *The Journal of Asian Finance, Economics, and Business* 5 (1): 17-27.

Rahman, A., 2018b, *Voluntary Insurance in Banking Services – New Product for Ensuring Risk-free Digital-banking of World-economy*, Lambert Academic Publishing, European Union, ISBN: 978-613-9-84189-9.

Rahman, A., 2019, *Microeconomics Basics–New Way Learning Microeconomics in the 21st Century Era*, Academic Publishing Company, Dhaka, Bangladesh.

Rothschild, M., Stiglitz, Joseph E., 1976, Equilibrium in Competitive Insurance Markets: An Essay on the Economics of Imperfect Information, *Quarterly Journal of Economics* 90 (4): 630–649.

Staikouras, C., Mamatzakis, E. and Koutsomanoli-Filippaki, A., 2008, An empirical investigation of operating performance in the new European banking landscape, *Global Finance Journal* 19 (1): 32-45.

https://www.bankofgreece.gr, Accessed 1 June 2021.