

# **Private Health Insurance in OECD Countries and Selection in Private Health Insurance Markets**

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## **Abstract**

In this paper, we present an overview of the private health insurance market and regulations on private health insurance in OECD countries along with a graphical framework to address selection in this market. We find that private health insurance plays an important role in the health care system of OECD countries. It is highly promoted in countries like Chile, the United States, Israel, Ireland, Canada, Slovenia, Germany and France due to the fact that it has the potential to provide better health care services to individuals along with shifting cost pressures from public health systems to the private sector. However, the existence of selection in this market can cause the positive impacts to disappear.

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## **1. Introduction**

Health care expenditure can be financed by a mix of public funds and private spending. Private spending in health care largely varies with the income level of a country. Evidence suggests that private spending is very high in low and middle income countries compared with high income countries (Brunner et al., 2012). Private health insurance (PHI) can be separated from public health insurance by its way of funding. PHI is associated with premiums which are generally paid on the basis of a contract between an individual who is seeking coverage and a PHI provider. A publicly funded health system is associated with taxes or social security payroll contributions. In the health system, PHI performs different roles. Some of the roles can be seen as positive and some of them can be seen as less positive or less advantageous. It's a very important source of coverage for significant population groups in most of the OECD countries. PHI mainly copies universal health coverage in Australia, Ireland, New Zealand and the United Kingdom. Evidence suggests that introduction of PHI and designing it as an alternative means of financing health expenditure compared with public funding leads to purchase of PHI policy by half of the Australian and Irish populations (OECD, 2004). PHI plays a very important role along with the public health care system by financing goods, services and products, such as pharmaceutical products in Canada. It covers 65% of the total population in Canada, 80% in Switzerland and 90% in Netherlands and it is purchased by over 30% of the population in a third of OECD members (Colombo & Tapay, 2004).

Policy makers commonly consider PHI as an additional source of funding for the publicly financed health care system. It plays an important role when governments of the OECD countries face difficulty to provide sufficient amount of funding for publicly funded health coverage. In the United States, the contribution of PHI accounts for half of total health expenditure (OECD, 2013). In addition, PHI remains a significant funding source (above 10%) in the Netherlands, Canada, France, Germany and Switzerland (OECD, 2004).

In recent times, PHI has attracted the attention of policy makers due to the fact that out-of-pocket payment for health services is positively correlated with households incurring catastrophic expenditures and policy makers wish to provide financial risk protection to individuals through pre-payment (Xu et al., 2003). According to Sekhri & Savedoff (2006, p.2) "Governments in

developed countries with well-established PHI markets routinely intervene in the market to protect consumers and promote public health objectives of equity, affordability and access to health services”. Even though the PHI concept was formed to reduce budgetary pressures for the governments of OECD countries, sometimes it may have very little effect on cost reduction. One of the main reasons for this is that it is difficult to achieve first best conditions in this market. Existence of asymmetric information between buyers and sellers leads to Selection which plays a significant role to drive this market away from efficiency. Information deficiencies, moral hazard and adverse selection lead to market failure for PHI (Brunner et al., 2012). In this paper, we present an overview of PHI market and regulations in OECD countries. In addition to that we also present a graphical framework to analyze selection in PHI markets based on the framework of Einav & Finkelstein (2011), who studied selection under perfect competition; we extend their work by analyzing selection in a monopolistic market. We find that PHI allocation and social welfare vary significantly between a perfectly competitive market and an imperfectly competitive market structure.

This paper is organized as follows: Section 2 describes different types of PHI in OECD countries. Section 3 considers health expenditure and financing in OECD countries. Section 4 describes some regulations regarding PHI. Section 5 provides a simple mathematical illustration of first best conditions in a PHI market using Varian’s (1992) model. Section 6 studies the promotion of PHI and its consequences in Canada, while section 7 presents a case study based on PHI in Australia. Section 8 addresses asymmetric information and regulations to address asymmetric information in a PHI market. Section 9 presents a graphical framework to analyze theoretical aspects of selection in PHI market under monopoly versus perfect competition. Section 10 concludes the paper.

## **2. Private health insurance**

The primary function of health insurance is to provide financial risk protection when individuals are in need of health care service (Kutzin, 2001). The difference between public health insurance and PHI can be seen in terms of insurance coverage and the financing agent. The government provides public health insurance which is funded through taxes, either general or social security taxes. On the other hand, PHI is provided through the direct payment of premiums to insurers.

In general, there are four types of PHI in OECD countries. These are:

1. Primary PHI
2. Duplicate PHI
3. Complementary PHI
4. Supplementary PHI

Primary PHI: When only PHI provides financial risk protection through health coverage. There are two reasons for this (OECD, 2014). First, public health insurance is absent or individuals are not eligible to gain access to government/social programs. Second, individuals are eligible to get public health insurance but chose to opt out. For example, primary PHI can be found in Chile, Estonia, Iceland and Spain.

Duplicate PHI: When PHI provides all the health coverage that is already included in public health insurance. It provides access to different providers and doesn't require exemption from public coverage (OECD, 2014). For example, duplicate PHI can be found in Australia, Greece, Ireland, Mexico and the United Kingdom.

Complementary PHI: When PHI complements public coverage by covering all or part of the residual costs not otherwise reimbursed in the form of copayment or cost-sharing (OECD, 2014). For example, complementary PHI exists in Austria, Belgium, Czech Republic, France and Slovenia.

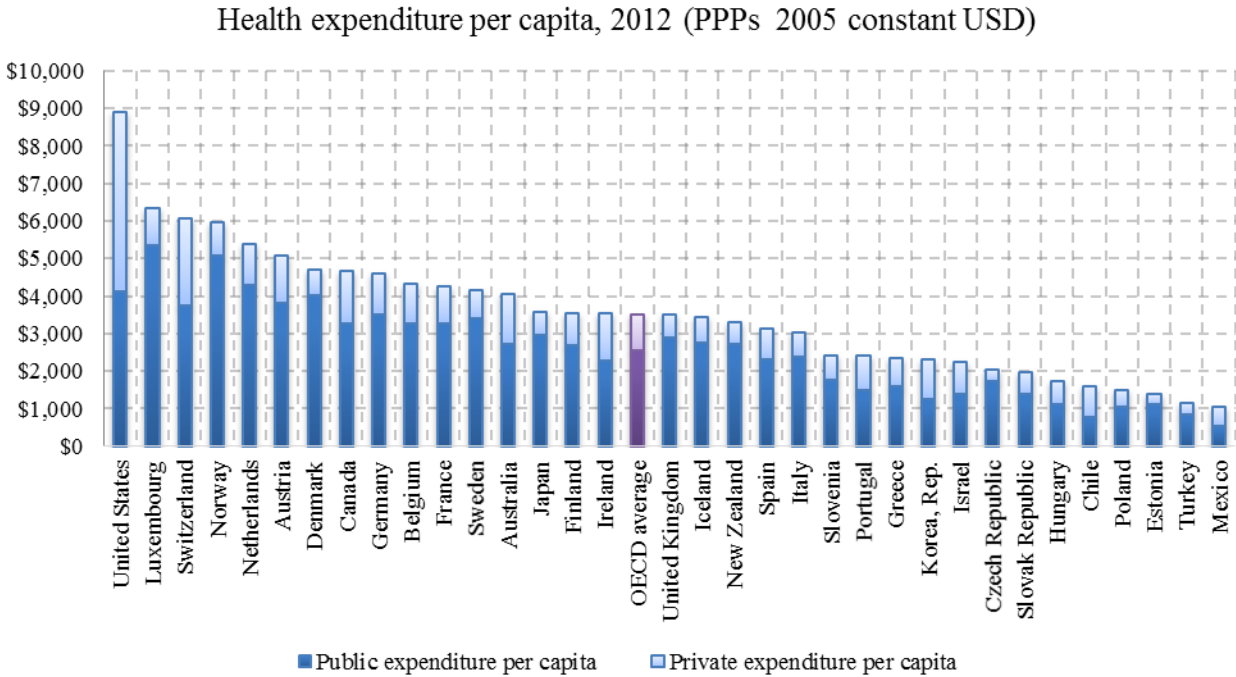
Supplementary PHI: When PHI provides all the services or coverages that are not included in public health insurance. For example, supplementary PHI exists in Canada, Finland and Hungary (OECD, 2014).

### **3. Health expenditure and financing**

In 2012, health expenditure (USD 8895 per person) in the United States continued to be the highest among OECD countries (Figure 1). This level of health expenditure is almost two and half times the OECD average. Large economies like Canada, Germany and France have half of the United States health expenditure. Per capita health expenditure in two thirds of the OECD

countries is below USD 4000. Countries spending below USD 1500 are Chile, Poland, Estonia, Turkey and Mexico.

**Figure 1**

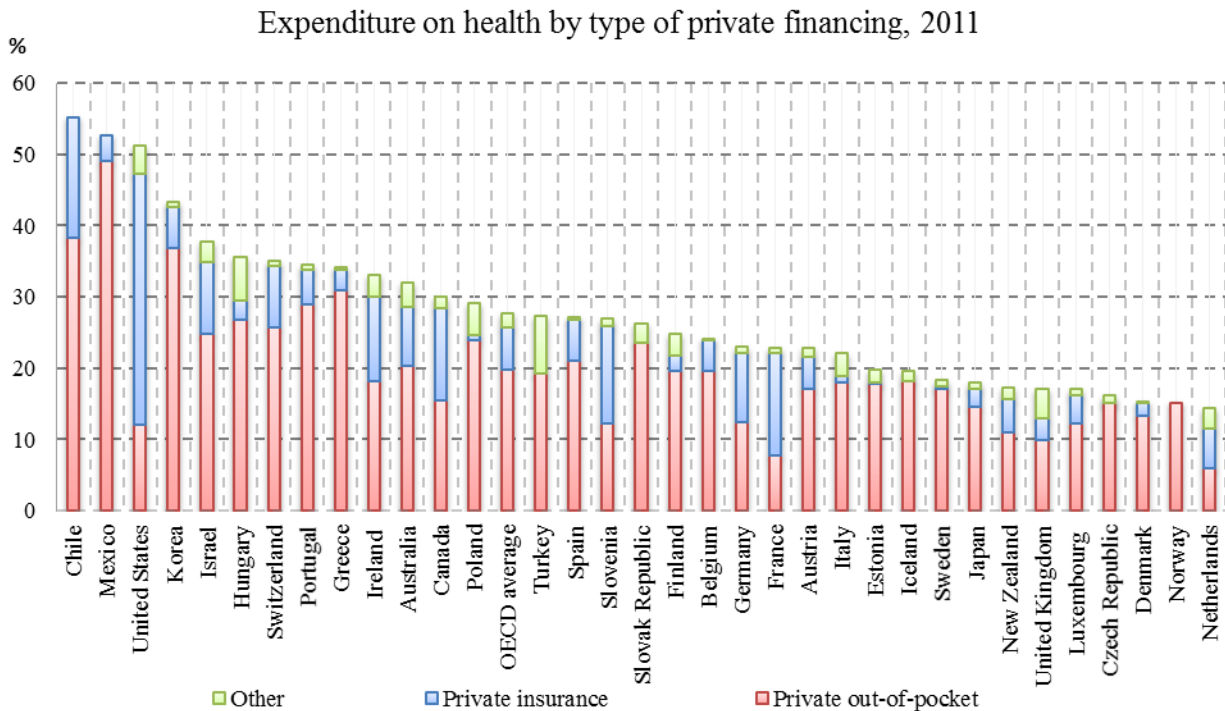


Source: The World Bank, <http://data.worldbank.org/indicator/SH.XPD.PCAP/countries>; Health expenditure per capita (PPPs 2005 current USD).

Figure 1 also shows the breakdown of per capita health spending into public and private sources. We can see that private health expenditure is highest in the United States and public health expenditure is highest in Luxembourg. On average across OECD countries, per capita private health expenditure is USD 964 and per capita public health expenditure is USD 2557.

Private sector financing is mainly driven by out of pocket financing and PHI financing. In 2011, the share of private sector financing in total health expenditure was highest (55.1%) in Chile and lowest (14.4%) in the Netherlands (Figure 2) among OECD countries. PHI financing is highest in the United States, accounting for 35.2% of total health expenditure.

**Figure 2**



Source: OECD Health Statistics 2013, <http://apps.who.int/nha/database/Select/Indicators/en>; WHO Global Health Expenditure Database.

In countries like Chile, the United States, Israel, Ireland, Canada, Slovenia, Germany and France PHI plays a very significant role in financing health expenditures. On the other hand, in countries like Denmark, Italy, Poland, Sweden, Estonia, the Czech Republic, the Slovak Republic, Norway, Iceland and Turkey PHI accounts for less than 2% of total health expenditure. On average across OECD countries, 5.9% of health spending is paid by PHI.

#### **4. Regulation of private health insurance in OECD countries**

Governments of OECD countries regulate the health insurance market to some degree. The degrees to which they intervene in different marketplaces and their actions, or absence of actions depend upon several factors. Possibility of market failure has always been an important concern. By regulating health insurance policymakers want to achieve equal distribution of health risk and minimize it for all individuals. According to Sekhri & Savedoff (2006, p.5) “The case for public

intervention in health insurance is based on a number of factors, including the rationale for regulating financial institutions in general, market failures specific to health insurance, the public's interest in preserving the health of its citizens and potential policy objectives to address the unequal distribution of income and health risks”.

In a PHI market, the opportunity and content of regulation depends on whether a specific kind of service is provided by the PHI or not (OECD, 2004). If a similar kind of service is provided by the government or other non-private organization then policy makers consider it as a potential field for intervention. In the case of private insurance, there exists an agreement across OECD countries that financial conditions of the PHI providers must be regulated and certain minimum standards must be maintained (OECD, 2004). These regulations and laws vary by a small range among OECD countries. All the OECD countries with PHI regulate the general financial conditions of PHI providers (OECD, 2004). By examining the PHI regulations across the OECD countries it is possible to say that the degree of regulation mostly depends on the share of PHI in the health system. To determine regulation, public and private financing mixture in a country and the role that PHI plays within the structure are also important (OECD, 2004).

Challenges associated with health care costs of high risk persons have played an influential role for government intervention in the PHI market (Colombo & Tapay, 2004). Not all the OECD countries provide similar kinds of PHI coverage. Some provide more expensive health care services. To provide individuals protection against possible health risks alongside with the goal of reducing pressure on the public health system, regulating PHI is a must.

When private insurance is intended to be a primary source of coverage for large segments of the population, determining the core benefits are very essential (Sekhri & Savedoff, 2006). If the government puts constraints on private insurers to standardize benefit packages or designs minimum benefit plans it will not be possible for insurers to attract only lower risk individuals. The Health Insurance Act in the Netherlands mandates a standard package that insurers must offer to those who meet certain conditions, such as - persons who are uninsured, persons who have to leave the social insurance program, persons who have recently moved to the Netherlands and were insured elsewhere and the elderly who had private insurance previously (Tapay & Colombo, 2004). In general, OECD countries do not try to determine the level of benefits that PHI providers may provide. But there are exceptions. Some countries have done it so that they

can navigate the private market's collaboration with public coverage. For example - Canadian provinces exclude PHI coverage for outpatient, inpatient and dental benefits covered by the public health insurance program (Flood & Archibald, 2001). Australia also doesn't allow PHI to cover services like out of hospital physician services which are already covered by public insurance (Colombo & Tapay, 2003).

Government interventions in determining the conditions of contract exclusion, clauses under limited coverage for pre-existing conditions and waiting periods are also important (Sekhri & Savedoff, 2006). If restrictions exclude care for more common high cost conditions like cancer or AIDS, the purpose of providing health risk protection will not be achieved. By 2001 in the United States, 45 states had imposed restrictions on the exclusion of pre-existing conditions (Jost, 2001).

To reduce patients' excessive use of health care service, private health insurers often introduce cost sharing mechanisms such as deductibles, co-payments and payment ceilings. These mechanisms keep insurance premiums low (Zweifel & Manning, 2000). But there is a downside to these cost sharing mechanisms. According to Mocan et al. (2004, p.6) "...co-payments may disproportionately reduce service utilisation among the poor and discourage people from seeking preventive services that would avoid the subsequent need for costly curative care". Co-payment exists in New Zealand and the UK when PHI is used for ambulatory care, but Australia bans private insurance for co-payments (Tuohy et al., 2004).

Regulating PHI providers' ability to accept or reject applicants for health coverage is common in OECD countries. Seven OECD countries apply guaranteed issuance requirements (partial or full) (OECD, 2004). These are - Australia, Germany, Ireland, the Netherlands, Spain, Switzerland and the United States. "Guaranteed insurance" generally requires insurers to accept all applicants for health coverage. This restriction can last for a limited amount of time or can be open ended.

The PHI market is exposed to adverse selection and moral hazard due to the existence of asymmetric information. Higher premiums or prices create market distortions which lead to government intervention. According to Sekhri & Savedoff (2006, p.18) "Regulating how private companies can price their products is a significant governmental intervention and can have unintended consequences. In health insurance markets pricing policies are particularly difficult to

design because there are so many competing objectives: affordability, equity, viability, as well as avoiding adverse selection, risk selection and moral hazard”.

Countries like the Netherland or Germany impose a price cap on premiums (Tapay & Colombo, 2004). Through this they try to reduce expenditures of individuals in the PHI market or in the public health insurance coverage system. The restrictions on premiums also depend on insurance related requirements in all the OECD countries. Countries that impose rating-related restrictions or caps on premiums also provide some mechanisms to providers so that they can redistribute the risk among themselves. Mechanisms like loss assessment program and premium surcharge exist in Australia, Germany, Ireland, the Netherlands, and the United States (Brunner et al., 2012). According to the OECD (2004, p.123) “A specialised pool for high-cost drug claims is also in place for all private insurers in the supplementary health insurance market in the Canadian province of Quebec”. This type of mechanism can help to protect health insurance providers who provide services to individuals associated with high health cost. The existence of these types of mechanisms in the PHI market indicates that policy makers not only impose premium restrictions but also provide some incentives to providers so that they can easily coordinate between risk exposure and premiums.

The PHI market lacks competitiveness due to the fact that there are complexities associated with this market (Colombo & Tapay, 2004). Sometimes it is very difficult for the clients to understand the terms and conditions. Easier representation and use of understandable language can play a very important role to resolve this problem. If information can be provided in an easier and comparable form then it will be easier for clients to compare products and prices and understand the benefits that they can get. Regulation related to this matter will prevent a situation from arising where consumers are not getting what they are supposed to according to the policy terms and conditions. In general cases, OECD countries require disclosing the terms and conditions of the insurance contract to the buyers. Australia, Portugal, Germany, Mexico and the United States have disclosure requirements specifically targeted to health insurance (Colombo & Tapay, 2004).

## 5. First best condition in private health insurance market

Varian (1992) has presented a theoretical model where he has shown that under certain circumstances it is possible to achieve the first best in insurance markets. It is possible to fit his model to the PHI market.

There is a representative consumer who has initial wealth  $W$ . There is a probability  $p$  that a person can become sick under which he will need a PHI to cover the costs for medical expenses. The medical expense associated with the sickness is denoted be a loss,  $L$ . To cover the possible medical expenses the consumer will buy PHI coverage. The consumer can purchase a PHI coverage which will pay him  $q$  amount of money under the circumstance that he is sick and has incurred medical expenses. For the medical expense coverage the consumer needs to pay an amount which is equal to  $\pi q$ . So, the premium is the portion of the total amount of coverage.

The utility maximization problem is,

$$\text{Max}_q pu(W - L - \pi q + q) + (1 - p)u(W - \pi q)$$

By partially differentiating this equation with respect to  $q$  and setting the derivative equal to zero we get -

$$pu'(W - L + q^*(1 - \pi))(1 - \pi) - (1 - p)u'(W - \pi q^*) \pi = 0$$

$$\frac{u'(W - L + (1 - \pi)q^*)}{u'(W - \pi q^*)} = \frac{(1 - p) \pi}{p (1 - \pi)}$$

When the consumer falls sick the insurance company receives  $(\pi q - q)$  dollars. If the consumer doesn't get sick then the insurance company receives  $\pi q$  dollars. The expected profit for the insurance company is

$$(1 - p) \pi q - p (1 - \pi) q$$

The author assumes that the insurance market is perfectly competitive. Setting expected profit equal to zero, we get

$$(1 - p) \pi q - p (1 - \pi) q = 0$$

According to this equation we can see that  $\pi = p$ . From this result we can say that under perfect competition the health insurance company is charging a perfectly fair premium. The premium is set such that the cost associated with a coverage policy equals exactly its expected value.

Substituting  $\pi = p$  in the first order condition of the representative consumer's utility maximization problem yields,

$$u'(W - L + (1 - \pi)q^*) = u'(W - \pi q^*)$$

In the case of strictly risk averse consumer the above equation leads us to,

$$W - L + (1 - \pi)q^* = W - \pi q^*$$

Which implies  $L = q$ , meaning that the representative consumer completely insures himself against the medical expenditure. So it can be seen that under the assumptions made here it is possible to achieve complete coverage in health insurance.

## **6. Promoting private health insurance and consequences in Canada**

Stabile (2001) has examined the effect of government subsidies to employee provided health insurance (PHI coverage) on the decision to purchase private health coverage and on utilization of publicly funded health services in Canada. According to Stabile (2001, p.1), "In both the United States and Canada, governments subsidize employment-based health and dental insurance through the tax system". The Government of Canada provides tax exemption to firms based on the portion of a worker's health insurance they provide. As a result, government subsidies effectively reduce the cost associated with a dollar's worth of PHI. The author suspects that the effect of tax subsidies is not limited to purchase of PHI coverage but also has a significant impact on social welfare. According to Stabile, promoting PHI has a series of effects. Among these, reducing tax revenues along with increasing utilization of publicly funded health insurance can be seen as important issues regarding PHI.

The author argues that drawing a relationship between PHI coverage and the use of publicly funded health coverage is difficult due to the existence of adverse selection and moral hazard which can change the magnitude of the effect. He uses the existence of tax subsidies to identify

the moral hazard effect of holding PHI coverage on the utilization of publicly funded health care services. According to his results, holding PHI increases the probability of consuming more publicly funded health insurance by 2%. This suggests that moral hazard creates a distortion in the PHI market in Canada.

The results from this paper show that promoting PHI coverage through tax subsidies has two effects. Firstly, it increases the purchase of PHI coverage. Secondly, it increases the utilization of publicly funded health care services. According to Stabile (2001, p.3), “Estimates of the semi-price elasticity of demand for supplemental insurance in Canada range from -0.3 to -0.6. My estimates of the effect of holding private insurance on the use of public health services suggest that individuals with PHI use 10 percent more public health services than do those who do not have insurance, and that approximately half of this additional use is due to moral hazard”.

From this paper, we can conclude that promoting PHI not only creates distortions in the PHI market but also increases public and total health expenditure in Canada.

## **7. A case study: private health insurance market in Australia**

The Australian health care system relies upon a mix of public and private financing and provision (Connelly et al., 2010). Private hospital insurance in Australia covers 44% of the population, one of the highest percentages across OECD countries, following France (86%), the USA (70.3%), Canada (70%) and Ireland (48%) (OECD, 2004). In Australia, PHI accounts for 7.1% of total health expenditures (Colombo & Tapay, 2003).

Even though Australia has universal public health insurance, PHI plays a very important role by providing services to a large share of the population. It covers hospitalization costs for both private and public hospitals along with the cost of the prescribed drugs. According to Colombo & Tapay (2003, p.14), “Government of Australia has been encouraging private health insurance market for a long time, although policy changes have swung between supporting private versus public funding of the health system”.

PHI has been viewed as an alternative method of financing health expenditure. The government of Australia was providing direct support by subsidizing PHI but this was discontinued in 1987

(Colombo & Tapay, 2003). Another study by Willcox (2001, p.5) finds that “...support for private hospital care has been increasingly achieved by supporting private health insurance along with the fact that Medicare reimburses a share of private in-hospital medical costs which indicates that Australia is encouraging a mixed financing and provision system, as well as some degree of universal access to private hospital care”.

There are two types of PHI in Australia. One type covers the hospital inpatient charges and another type covers the services not reimbursed by Medicare like - dental care, physiotherapy, and glasses (Colombo & Tapay, 2003). In Australia, the duplicate PHI presents some precise features. Along with providing coverage for in-hospital accommodation it can also provide some services offered by the public health care system (Colombo & Tapay, 2003). However, Australia doesn't allow private insurances to cover out-of-hospital services. The Government of Australia regulates the PHI market in different ways to achieve efficiency.

The regulations that have been implemented by the Government of Australia are presented in the following table.

**Table 1**

Main regulatory provisions on PHI in Australia

| Main policy goal of regulation   | Type of regulation                  | Description   |
|--|-------------------------------------|---|
| <i>REGULATION OF PHI IN ITS INTERACTION WITH PUBLIC COVERAGE SYSTEMS</i> |                                     |   |
| Ensure sustainable and fair public health insurance                      | Coverage of services allowed to PHI | <ul style="list-style-type: none"> <li>Funds cannot offer cover for out of hospital medical services for which Medicare already pays a benefit.</li> <li>Funds are required to cover medical fees on private in-patient stays for 25% of MBS rates. Funds can also cover any remaining medical gap above the MBS rate.</li> <li>Funds cannot cover co-payments on pharmaceuticals listed in the PBS.</li> </ul> |
|  | Provider coverage                   | <ul style="list-style-type: none"> <li>Funds can cover stays in public hospitals by private patients</li> <li>Funds can cover services provided by private hospitals.</li> </ul>  |
| <i>FINANCIAL REGULATION</i>  |                                     |   |
| Promoting fund's financial stability                                     | Solvency                            | <ul style="list-style-type: none"> <li>At any time, the value of the assets of the Fund must be of an amount considered sufficient to meet the obligations of the Fund at that date.</li> </ul>   |
|  | Capital adequacy                    | <ul style="list-style-type: none"> <li>At any time, the value of the assets of the Fund must be of an amount considered sufficient to allow the Fund to continue to meet, into the future, its obligations.</li> </ul>  |
| <i>REGULATION OF HEALTH FUNDS OFFERINGS AND ACTIVITIES</i>               |                                     |   |
| Ensuring equity of PHI coverage  | Open enrolment                      | <ul style="list-style-type: none"> <li>Insurers have to accept all applicants within certain membership categories. Risk selection/discrimination on the basis of sex, age, health status, etc is prohibited.</li> </ul>  |
|  | Community rating                    | <ul style="list-style-type: none"> <li>Premiums are community-rated (Health Insurance Act, 1953) for each product.</li> <li>Automatic renewal of membership.</li> </ul>   |
|  | Product approval                    | <ul style="list-style-type: none"> <li>New products or changes in existing products must be filed with the Department for Health and Ageing, which may disapprove them.</li> </ul>  |
|  | Minimum benefits                    | <ul style="list-style-type: none"> <li>All funds are required to provide Federal Government Defaults Benefits, although they may have policies covering those only as private patients in a public hospital.</li> </ul>   |
| Guaranteeing affordable coverage and financing equity                    | Premium approval                    | <ul style="list-style-type: none"> <li>Premiums must be filed with the Department for Health and Ageing, which may disapprove them.</li> </ul>  |
|  | Gap cover scheme                    | <ul style="list-style-type: none"> <li>The Gap cover schemes – Act (2000) allows funds to cover part or the entire medical gap for private in-patient care above scheduled MBS fees.</li> <li>Funds are obliged to offer at least one policy involving no gap.</li> </ul>   |

|   |                                      |  |
|---|--------------------------------------|--|
| Protecting consumers and building confidence  | PHI Ombudsman                        | <ul style="list-style-type: none"> <li>• Deals with consumer complaints.</li> <li>• Publishes aggregate data about complaints.</li> <li>• Makes available and publicises the Private Patients' Hospital Charter.</li> <li>• Does not have power to enforce a certain course of action following investigation of complaints, but usually funds adhere to recommendations.</li> </ul>                 |
|   | Informed financial consent           | <ul style="list-style-type: none"> <li>• Medical practitioners charging patient an amount above the benefit provided by the health fund must inform the patient of this cost, and obtain written financial consent.</li> <li>• Funds have an obligation to include in their agreements with hospitals a clause according to which providers apply informed financial consent requirements</li> </ul> |
|   | Information disclosure requirements  | <ul style="list-style-type: none"> <li>• Funds can change premiums or rules on PHI coverage but are required to inform members of any change adversely affecting the scope, level or nature of the benefit, including premium increases.</li> </ul>  |
|   | Portability of cover                 | <ul style="list-style-type: none"> <li>• Individuals transferring between funds do not need to serve additional waiting periods, if they transfer to a product with the same or lower level of benefits.</li> <li>• Benefits paid by the previous fund may be taken into consideration by the new fund when determining the annual benefit limit.</li> </ul>   |
| Protecting insurers against adverse selection | Waiting period                       | <ul style="list-style-type: none"> <li>• Health funds may impose waiting period on hospital treatments where it is apparent that there was a pre-existing ailment. Waiting periods for pre-existing conditions consists of: i) 12 months for pre-existing ailments; ii) 12 months for obstetrics; iii) 2 months for all other circumstances.</li> </ul>  |
|   | Pre-existing ailments                | <ul style="list-style-type: none"> <li>• A pre-existent ailment is an ailment, illness or condition, the signs of symptoms of which, in the opinion of the medical practitioner appointed by the fund, existed at any time during the 6 months prior to joining or upgrading a hospital PHI product.</li> </ul>  |
|   | Exclusions and front-end deductibles | <ul style="list-style-type: none"> <li>• Insurers are allowed to have exclusions in policies (for example a disease condition such as maternity, hip replacement, knee replacement, etc).</li> <li>• Since 1996, insurers can offer policies with front-end deductibles specifying the amount that an individual has to pay before health fund benefits are payable.</li> </ul>                      |
|   | Lifetime cover                       | <ul style="list-style-type: none"> <li>• Introduced in 2000 as slight modification to the community rating regime by allowing funds to rate premiums on the basis of age of entry (see details in table 7)</li> </ul>  |
| Ensuring fair competition                     | Reinsurance                          | <ul style="list-style-type: none"> <li>• A reinsurance pool exists, which equalised the cost of the elderly and chronically ill (i.e. hospitalised for over 35 days) across funds.</li> </ul>  |

Source: Colombo & Tapay, 2003, p.19

Even though regulations are implemented to increase efficiency in the PHI market, they pose some challenges to cost-minimization. Unfortunately, like all other OECD countries the PHI market in Australia hasn't been able to effectively engage in cost control (OECD, 2004). Government subsidies to private health coverage lead to considerable pressure on public health insurance coverage. It has been an ongoing challenge for the Australian government to drive this market effectively and efficiently to achieve the main goal of cost sharing to reduce the burden. Recently, to handle inefficiencies the government of Australia has implemented some regulations like copayments, reducing PHI membership and giving monopsony power in the health insurance sector (Willcox, 2001).

## **8. Asymmetric information in the health insurance market**

Existence of asymmetric information in the health insurance market is a common phenomenon (Machado & Mata, 2014). Asymmetric information creates market inefficiency in the form of adverse selection, advantageous selection and moral hazard and can be found in different market settings. According to Salanie & Chiappori (2013, p.420), “The practical importance of information asymmetries has been found to vary considerably across markets. In particular, there exists clear and convincing evidence that some insurance markets are indeed affected by asymmetric information problems and that the magnitude of these problems may in some cases be significant”.

### **8.1 Adverse selection**

Adverse selection is a cause of market failure for PHI. It can cause higher losses for providers (Brunner et al., 2012). Asymmetric information leads to adverse selection when individuals know better about their health than insurers. In a free market this causes an inefficient outcome (second-best). Efficiency would require different individuals with different risk types to get different contracts; gains from low risk contracts can be used to subsidize high risk contracts (Neudeck & Podcizek, 1996). But achieving efficiency is very difficult as firms will have the tendency to reject loss-making contracts and high risk individuals will have an incentive to hide their identity by imitating the behaviour of low risks (Neudeck & Podcizek, 1996). So, appropriate policies must be designed to address this problem. According to Farnsworth (2006, p.3), “Adverse selection affects enrollment patterns among health plan offerings”. In terms of efficiency and equity adverse selection is problematic.

Akerlof has presented a model to show that the existence of asymmetric information leads to market failure (Akerlof, 1970). He has used his model and finds that asymmetric information causes market failure for PHI. In the paper, the author assumes that there are two types of groups. For one group the expected medical expenditure is low and for the other group it is high. But while setting the premium the insurance company will always consider the average expected medical expenditure. In this situation the individual who is relatively healthy and whose expected medical expenditure is less than the average expected medical expenditure is not going

to buy the insurance coverage. As a result only relatively sick people will stay in the market. So the insurance company will have to increase the premium based on new average expected medical expenditure. Again some relatively healthy people will leave the market and the insurance provider will again increase the premium. As this continues eventually only very risky people will buy the insurance coverage at a very high price or the market will collapse.

Under this circumstance as insurance companies cannot set the premium too high, they try not to provide health insurance to the people who need it the most. According to Akerlof (1970, p.6), “It is a well-known fact that people over 65 have great difficulty in buying medical insurance”.

Akerlof also provides an example where the insurance companies involve themselves in adverse selection. According to him, “Group insurance, which is the most common form of medical insurance in the United States, picks out the healthy, for generally adequate health is a precondition for employment. At the same time this means that medical insurance is least available to those who need it most, for the insurance companies do their own adverse selection” (Akerlof, 1970, pp.7-8).

Lee (2012) studies the relationship between asymmetric information and demand for PHI in Korea. According to him (p.1), “With regard to the demand for private health insurance, the adverse selection problem has long been highlighted as a focal point of possible market inefficiency”.

Advantageous selection is the opposite of adverse selection. Advantageous selection occurs when a risk-averse individual having low risk buys more insurance coverage and causes market inefficiency (De Meza & Webb, 2001). Advantageous selection exists in health insurance market. Fang et al. (2008) have found strong signs of advantageous selection in the Medigap market.

### **8.1.1 Regulations to reduce market inefficiency under adverse or advantageous selection**

Addressing adverse selection and advantageous selection is very important to reduce inefficiencies in PHI markets. According to Farnsworth (2006, p.269), “...plan options must be priced appropriately to minimize the effects of adverse selection”.

Neudeck and Podczeck (1996) believe that in a free market we can't have separate contracts (one directed to low risk individuals and another directed to high risk individuals) which will prevent insurers from getting cross-subsidization. They argue that in this scenario government policy should be to grant private firms a temporary exclusive right to serve certain groups of population if possible and if regulators try to implement cross-subsidization within the PHI sector it can lead to a situation where second best efficiency will not be viable.

PHI providers try different ways to control adverse selection. There exists a common process which is called medical underwriting to address adverse selection (Brunner et al., 2012). The authors mention that through this medical underwriting process insurers desire to achieve four goals. First, providers want to determine the degree of risk associated with the group of persons applying for coverage. Second, they want to determine whether a policy should be sold or not. Third, they want to determine the terms of the policy. Fourth, they want to set the premium based on previous information (Brunner et al., 2012).

From a policy perspective, the way to tackle advantageous selection in the PHI market is the opposite of adverse selection. Einav and Finkelstein (2011) believe that advantageous selection produces too much insurance in the market which calls for policies such as taxing existing insurances or outlawing insurance coverage.

## **8.2 Moral hazard**

Moral hazard plays an important role in increasing the cost of health care. It describes a situation where the tendency for consumers to seek health care services is higher when they have health insurance. Simultaneously it can also exist due to the tendency of PHI service providers to provide more extensive services to individuals who have coverage (Sekhri & Savedoff, 2006).

Moral hazard refers to a situation where an individual's behaviour regarding a particular event is influenced by the presence of insurance. According to Farnsworth (2006, p.254), "...once an insurable event such as an auto theft is insured against, the insured will tend to be more careless, such as leaving the car unlocked or parking in higher-theft areas. Similarly, it has been shown that where a house is insured against fire, the prevalence of accidental fire attributable to

carelessness increases”. Individuals in general have a tendency to increase utilization of medical services which are covered by the insurance compared with those services not covered.

According to Farnsworth (2006), moral hazard is caused by several economic principles and theories:

- Rational individuals always act in their own best economic interest. So in the case of covered services it is obvious that a patient will seek more services as the marginal cost of medical services declines. According to the author, “studies have continually shown that after controlling for health status, those who have health insurance consume more medical services than those without insurance” (Farnsworth, 2006, p.254).
- Information asymmetry between the consumer and the PHI provider can lead to moral hazard. The consumer knows very little compared with physicians as physicians have extensive training and experience on treatment options and risks (Farnsworth, 2006). According to the author, “This contributes to moral hazard in that patients who are understandably ignorant regarding their options must put substantial trust in the physician. Furthermore, it should not be overlooked that the physician cannot completely set aside his own self-interests in billing for treatment. This can be particularly true with so-called "dynamic moral hazard" in which a physician or facility has invested in the latest technology and therefore is motivated to recommend testing or treatment using this technology, even if lower-cost alternatives are available, knowing that the decision will not affect the patient” (Farnsworth, 2006, p.255).

Sapelli and Vial (2003) study the interaction between the purchase of health insurance and health care service utilization in Chile. According to the authors, “The relationship arises from the effect of the purchase/design of insurance policies on utilization through moral hazard and consumer self-selection. Significant effects of insurance on the demand for health services (moral hazard) have been found in the literature for the US; for Australia; and for Argentina” (Sapelli & Vial, 2003, p.1). In this paper, the authors find that moral hazard is a common scenario when PHI and public health insurance co-exist. They think that this is due to the fact that the services that are not provided by the public health insurance are generally provided by the PHI. This gives the insured individual additional incentive to use more of health services than normal. As a result the existence of a mixed system is very likely to increase moral hazard in

comparison with a system where only one type of insurance exists. The design of the system is also very crucial. It can play a vital role to determine the magnitude of the moral hazard (Sapelli & Vial, 2003).

Arrow (1963) examines the individual's behaviour towards using health insurance and tries to find its consequences on welfare. According to him (p.961), "...in medical policies the cost of medical care is not completely determined by the illness suffered by the individual but depends on the choice of a doctor and his willingness to use medical services. It is frequently observed that widespread medical insurance increases the demand for medical care".

### **8.2.1 Regulations to reduce market inefficiency under moral hazard**

The most common form of strategy by policy makers to address moral hazard is cost sharing (Qingyue et al., 2011). Cost sharing also known as co-payment means an individual needs to pay a portion of the medical expenditure and the balance will be paid by the insurance coverage plan. For example – if an individual undergoes surgery under a copayment system he/she needs to pay 20 percent of the total expenditure and the balance will be covered by the insurance plan. Recent literature shows copayment can take one of two forms. Firstly, the individual may need to pay a portion of the total expenditure. Secondly, the individual may need to pay a fixed amount every time he/she incurs a medical expenditure. It provides a financial incentive to the individual and makes them think whether the services that he/she is seeking are necessary or not. However, cost sharing can have a negative impact on low income groups. But under certain circumstances it is possible for the regulator to induce this policy for a specific targeted group. It is important for the regulators to balance the real concern caused by moral hazard against the adverse impact of cost sharing on an insured individual's financial ability to take needed health care service (Brunner et al., 2012).

Farnsworth (2006) has presented two approaches for controlling moral hazard: a historical approach and a modern approach. Under the historical approach the provider tries to control moral hazard through the supply side by introducing utilization review and management. This provides the opportunity for the provider to review specific treatment plans recommended by physicians. This review is mostly applicable to urgent admissions and surgery procedures. In that

case it is possible for the providers to make sure that the claims are authentic. For the modern approach, the author has shown that different types of cost sharing methods play an efficient role to control moral hazard. According to Einav et al. (2013, p.37), "...improvements in monitoring technology - traditionally thought of as a way to reduce moral hazard may have the ancillary benefit of ameliorating some of the welfare costs associated with it".

## **9. Selection in the insurance market: A graphical framework**

In this paper, we use a graphical framework which is an extension of the model established by Einav and Finkelstein (2011). In their paper, the authors have presented a model to analyze both the theoretical and empirical work on selection in insurance markets. It is a generalized model of the insurance market so it is possible to use this model to analyze adverse selection and its implication for PHI allocation and social welfare.

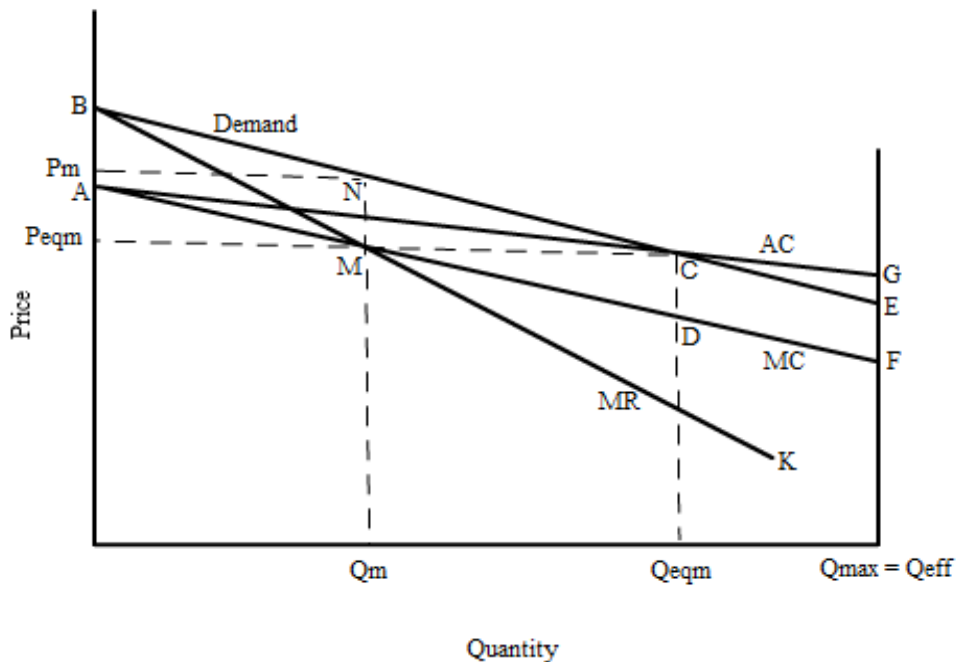
To construct the model, the authors have considered the basic case of insurance demand and cost which means perfectly competitive market structure, risk-neutral insurers providing contracts to cover possible losses and risk-averse individuals having private information (asymmetric information) only differing in the probability of incurring the loss. At the beginning, the authors also assume that there is no administrative or claim processing cost which is relaxed later on in the model. The authors are also assuming that individuals are being treated identically by the insurers.

In addition to all the assumptions made by the authors we are incorporating an imperfect market structure. It is going to provide us the opportunity to analyse how the PHI allocation and social welfare will change between a perfectly competitive market and an imperfectly competitive market structure.

I am considering a monopolistic health insurance market structure. The insurer can set the price of the insurance. In a perfectly competitive market structure no agents (insurers or consumers) have market power and every one is a price taker. Consumers in both market structures make a choice between whether to buy the insurance or not. The following figures are modified from Einav & Finkelstein (2011) by incorporating a standard marginal revenue curve and making necessary changes according to the assumptions.

Figure 3 provides a graphical representation of the PHI coverage and welfare in monopoly and perfectly competitive market under adverse selection. The vertical and horizontal axes indicate price and quantity of the contract respectively. The quantity of the insurance represents the fraction of insured individuals as individuals are facing a choice between buying and not buying the insurance. Cost associated with insurance is only the expected insurance claims. The market demand curve BE reflects the cumulative distribution of individuals' willingness to pay for the contract. For a risk-averse individual the willingness to pay for insurance is the expected cost plus the risk premium. The original model makes the assumption that individuals are homogenous in their risk aversion; as a result individuals' willingness to pay for a contract is positively correlated with their risk type which is private information. In figure 3 AF reflects the marginal cost curve and AG reflects the average cost curve. The marginal cost curve is downward sloping because of the adverse selection property of the insurance market which is individuals with highest willingness to pay for insurance are associated with highest expected cost for the insurer (Einav & Finkelstein, 2011).

**Figure 3**  
**Adverse Selection in the Basic Setting**



Source: Modified from Einav & Finkelstein (2011)

In the health insurance market demand and cost curves are linked due to selection. The risk type of the individuals influences both the demand and cost curves. The vertical difference between the demand curve and the marginal cost curve reflects the risk premium, which is always positive. The argument provided by the authors in the original model is that in the absence of administrative or claim processing costs the demand curve will always be above the MC curve for risk averse individuals. This means, the first best condition would be to provide insurance coverage to all individuals ( $Q_{\max}=Q_{\text{eff}}$ ). If we assume that the market is perfectly competitive then zero profit condition will provide the equilibrium quantity ( $Q_{\text{eqm}}$ ) and price ( $P_{\text{eqm}}$ ). In figure 3 the demand curve (BE) intersects the average cost curve AG at point C, average revenue equals average cost. Point C provides the corresponding competitive equilibrium price ( $P_{\text{eqm}}$ ) and quantity ( $Q_{\text{eqm}}$ ) of the insurance. Insurers providing insurance beyond this point will incur loss.

We can see that inefficiency arises because equilibrium quantity ( $Q_{\text{eqm}}$ ) is less than the efficient quantity ( $Q_{\text{eff}}$ ). According to the original framework, this inefficiency is created by the adverse selection as efficient allocation is determined by the relationship between demand and marginal cost and on the other hand equilibrium allocation is determined by the relationship between demand and average cost. The forgone risk premium due to under-insurance in the competitive market results in a welfare loss which is depicted by the area CDFE.

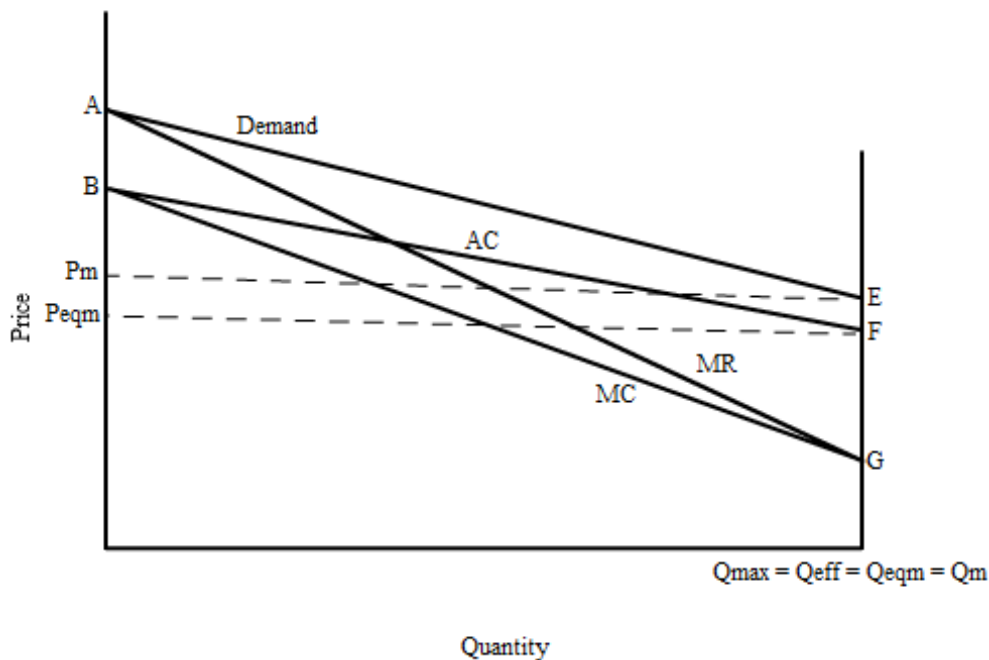
Now, to present a comparative analysis we are considering a monopoly market structure for the PHI. In figure 3 BK reflects the marginal revenue curve. Price and quantity are determined by the intersection of the marginal cost and marginal revenue curves at point M. At this point the corresponding monopoly price is  $P_m$  and monopoly quantity is  $Q_m$ . As we can see, monopoly creates further inefficiency in the PHI market as  $Q_m < Q_{\text{eqm}}$  which means the welfare loss is higher under monopoly. The welfare loss in monopoly market relative to the first best is depicted by NMFE area.

In the original framework under perfect competition Einav and Finkelstein (2011) have showed that in a textbook environment of adverse selection the allocation of insurance and welfare loss can vary significantly. The authors have depicted two extreme conditions, one that produces an efficient allocation and another that produces no coverage to any individual under perfect competition. As an extension of the framework we are showing the situations under monopoly. Figure 4 provides a graphical representation of the efficient allocation both under competitive

and monopolistic environments. In figure 4 AE, BF, AG and BG are demand, average cost, marginal revenue and marginal cost curves respectively. In this particular scenario, the demand curve always lies above the average cost curve making competitive equilibrium quantity ( $Q_{eqm}$ ) equal to the efficient allocation ( $Q_{eff} = Q_{max}$ ). Marginal revenue intersects marginal cost at point G making the monopoly allocation of PHI ( $Q_m$ ) also equal to the efficient allocation ( $Q_{eff} = Q_{max}$ ).

**Figure 4**

**Efficient Insurance Allocation Under Different Market Settings**

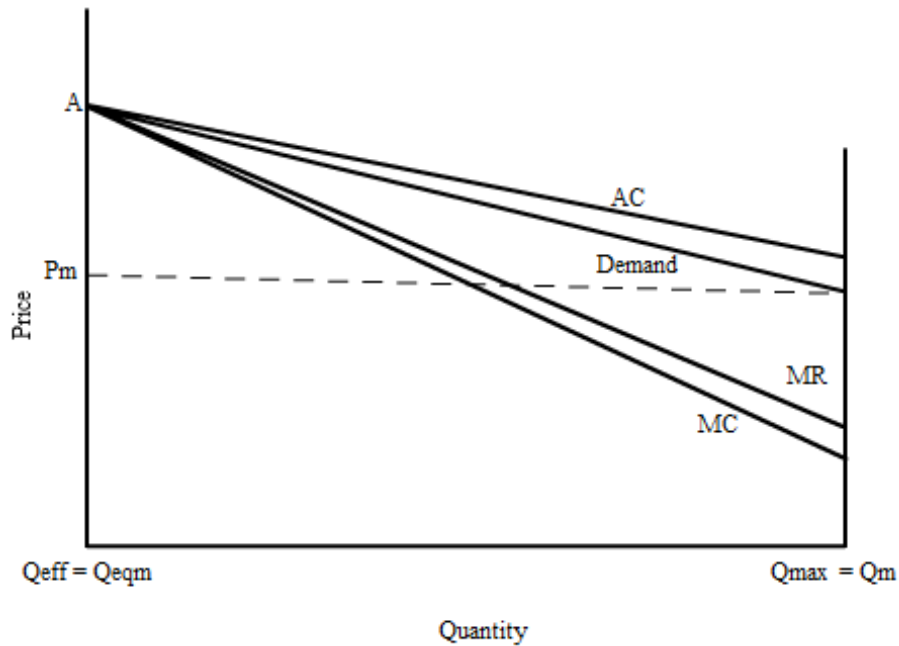


Source: Modified from Einav & Finkelstein (2011)

Figure 5 provides a graphical representation of no insurance allocation under both competitive and monopoly market. In this particular scenario, the demand curve always lies below the average cost curve making the equilibrium quantity of allocation  $Q_{eqm} = 0$ . Moreover, marginal revenue always lies above marginal cost making monopoly allocation of insurance,  $Q_m = Q_{max}$ . So, no one under competitive market setting is insured. However, everyone is insured under monopoly.

**Figure 5**

**Insurance Allocation Under Different Market Settings**

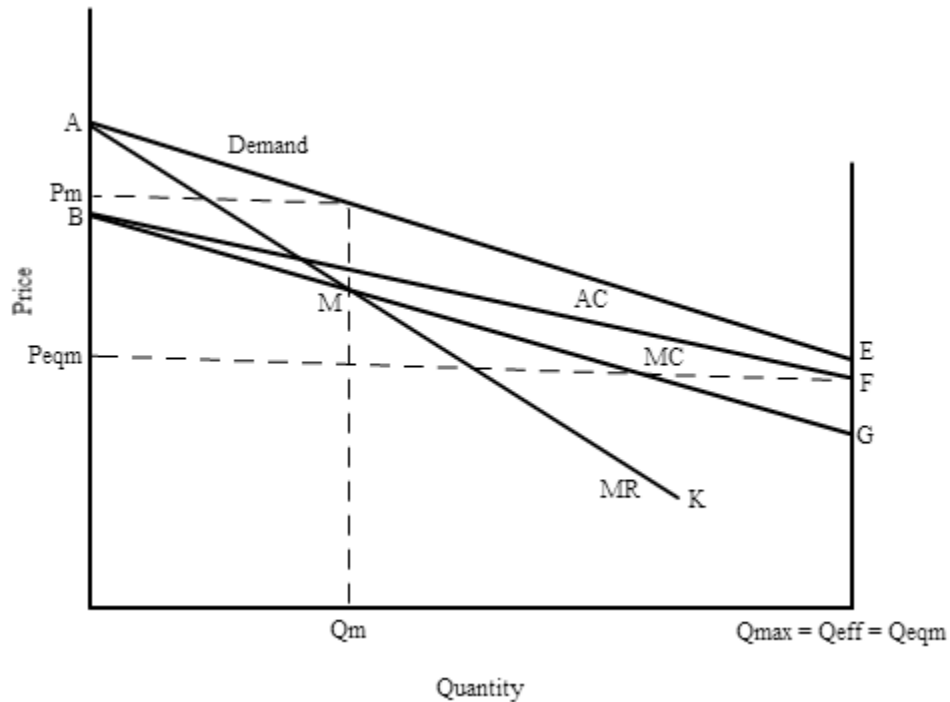


Source: Modified from Einav & Finkelstein (2011)

In addition to the two above depicted extreme conditions it is also possible to show a scenario where a competitive market will produce an efficient allocation but a monopolist will create distortion by providing insurance to a portion of the population. Figure 6 provides a graphical representation of this scenario. AE, BF, AK and BG are demand, average cost, marginal revenue and marginal cost curves respectively. The average cost curve always lies below the demand curve. This leads to competitive equilibrium quantity ( $Q_{eqm}$ ) equal to the efficient allocation ( $Q_{eff} = Q_{max}$ ). Marginal revenue and marginal cost curves intersect at M providing the corresponding monopoly price  $P_m$  and monopoly quantity  $Q_m$ . We can see that insurance allocation under monopoly market ( $Q_m$ ) is less than insurance allocation under competitive market ( $Q_{eqm}$ ).

**Figure 6**

Different Insurance Allocations Under Different Market Settings



Source: Modified from Einav & Finkelstein (2011)

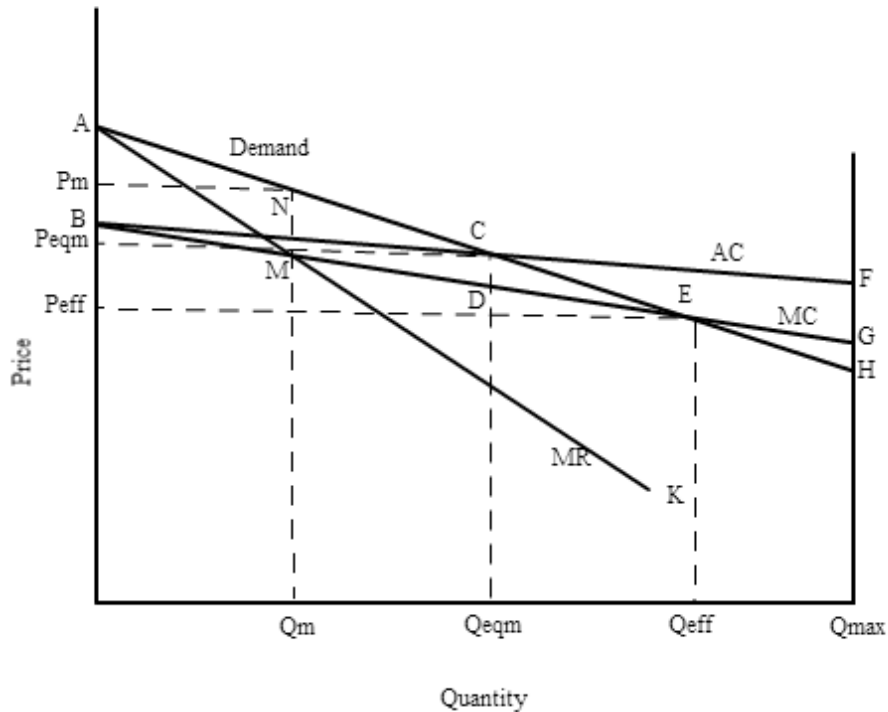
In the original framework under perfect competition Einav and Finkelstein (2011) have also showed how allocation of insurance and welfare loss will change when we introduce two important features of actual insurance markets.

In the original model, first - they introduce insurance “loads” or administrative costs of providing insurance and second - they introduce preference heterogeneity and examine the insurance allocation and welfare loss under both market settings (competitive and monopoly).

Figure 7 provides a graphical representation of insurance allocation and welfare loss for competitive and monopoly markets under adverse selection with additional cost of providing insurance. When we have additional costs of providing insurance for risk averse individuals it can be the case that for few individuals the risk premium is less than that additional cost. In other words, we can say that it will not be socially efficient to allocate insurance coverage to all individuals.

**Figure 7**

**Adverse Selection with Additional Cost of Providing Insurance**



Source: Modified from Einav & Finkelstein (2011)

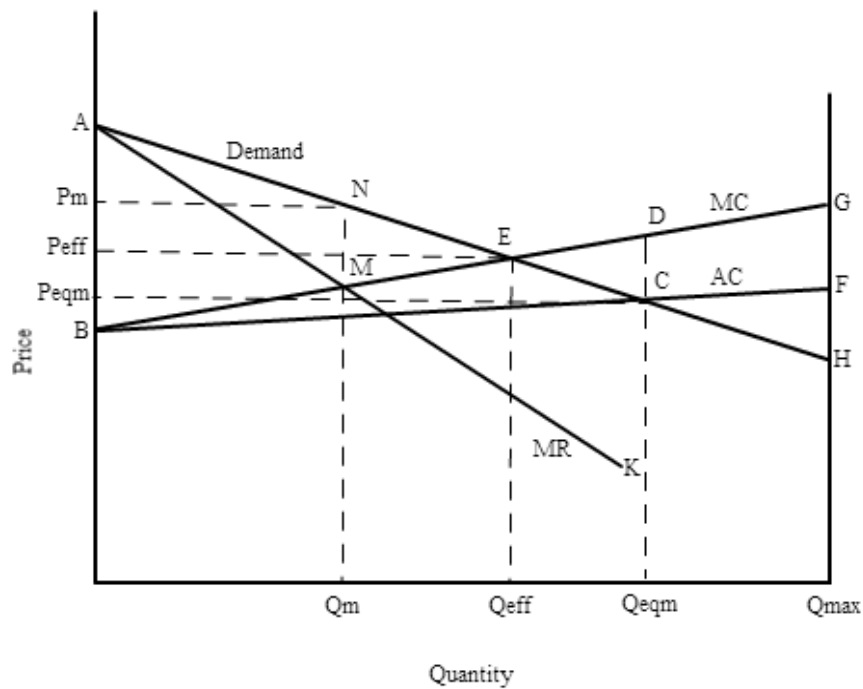
In figure 7 we incorporate the increase in costs (introducing additional costs) by shifting the cost curves upward. AH, BF, AK and BG are demand, average cost, marginal revenue and marginal cost curves respectively. Demand and marginal cost intersect at E determining the efficient allocation of insurance  $Q_{eff}$  which is less than maximum insurance allocation  $Q_{max}$ . Demand intersects average cost at C determining the competitive equilibrium price  $P_{eqm}$  and quantity  $Q_{eqm}$ . We can see that  $Q_{eqm} < Q_{eff}$  creating a deadweight loss CDE. In figure 7 marginal revenue and marginal cost curves intersect at M, providing the corresponding monopoly price  $P_m$  and monopoly quantity  $Q_m$ . From the graph, we can see that the deadweight loss under monopoly (given by NME) is higher than under perfect competition as  $Q_M < Q_{eqm} < Q_{eff}$ .

Figure 8 provides a graphical representation of insurance allocation and welfare loss for competitive and monopolistic markets when we have preference heterogeneity. Preference heterogeneity means individuals can differ in their willingness to bear risk. Preference heterogeneity leads to the possibility of advantageous selection which is the opposite of adverse

selection. Advantageous selection arises from the concept that individuals with highest willingness to pay for insurance can be most risk-averse resulting in lower expected cost. Fang et al. (2008) have found strong signs of advantageous selection in the Medigap market. Under advantageous selection we have upward sloping marginal cost curve as the expected cost of the marginal individual is higher than the infra-marginal individual. Upward sloping MC curve means MC curve will always lie above the AC curve.

**Figure 8**

Advantageous Selection



Source: Modified from Einav & Finkelstein (2011)

From figure 8, we can see that advantageous selection with additional cost of providing insurance generates the mirror image of adverse selection case under perfect competition. Point E (MC curve intersects demand curve) gives us the efficient allocation of PHI,  $Q_{eff}$ . The demand curve intersects average cost curve at C, providing the competitive equilibrium allocation  $Q_{eqm}$  which is higher than the efficient allocation  $Q_{eff}$  resulting in a deadweight loss of CDE due to over insurance. Point M (MC curve intersects MR curve) gives us the monopoly allocation of insurance  $Q_m$  which is lower than the efficient allocation  $Q_{eff}$  resulting in a deadweight loss of

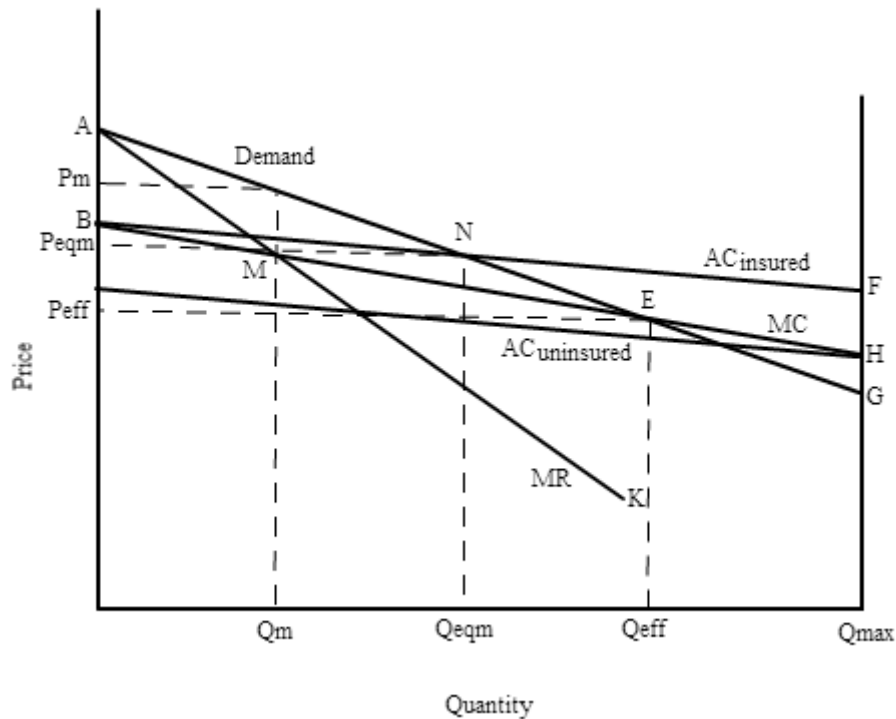
NME due to underinsurance. So, we can see that advantageous selection creates over-insurance under perfect competition and under-insurance under monopoly.

### 9.1 Positive Correlation Test for adverse selection

Using the graphical framework Einav and Finkelstein (2011) have presented a “Positive correlation” test for adverse selection under perfect competition. We will extend the test by incorporating a monopolistic setting. Figure 9 incorporates both perfect competition and monopoly and presents the “Positive Correlation” test.

**Figure 9**

The "Positive Correlation" Test for Adverse Selection



Source: Modified from Einav & Finkelstein (2011)

To construct figure 9 we will begin with figure 7 that depicts the adverse selection case. We know that MC curve is downward sloping when we consider adverse selection. The average cost curve from figure 7 now represents AC<sub>insured</sub> (average cost of those individuals who do have

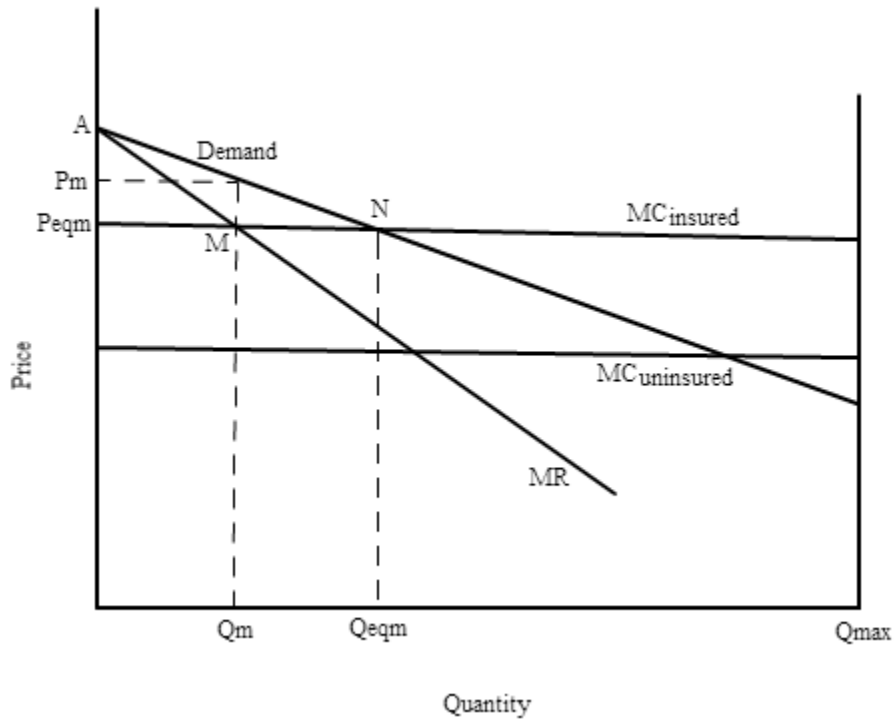
insurance). The authors add another line that represents the average cost of those individuals who do not have any insurance,  $AC_{uninsured}$ .  $AC_{insured}$  is drawn by averaging the expected cost of the insured starting from  $Q = 0$ . The  $AC_{uninsured}$  curve is drawn by averaging the expected cost of the uninsured starting from  $Q = Q_{max}$ . Downward sloping MC curve implies  $AC_{insured}$  is always above  $AC_{uninsured}$ . In figure 9, points E, N, M give us corresponding efficient, competitive and monopoly price and quantity of insurance respectively. We can see that at any insurance price, specifically for monopoly and competitive price, adverse selection implies average cost of insured individuals is higher than the average cost of the uninsured. It means in both competitive and monopoly market under adverse selection insurance coverage and expected costs are positively correlated.

## 9.2 Positive Correlation Test for moral hazard

Einav and Finkelstein (2011) have also presented a “Positive correlation” test for moral hazard under perfect competition. Figure 10 provides the graphical presentation of the “Positive correlation” test for moral hazard (without selection) under both competitive and monopoly market settings. The flat MC curve captures the lack of selection. The authors have drawn two different MC curves to show the existence of moral hazard. The  $MC_{insured}$  curve represents expected cost of insured individuals and  $MC_{uninsured}$  curve represents expected cost of uninsured individuals. Existence of moral hazard implies that expected cost will be higher when an individual is insured. This means  $MC_{insured} > MC_{uninsured}$ . In figure 10, points N and M give corresponding competitive and monopoly price and quantity. We can see that for any given level of insurance price and quantity the expected cost of an insured individual is higher than the expected cost of an uninsured individual. This proves that “Positive Correlation” exists under moral hazard.

**Figure 10**

The "Positive Correlation" Test for Moral Hazard



Source: Modified from Einav & Finkelstein (2011)

### 9.3 Positive Correlation and its (non) relation to welfare costs of selection

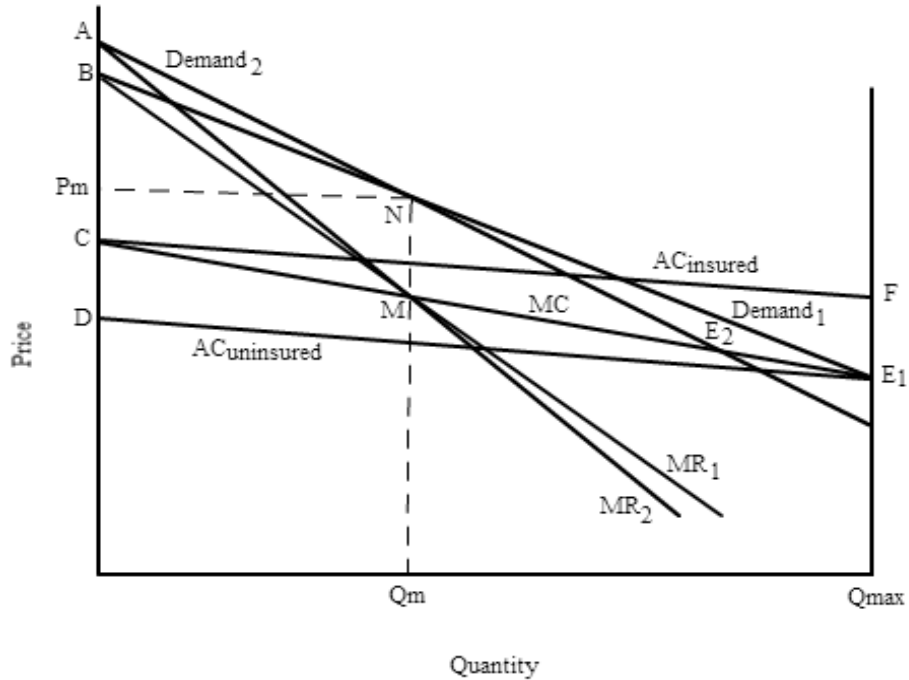
Using the “Positive Correlation” framework Einav and Finkelstein (2011) have proved that under perfect competition different sizes of deadweight loss can be generated even though “adverse selection” as measured by the difference in average costs is the same. We will examine this under monopoly market settings for both adverse selection and advantageous selection.

First, we consider a monopoly market with adverse selection. Figure 11 provides the graphical representation.  $AC_{insured} > AC_{uninsured}$  as the MC curve is downward sloping. We have drawn two possible demand curves, each of which produces the same monopoly price and quantity of insurance (both corresponding marginal revenue curves intersect the marginal cost curve at the same point) while keeping the MC and AC curves unchanged. These two demand curves intersect the marginal cost curve at  $E_1$  and  $E_2$  respectively which generate different efficient

outcomes. From the graph, we can see that the demand curves produce different-size welfare losses given by the corresponding areas  $NME_1$  and  $NME_2$  even though “adverse selection” as measured by the difference in average costs is the same.

**Figure 11**

Adverse Selection

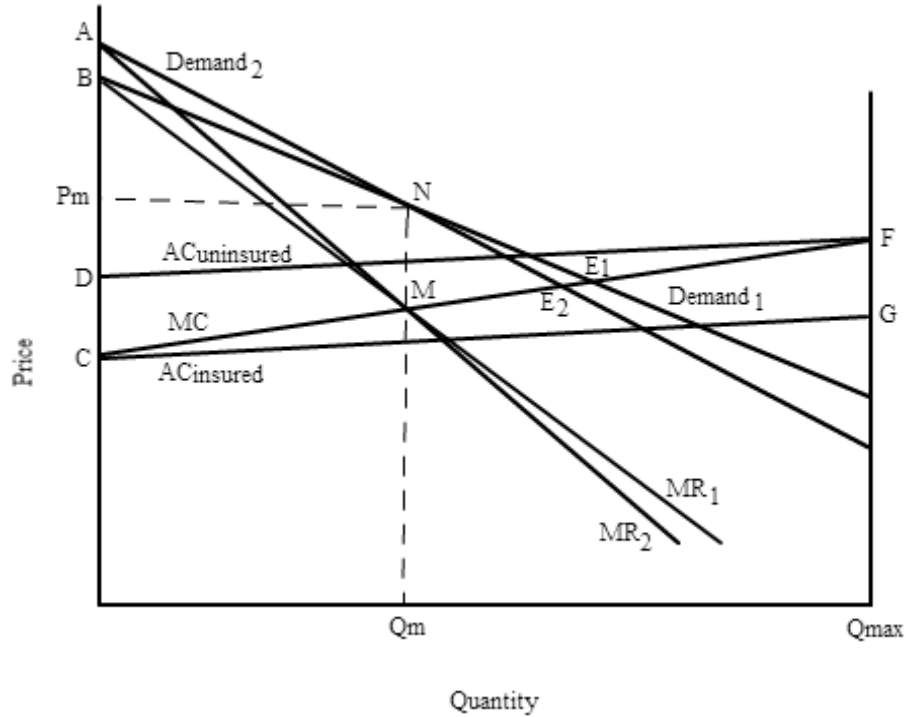


Source: Modified from Einav & Finkelstein (2011)

Second, we consider a monopoly market with the existence of advantageous selection. Figure 12 provides the graphical representation. Here,  $AC_{insured} < AC_{uninsured}$  as the MC curve is upward sloping. We have drawn two possible demand curves, each of which produces the same monopoly price and quantity of insurance (both corresponding marginal revenue curves intersect the marginal cost curve at the same point) while keeping the MC and AC curves unchanged. These two demand curves intersect the MC curve at  $E_1$  and  $E_2$  respectively which generate different efficient outcomes. From the graph, we can see that the demand curves produce different-size welfare losses given by the areas  $NME_1$  and  $NME_2$  even though “adverse selection” as measured by the difference in average costs is the same.

**Figure 12**

**Advantageous Selection**



Source: Modified from Einav & Finkelstein (2011)

## 10. Conclusion

PHI market is often viewed as a tool to enhance efficiency in the health care system. The role of PHI market has always been very important because of its impact on the health system. In an ideal situation, the existence of PHI market is supposed to reduce the burden of the government through cost sharing. However, efficient conditions or social welfare improving conditions are difficult to achieve in this market as all agents can influence the market. The insurance buyers can create distortion through moral hazard, adverse selection and advantageous selection. The proper set of regulations like co-payment and group insurance can reduce inefficiencies in PHI market. Along with implementing regulations a close controlling and monitoring approach can bring about efficient conditions in this market.

The graphical framework in this paper incorporates the assumptions of basic PHI market structure and tries to find insurance allocation and social welfare under perfectly competitive and monopolistic market structures. We believe that this framework will be useful to the policy makers as it provides a comparative study of these two extreme market structures.

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