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The Econometric Analysis of the Principal -Agent Problem Using a Contemporary Employment Contract as a Model

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Abstract
This essay investigates the theory behind principal-agent problems by utilizing mathematical tools and contractual policies for the offered analysis. With a reliance on Boolean Search technique, the essay's study design follows narrative literature reviews. The overall effort has been answering several study questions, which included the following: (a) does the type of contract matter to the two parties—the principal and the agent? (b) what informs the determination of fixed wage? and (c) how does the risk types among the agent and principal influence the type of contract? Also, as a part of the study findings: it has been concluded that the type of prevailing contract or offer matters to both the agent and the principal. A crucial factor of the study is the revealed that fixed wage determination should be tied to the agent's reservation utility and the type of effort embarked on. With regard to the effect of the type of prevailing risk on the offer, it is concluded in the essay that once effort is observable and the agent is risk averse, then such agent has to be insured. The rationale behind the foregoing scenario is the fact that risk sharing becomes possible if the principal is risk neutral. Meanwhile, efficiency demands that it is advisable for the principal to insure the agents, who is risk averse, by offering a wage that does not depend on the variability of profit. The research for the study has revealed further that, in instances whereby both the principal and the agent are risk neutral, then there are several kinds of options made available to the agent, which include (a) fixed wage, and (b) tying wages to efforts when efforts are observable. Also, for the situation whereby a pursued effort is not observable while the agent is risk averse, then the principal has to provide a variety of incentive schemes or structure in the context of the agents for him/her to improve upon his/her utility, thereby either choosing or putting in the right effort. Finally, in a case whereby the requisite effort is not observable and agent is risk neutral, it is advisable that the principal should, in principle, sell the project to the agent for a fixed income (F). Thus, if the agent is risk neutral, then one should allow the agent to face the risk and subsequently for one to choose the optimal effort to maximize the ultimate or expected utility.
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INTRODUCTION:

The principal–agent problem, which cut across such different disciplines as political science, supply chain management, economics and many others, is discussed in theory as either agency dilemma (*Eisenhardt, 1989). Eisenhardt (1989), therefore, defines principal-agency theory in the context of the literature as the relationship between the owner of firm and the agent contracted to manage the firm organization on the owner's behalf. In some organizations for example, the appointment of agent such as executive directors of the company or managers, and the other employees are made by the principal, which maybe the chief executive director of the organization.*

Meanwhile, in economic theory, the principal-agent approach which is also called agency theory is an aspect of the field of contract theory. In the modern corporation, the principals always hire employees to conduct the day-to-day operations of the firm (see Figure 1). Since these employees are hired to be working for the principal, they are therefore paid a salary to represent the interest of the owners, supposedly, to maximize the value of the firm and by so doing help the business to achieve its stated mission and goals. As the norm goes in every organization, a board of directors is elected by the owners to meet regularly with the managers to oversee their activity and to try to ensure by monitoring and assessing the activities of the managers, to ascertain whether they are acting in the best interest of the owners (*Eisenhardt, 1989;* Jensen & Meckling, 1976; Pendergrast, 1999; Szuchman & Anderson, 2013). By taking firms into consideration, we normally have owners of the firms, who hires the agents to work on their behalves.

Very importantly, as rightfully observed from the literature, in situation where contracts between the principal and agents are complete, there is little scope for deviations from the objectives and requirements of the owner of the business or firm and the expected obligations as well as the duties of the agent (*Eisenhardt, 1989;* Jensen & Meckling, 1976; Pendergrast, 1999; Szuchman & Anderson, 2013). The major problem does exist in situations where most of the contracts are incomplete to a greater or lesser degree so that glitches can arise (Jensen & Meckling, 1976; Pendergrast, 1999; Szuchman & Anderson, 2013). For instance, there are instances that some

agents may pursue their own "hidden agenda", by substituting their own objectives for those of the principal of the firm (*Eisenhardt, 1989;* Jensen & Meckling, 1976; Pendergrast, 1999; Szuchman & Anderson, 2013).

A practical case was observed in agent-cost theory by Farlex Financial Dictionary (2009) and Collins Dictionary of Economics (2005) such that some cost that arise from the inefficiency of a relationship between an agent and a principal, in a publicly-traded firm do arises because the employees may act in their own interest at the expense of the owners of the firms' interest. Farlex Financial Dictionary (2009) and Collins Dictionary of Economics (2005) further argued in the literature that such anomalies may arise in specific situations whereby the agents may raise their own salaries to an unrealistic level without taking into accounts the profitability margin of the frim. As part of the solutions suggested in the literature to check the agency cost concept associated with the principal-agent problem, it is argued that the agency costs are best reduced by providing appropriate incentives to align the interests of both the agents and the principals.

Issues that Affect the Clean Contract Between Principal and Agents in a Given Employment Agreement

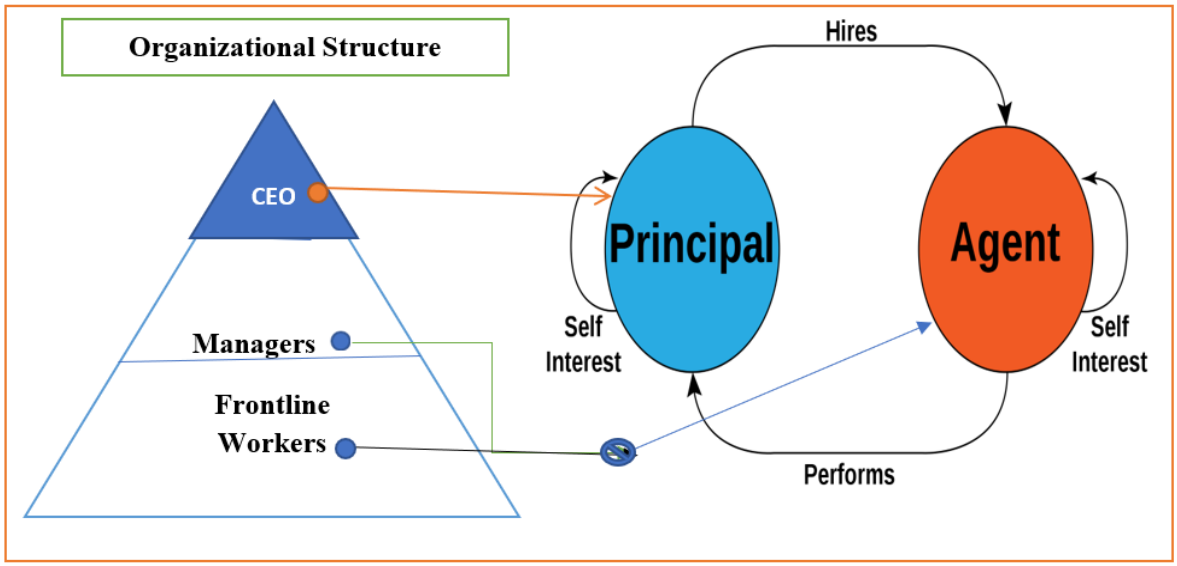
Indeed, it is an undeniable fact that businesses must pay serious attention to the type of contract, incentives, and securities that needs to be given to both the agents and the owners of businesses in order to achieve a balance and conducive business environment. However, it is hard to achieve such a balance due to the concept of self-interest that Adam Smith the father of economics preached to address the principle of liberalism and the free market systems, and some perceived market failure issues such as asymmetric information and moral hazard (Voorn, Genugten, &Van Thiel, 2019). The principal–agent problem typically arises where the two parties have different interests (see Figure 1 for more details) and asymmetric information, that is the agent having more information, such that the principal cannot directly ensure that the agent is always acting in their best interest (Voorn, Genugten, &Van Thiel, 2019), particularly when activities that are useful to the principal are costly to the agent, and where elements of what the agent does are costly for the principal to observe. According to Laffont and Martimort (2002) and Bolton & Dewatripont (2005), the nature of a complete contract could either be written or non-written, and their respective assumptions will also made available. Hence, there are no restrictions on the class of feasible contractual arrangements between principal and agent, but most often the issues of asymmetric information and moral hazard do exist between them in the business environment.

In contract theory and economics, information asymmetry deals with the study of decisions in transactions where one party has more or better information than the other (Wilson, 2008; Ledyard, 2008). This asymmetry creates an imbalance of power in transactions, which can sometimes cause the transactions to be inefficient causing market failure in the worst case. Examples of this problem are adverse selection (Wilson, 2008; Ledyard, 2008), moral hazard, and monopolies of knowledge (Wilson, 2008; Ledyard, 2008).

In economics, moral hazard occurs when an entity has an incentive to increase its exposure to risk because it does not bear the full costs of that risk (Wilson, 2008; Ledyard, 2008). For example, when a corporation is insured, it may take on higher risk knowing that its insurance will pay the associated costs (Dembe & Boden, 2000; Arrow, 1963). A moral hazard may occur where the actions of the risk-taking party change to the detriment of the cost-bearing party after a financial transaction has taken place (Wilson, 2008; Ledyard, 2008). Moral hazard can occur under a type of information asymmetry (Wilson, 2008; Ledyard, 2008), where the risk-taking party to a transaction knows more about its intentions than the party paying the consequences of the risk and has a tendency or incentive to take on too much risk from the perspective of the party with less information (Dembe & Boden, 2000; Arrow, 1963; Wilson, 2008; Ledyard, 2008). One example is a principal-agent problem, where one party, called an agent, acts on behalf of another party, called the principal (Dembe & Boden, 2000; Arrow, 1963).

In particular, asymmetric information is assumed to be favoring agents who (as insiders) are involved in day-to-day management, making it very difficult for principals (as outsiders) to track and monitor the behavior of executive directors within the organization, which in effect may give rise to moral hazard (Dembe & Boden, 2000; Arrow, 1963). This is because, further down the organization, problems of moral hazard are very common among the employees (Dembe & Boden, 2000; Arrow, 1963). At this juncture, it is assumed that the employees indulge in shirking, working at less than optimal efficiency more especially when it comes to the employees working in team and groups.

Figure 1: Principal-Agent Problem



Source: Author's Modification

BRIEF DISCUSSION OF AN ECONOMIC AGENT RISK TYPES

In this particular study, an economic agent could either be the principal or the agent. The agent is someone who actually works for the principal. In economic and finance theory, these economic agents could possess any of the three types of individual risks such as risk averse, risk lovers, and risk neutral (Adu-Frimpong, 2016; Scott, 2020; The Economic Times, 2021). The term risk neutral is predominantly used in both game theory studies and in finance literature. According to Scott (2020), risk neutral refers to a mindset where an individual is indifferent to risk when making an investment decision. He further argued that this mindset is not derived from calculation or rational deduction, but rather from an emotional preference (Scott, 2020). A person with a risk-neutral approach simply doesn't focus on the risk--regardless of whether or not that is an ill-advised thing to do. This mindset is often situational and can be dependent on price and other external factors (Scott, 2020).

On the other hand, The Economic Times (2021) also defined risk lover as a person who is willing to take more risks while investing in order to earn higher returns. The Economic Times (2021) further argued in the literature that when it comes to taking risk for earning returns, different people have different attitudes. Some are risk lovers, some risk averse and some are neutral towards risk (The Economic Times, 2021). Generally speaking, almost all kind of investments that yield lower returns come with lower risks, while the investments that yield higher returns involve higher risks (The Economic Times, 2021). A risk-averse person would prefer investing in fixed deposits, bonds, and many others as they involve lesser risk, while a risk lover would prefer investing his money in stocks as they have the potential to give higher returns than fixed deposits (The Economic Times, 2021).

BRIEF DISCUSSION OF ECONOMIC CONTRACT AND INCENTIVE FORMS

Individual contracts as part of economic contract in general form a major method of restructuring incentives, by connecting as closely as optimal the information available about employee performance, and the compensation for that performance (Jensen & Meckling, 1976; Pendergrast, 1999; Szuchman & Anderson, 2013). Since there are differences in the quantity and quality of information available about the performance of individual employees in the business environment, such as the ability of employees to bear risk, and the ability of employees to manipulate evaluation methods, the structural details of individual contracts vary widely, including such mechanisms as piece rates, share options, discretionary bonuses, promotions, profit sharing, efficiency wages, deferred compensation, and so on (Jensen & Meckling, 1976; Pendergrast, 1999; Szuchman & Anderson, 2013). Characteristically, these machineries are utilized in the context of different types of employment contracts and across different sectors in the economy. The used of the machineries include the fact that salesmen often receive some or all of their remuneration as commission, production workers are usually paid an hourly wage, while office workers are typically paid weekly, monthly and if paid overtime, typically at a higher rate than the hourly rate implied by the salary (Jensen & Meckling, 1976; Pendergrast, 1999; Szuchman & Anderson, 2013).

The secondary sector is characterized by short-term employment relationships with little or no prospect of internal promotion, and the determination of wages by market forces. In terms of occupations, it consists primarily of low or unskilled jobs, whether they are blue-collar (i.e. manual-labor), white-collar (i.e. filing clerks), and

service jobs (i.e. waiters) (Jensen & Meckling, 1976; Pendergrast, 1999; Szuchman & Anderson, 2013). It was observed from the literature that these jobs are connected by the fact that they are considered as low skill levels, low earnings, easy entry, job temporariness, and required low education and experience for entry (Jensen & Meckling, 1976; Pendergrast, 1999; Szuchman & Anderson, 2013). In a number of service jobs as discussed in the literature, such as food service, golf caddying, and valet parking jobs, workers in some countries are paid mostly or entirely with tips (Jensen & Meckling, 1976; Pendergrast, 1999; Szuchman & Anderson, 2013). The use of tipping is a strategy on the part of the managers to align the interests of the service workers with those of the owners and the managers. The availability of tips for the service workers serve as incentive for them to provide good customer service (Pendergrast, 1999; Szuchman & Anderson, 2013).

The issue of tipping is sometimes discussed in connection with the principal–agent theory. Examples of principal-agent problems or scenarios include bosses and employees, and sometimes diners and waiters (Szuchman & Anderson, 2013). In fact, as observed in the literature from the previous discussion, the concept of principal–agent problem, as it is also known in economics, do arises any time agents are not motivated to do what the principals want them to do (Jensen & Meckling, 1976; Pendergrast, 1999; Szuchman & Anderson, 2013). In order to sway the agents, the principals have to make it worth the agents' by providing more incentives structures to entice the agent to do their best. A practical case in United States of America can be observed from restaurants operation. In the restaurant context, the better the diner's experience, the bigger the waiter's tip (Pendergrast, 1999; Szuchman & Anderson, 2013).

MODELING PRINCIPAL-AGENT PROBLEM

The principal is the owner of a firm which could be an individual, a group of people, a community, a government, and the owner of an asset. By assumption, it is believed that the principal hires employees to work for the company, while the agents in theory and practice work for the principal (*Eisenhardt, 1989;* Jensen & Meckling, 1976; Pendergrast, 1999; Szuchman & Anderson, 2013). Note that the agent could range from highly skilled workers such as doctors, physicians, dentists, pharmacists, accountants, teachers, managers, secretaries, loans officers e.tc. to low skilled workers like security personnel, cleaners, laborers and many others who works for the principal (*Eisenhardt, 1989;* Jensen & Meckling, 1976; Pendergrast, 1999; Szuchman & Anderson, 2013). In principle, it is also assumed that the agents are always hired by the principal (*Eisenhardt, 1989;* Jensen & Meckling, 1976; Pendergrast, 1999; Szuchman & Anderson, 2013).

Principal-Agent Problem Models: Perceived Contractual Assumption

In order to effectively model the principal-agent problem that exist within the business environment for both the private and the public sector, then several assumptions needs to be developed to assist the process. Therefore, in this context, the **principal** is assumed as the owner of a firm, while the **agent** is also assumed as the employees such as managers, teachers, executive directors, etc. for both skilled and unskilled. The principal pays the agents a wage that depends on the project profit [i.e. $w(\pi)$ where w=wage and π=profit]. Because profit depends on effort of the agent, therefore, the agent is expected to put in more effort for the project for the principal to get enough profit. The payment to the principal is profit (denoted as π). The profit that a principal can gets depends on the efforts of the agents hired but it is not always the case. This implies that the profit depends on effort stochastically (i.e. with some probabilities). As a result, there exist a wide range of profits since profit is not certain but depends on a stochastic factor like the agent's effort.

Assume also that there are two (2) types of efforts, some points in time efforts can be low (L) and some points in time efforts can be high (H). Let's also assume that effort can be denoted as "e", then e_L = lower efforts and e_H = Higher efforts. Then it is also assumed that the expected profit when effort is low (e_L) is lower than the expected profit when effort is high (e_H). The principal pays the agent part of the profit and take the rest as income [denoted as $\pi - w(\pi)$]. Above all, it is assumed that the principal is risk neutral. The principal is risk neutral because he/she can diversify his/her portfolio by investing the available resources in many different projects. The risk neutral will never put all his/her eggs in one basket. The analyses are based on continues function instead of the discrete function, which in effect takes into accounts an integral function. Since profit depends on efforts based on the stated assumptions, therefore the probability of profit occurring when effort is defined as "e" is given as $f(\pi/e)$; hence the profit function be written as: $\int \pi f(\pi/e_H)\ d\pi > \int \pi f(\pi/e_L)\ d\pi$.

The Agents: Assumptions

To better understand certain choices that agents make in the business environment, it is also appropriate to know some of the perceived assumption that guide the behavior of the agent. Obviously, consumers and employees are free-riders and wish to get everything for free without sacrificing anything for it. Workers wish they get paid without any work-done. Therefore, it is appropriate to assume that agent does not like effort. The agent could be risk averse or neutral but not lovers. Agents do not like to spend more efforts to complete a task if they have their way, therefore, efforts cause disutility to the agent. Agents faces a Bernoulli utility function [denoted as U(w,e)].

This particular utility function has two outcomes including probabilities. It is a concave function in wages, which increases with wages at a decreasing rate [i.e. $U_w>0$ and $U_{ww}<0$].

Daniel Bernoulli proposed that a nonlinear function of utility of an outcome should be used instead of the expected value of an outcome**,** accounting for risk aversion**,** where the risk premium is higher for low-probability events than the difference between the payout level of a particular outcome and its expected value (Allais, 1979; Arrow, 1965). For any given wage [w(π)]; utility from higher effort is lower than utility from lower effort [$U(w, e_H) < U(w, e_L)$], which confirms that, effort causes a disutility to the agents. This implies that as you increase the efforts of a person, it leads to a fall in the person's utility. By using a separable utility function: U (w, e) = V (w) – g (e). We use separable utility because wage is an increasing function in utility [V (w)], while efforts is a decreasing function in utility [g (e)]. Therefore, it can be implied that wages have a positive relationship with an individual utility and efforts also have a negative relationship with utility since efforts serve as a disutility [i.e. $V'(w)>0$, $V''<0$ $g(e_H) > g(e_L)$].

SETTING-UP THE PRINCIPAL-AGENT PROBLEM

There are two cases since profit depends on effort: then effort could be (1) observable and (2) unobservable. Let us consider case 1, where effort of the agent is observable to the principal, then what will be the optimal contract to be given to the agent for him/her to be better-off and to also enable the principal to get the maximum profit.

Case 1: When Effort is Observable

In this case because effort is observable, then an optimal contract needs to be defined. Therefore, the principal will make the offer and the agents will choose to accept or reject the offer. Suppose the principal can make an offer to the agent and the contract specifies the following:

a. Efforts inputs
b. Wages payments

The agent then decides to accept or rejects the offers. If the agent rejects the offer, the principal loses everything since the outcome will be equal to zero (0). So, the principal objective is to make an offer that is likely to be accepted by the agent. The problem of the principal here is that; the firm has to maximize his/her profit by choosing efforts subject to the agent's utility. Therefore, the objective function of the firm is to maximize the profit function of $\int(\pi - w(\pi))f(\pi/e_H)\ d\pi$ subject to agent's utility function of $\int V(w(\pi))f(\pi/e_H)\ d\pi - g(e) \geq U$ represented in both equations 2 and 3 below;

$$\text{Maximize } \int(\pi - w(\pi))f(\pi/e_H)\ d\pi \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

$$\text{Subject to } \int V(w(\pi))f(\pi/e_H)\ d\pi - g(e) \geq U \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

By choosing effort (e_H, e_L), and wages [w(π)]. The agent utility function (represented in equation 3) is also known as the participation constraint. The principal chooses efforts (e) and wages (w(π)) to maximizes his/her net profit (π − w(π)) represented in equation 2, subject to the participation constraint stated in equation 3. Very importantly, readers will observe from equation 2 that if one tends to choose w(π) then the objective function will be negative; hence, is better to write it as a minimization problem instead of maximization. Therefore, the principal tends to minimize the cost of production through wage payments subject to the participation constraint (see below as equations 3 and 4).

$$\text{Minimize } \int(w(\pi))f(\pi/e_H)\ d\pi \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4)$$

$$\text{Subject to } \int V(w(\pi))f(\pi/e_H)\ d\pi - g(e) \geq U \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

By using the concept of Lagrangean multiplier, help us to better set-up and analyze the problem by choosing wage [w(π)] to find the first order condition (FOC) associated with the derivatives analysis:

$$L=\int(w(\pi))f(\pi/e_H)\ d\pi + \gamma\{U - \int V(w(\pi))f(\pi/e_H)\ d\pi + g(e)\}$$

To solve the problem, and guide the policy maker in the real world, the first order conditions must be obtained, and this is given below;

$$\text{FOC: } f(\pi/e_H) - \gamma V'(w(\pi))f(\pi/e_H)=0 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (5)$$

$$(1-\gamma V'(w(\pi))\ f(\pi/e_H)=0$$

$$\frac{1-\gamma VI(w(\pi))\ f(\pi/e_H)=}{f(\pi/e_H)} = \frac{0)}{f(\pi/e_H)}$$

$$1- \gamma V'(w(\pi))=0$$

$$1= \gamma V'(w(\pi)) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (6)$$

$$\frac{1=}{V'(w(\pi))} = \gamma \frac{V'(w(\pi))}{V'(w(\pi))}$$

$$\frac{1}{V'(w(\pi))} = \gamma \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (7)$$

Therefore, the equilibrium condition becomes $\frac{1}{V'(w(\pi))} = \gamma$ but γ has to be positive$(i.e.\ \gamma > 0)$ for the participation constraint to binds. The agent would only accept the offer at the point where the participation constraint binds, so

that he/she can attain his reservation utility. The agent's participation constraint will bind up to a point where the expected utility $[\int V(w(\pi))f(\pi/e_H)\, d\pi - g(e)]$ equals the reservation utility (U).

Agents' Attitude towards Risk

Risk Averse: In the real-world agents are not risk lover. An agent could either be a risk averse or neutral. Here the agent whose earnings comes from a sole principal without having any other source of income earning is termed as a risk averse agent. The agent in question has no other source of earnings from elsewhere; the agent only relies on the payment given to him by the principal. In such case, such agent who is risk averse has to be insured, since the agent has no other option aside your work. The principal has to tell the agent that he will be paid a fixed wage whether the company is doing well or not, in order for the agent to accept the offer for the participation constraint to binds. Here effort is observable, so the principal has to protect the agent. If $V^I(w(\pi))$ <0: Then it means that the optimal wage is fixed. The rationale behind this is that; this is for risk sharing. Since the principal is risk neutral then efficiency demands that it is advisable for the principal to insure the agents, who is risk averse, by offering a wage that does not depends on the variability of profit.

How Do We Determine the Fixed Wage?

The fixed wage is always determined at the point where the participation constraint binds.

Thus, $\int V(w(\pi))f(\pi/e_H)\, d\pi - g(e)) = U$ Note: $\int(w(\pi) = w^*$

Therefore, $U= V(w^*) - g(e)$ …….. (8)

From equation (8) make $V(w^*)$ the subject; to get: $V(w^*)= U + g(e)$. Therefore, by dividing through the equation $V(w^*)= U + g(e)$ by 'V', we arrived at: $\frac{V(w*)}{V} = \frac{U + g(e)}{V}$ or equation 9 below:

$w^* = V^{-1}(U + g(e))$……..…… (9)

Therefore equation (9) represents the fixed wage which takes into accounts the agents reservation utility and effort into consideration before it is set. Hence, given $U= V(w_L^*) - g(e_L) = V(w_H^*) - g(e_H)$, then it can be deduced that if $g(e_H) > g(e_L)$ then $w_H^* > w_L^*$ …… (10)

The condition holds that, if you want higher wages (i.e. higher optimal wage W_H^*) then the agent has to put in more or higher efforts (e_H). Conversely, if you want lower optimal wage (w_L^*) then less effort (e_L) is required.

Case 2: Deciding the Optimal Contract for a Case Where the Agents is Risk Neutral

Once the agent is assumed to be a risk neutral, then it is believed that the agent has diversified his/her portfolio on several jobs to increase his/her sources of income earning. Given the equilibrium as $\frac{1}{V^I(w(\pi))} = \gamma$ (recall equation 7). When the agent is risk neutral, then $V^I(w(\pi))$ should be constant for $\gamma > 0$. At that point the principal can choose a fixed wage for the agent, when effort is observable. But the principal does that when he/she is also a risk neutral and the agent's effort is also observable. Because the principal as a risk neutral is indifferent in terms of his/her financial abilities and capabilities, he/she can choose to protect the agent or not without going bankrupt. So, if the agent is risk neutral, there are all kinds of option available to him.

- The fixed wage is one of several options that are available to the principal.
- Also, if efforts are observable, then wages can be sets according to efforts. The fixed wage is optimal when the principal expects greater returns in future.

Case 3: Optimal Contract when effort is not Observable

Let's assume for the case of marketing for a product within the telecommunication companies (for example MTN company in Africa) and any of the insurance companies (such as Star assurance, etc.) for the purpose of the analysis. If MTN or Star assurance sent people to go out to work for them by marketing their products to the general public, in fact, when the people go out there to work for the company, you will realize that efforts are not observable. The main issue here is to come-out with a contract that will specify efforts and wages base on the outcomes. Since outcome depends on efforts. The firm will have to know the efforts. The principal has to provide some incentives schemes or structure to the agents for them to improve upon their utility, thereby choosing to put in the right effort.

In Conclusion:

Towards this end, when efforts are not observable and the agent is risk neutral, then for maximization purposes what the principal does is that, the principal maximizes the net profit by choosing a fixed amount (F) of money for daily, weekly, and monthly sales base on preference. For instance, the principal can tell the agent to make daily or weekly or monthly sales of $400 amount of money and take the rest of the money since efforts is not observable. Here the principal's net profit objective function can be stated as: Maximize $\int(\pi - F))f(\pi/e_H)\, d\pi$ by choosing effort (e), subject to the agent's wage—which is defined in this context as the difference between the principal profit and the fixed amount [i.e. wage= $w(\pi)= \pi - F$] and the utility function of the risk neutral [i.e. U (w, e) =V (w) - g(e)].

At this juncture the principal in principle sells the project to the agent and receives a fixed income (F). Since the agent is a risk neutral, he can absorb the risk and move on. Hence, the principal faces no risk. So, the agent will choose efforts to maximize profit because if profit (π) goes up by putting in more efforts the agent gets more as a wage at the end of the sales. Some emblematic examples include taxi drivers, MTN sales reps, commission

forms of payment, and many other sales and marketing jobs. In the nut-shell, it is advisable to conclude that if the agent is risk neutral then one should allow the agent to face the risk and subsequently for one to choose the optimal effort to maximize the ultimate or expected utility.

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