Credibility of earnings from a principal-agent coalition perspective

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The paper examines the basis of performance measurement between principal and agent. There is a need for an objective and measurable performance measurement. The most common performance measures in practice are based on earnings as reported in the financial statements. The relationship between the principal and agent is characterised by informational asymmetry and mutual distrust. For this reason it is essential to define objectively measurable earnings categories that can serve as a basis of performance measurement between the principal and its agent. The very situation created by the principal-agent problem causes that the two have different perceptions of earnings. This paper researches the question, how do the different income categories satisfy the criteria of credibility, objectivity and non-manipulability for earnings measurement. Three earnings categories are used that satisfy different levels of realisation. We conclude that only monetarily realised earnings are the category that satisfies the credibility criteria making it the intersection between the acceptable earnings to both principle and agent. We propose implementing this earnings realisation model in measuring performance and for the agents’ compensation schemes, because principles will be able to minimise agency costs when opting for more credible earnings categories.

Keywords: Principal-agent problem, earnings manipulation, agency cost

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1 Introduction

The principal-agent problem is essentially concerned with economic interest, and signifies a market coordination problem, a negative externality. (Bodó 1996)

The problem is rooted in that the goals of the principal are different from that of the agent commissioned to perform executive tasks. Both parties endeavour to maximise their own utility, but too often this venture comes at the expense of one another’s utility. The different goals often come paired with informational asymmetry, whereby the principal is less informed about the momentary state of the course of business, and the immediate factors affecting it. The deviant goals and informational asymmetry lead to mutual distrust between the principal and the agent. This prompts the principal to link performance measures to certain objective and quantifiable attributes. Such an attribute may be earnings generated by the agent that has to satisfy the criteria of objectivity and unmanipulability, as expected by the principal. Ronen and Sadan research long periods
of earnings manipulation and their effect on firm image that influence the trust and therefore decisions of principals. (Merchant 1989) (Ronen and Sadan 1981) This assumption, however, does not take into account honest agent behaviour. According to Gömöri (2001) the agent, as a well-informed participant, is interested in easing the concern of the principal by giving out signals. On the other hand, the less-informed principal tries to use controls to filter the true information content of the well-informed participant.

The best performance measures of the agent’s work are the earnings generated by him. Often, the compensation of the agent is linked to these earnings whereby the incentive scheme rewards the agents for achieving higher earnings. Friebel and Guriev (2005) show that earnings manipulation is related to the compensation scheme of management (agent).

The creators of compensation schemes should be aware of this relationship, however, and must take into account the conflicting interest that lead to mutual distrust. The principal is capable of taking certain actions to reduce the distrust and the agent risk factors by knowingly selecting earnings categories used for performance measurement.

Matsunaga and Park (2001) proxy credibility of earnings by linking analyst forecast to reported earnings. In their paper, they show that management and particularly CEOs, have monetary (or other economic) incentive to meet quarterly analyst earnings forecasts as well as minimize year-on-year earnings changes. (pp 313) By this, surprises in quarterly earnings reporting reflect adversely on managerial compensation. Earnings credibility was also approached by Bhattacharya et. al. (2003) by trying to allocate value for credible earnings. They model the credibility of earnings through a latent variable called “opacity of earnings” that was measured by three factors: earnings aggressiveness, loss avoidance and earnings smoothing. Earnings credibility is also signaled by the “perceived credibility of earnings report audited by certain Big 8 firms.” (Teoh and Wong pp. 346) The pay-for-performance arrangement of management compensations, detecting for earnings management is a highly published topic (see. Dechow et. al(1995), Thomas (1989)

This paper aims at addressing the problem of credibility of earnings. We identify earnings of an enterprise as falling into three distinguishable categories: unrealised earnings, realised earnings, and monetarily realised earnings. We apply these earnings categories to the earnings used as the basis of performance measurement in the principal-agent problem.

2 The principal-agent problem

Tirole (2006) introduces a principal-agent based model that sets the incentive constraint of the agent and the participation constraint of the principal. In this model, the earnings generated by the firm (R) is shared between the principal and the agent by the amounts \( R_p \) and \( R_a \) respectively. From this comes:

\[
R = R_p + R_a
\]
The agent has the opportunity to take advantage of a certain private benefit or earnings (denoted B) if working with low effort (L). Let \( p_H \) denote the probability of success in the project when the agent exerts high efforts and let \( p_L \) be the probability of success in the project when the agent exerts low efforts. The principal has to create an incentive scheme that satisfies the below incentive constraint:

\[
p_H R_a \geq p_L R_a + B
\]  

(2)

This implies that the agent’s reward when exerting high efforts should exceed the reward in the case of low effort combined with the attained private benefit. The pledgeable income to the agent can be derived from this incentive constraint as follows:

\[
\Delta p R_a \geq B
\]  

(3)

\[
R_a \geq \frac{B}{\Delta p}
\]  

(4)

Where \( \Delta p \) is the difference between \( p_H \) and \( p_L \). Based on this, the largest, and yet incentive compatible pledgeable income to the principal is:

\[
P = \max p_H R_p = p_H \left( R - \frac{B}{\Delta p} \right)
\]  

(5)

Tirole derives both the agent’s incentive scheme, and the principal’s investment constraint from the business earnings, \( R \). We argue here, that to be able to implement the investment and participation constraints of Tirole’s model, we have to determine what earnings are. The earnings of an enterprise as reported by the financial reports are susceptible to manipulation and subject to the prevalent accounting policies. We argue, that there is a need to establish earnings categories that are free from the possibility of manipulation, i.e. they are objective, and are measurable and identifiable regardless of the accounting policies of an enterprise. We base the categorisations on three criteria:

1- Material realisation: this looks at whether physical exchange of goods or services materialised,
2- Acknowledging realisation: who acknowledges realisation of earnings? Is it the agent or principal or a third party? Where is the intersection point between the two participants?
3- Valuation of the exchange property: whether valuation of the asset takes place according to expected market value, or acknowledgment of third party, or by the eventual monetary fulfilment. The valuation is what gives us earnings after the deduction of the costs incurred.

We argue, that these criteria enable each economic transaction to be categorised, objectively, into one of the three earnings categories. We also argue that each transaction goes through all three earning categories. However, due to the need of
accounting at the end of each discrete fiscal period, there is a need to differentiate between earnings in their different realisation.

Here we introduce the realisation states that determine the categories of earnings.

3 Earnings categories

It can be stated, therefore, that the most appropriate measure of agent performance are the earnings associated with the work accomplished. To put this theory into practice, there is a need to operationalise the economic concept of earnings. This operationalisation is indispensable when creating the specific measurement processes by which earnings are observed and determined empirically.

Economics largely regards earnings as an individual measure, and the principal-agent problem cannot put into use the individualistic earnings for performance measurement purposes. The need arises for a collectivist approach to earnings. To define the collective – whose earnings we are looking for – we will view it as a coalition. In a principal-agent context the coalition is established between the participants (both principal and agent) through contracts that define their legal relationship. Therefore, earnings that form the basis of performance measurement in a coalition can be explained, in practice, by using the earnings as defined by the total accounting method.

In accounting, earnings are the difference in wealth at the end and at the beginning of the accounting period. The wealth at the beginning of the reporting periods is denoted by $I_{t-1}$ and $I_t$ is the wealth at the end of the period. $R_T$ earnings are a result of net asset value change throughout the lifecycle of the enterprise.

$$R_T = I_t - I_{t-1}$$

This approach would be called the “total income accounting” that spans the total period of a coalition’s lifetime, from the start to end. (Campos et. al. (2001), and Baricz 1994) In reality, for non-project businesses, it is difficult to capture total earnings for the whole lifetime of the coalition. The total income accounting method is therefore a good theoretical approach but it is unfortunately not practical, because the life of each principal-agent coalition is longer than the period during which the principal can dispense with information about the business. There exists an informational asymmetry that is the basis of the mutual distrust between principal and agent. For this reason, the lifetime of a business project is divided into periods that are short enough to enable the measurement of the principal’s performance. The change in the status of wealth for these short discrete periods results in the same change in wealth as if the total income accounting were used. In accounting, the discrete periods are known as reporting periods or fiscal years.

To derive the earnings of each discrete period, accounting utilises several global earnings categories, collectively denoted by $R_a$ (comprehensive earnings). The aggregate of the $R_{a1-n}$ in all the periods equal the total income earnings $R_T$. This is consistent with:
A period’s income $R_{1-n}$ derived by the different asset valuation methods are grouped in Figure 1 below.

Figure 1 shows earnings categories differentiated based on asset change and the realisation principle.

This principle materialises in two forms, a materially realised form and a monetarily realised form. According to the material realisation principle, a change in asset value becomes part of earnings in the event that the asset exchange between the coalition partners materialises and the recipient acknowledges the liability on the asset towards the seller. After such an exchange, the ownership and risks related to ownership of the asset are borne by the buyer.

Monetary realisation is based on asset change in a coalition whereby the exchange of the asset materially takes place and the liability is duly settled in monetary terms. The new owner bears the benefits and risks associated with the asset.

Unrealised earnings $R_m$ are the residual of the market value of end-of-period assets and the incurred costs related to those assets. In other words, unrealised earnings $R_m$ are based on the change in the wealth $I_t^m$, valued using the unrealised principle, in times $t$ and $t-1$.

$$R_m = I_t^m - I_{t-1}^m$$

That is
\[ R_m = Inc_m - Ex_m \]  \hspace{1cm} (9)

Where

- \( Inc_m \) expected **market value** of the assets at the end of the period.
- \( Ex_m \) costs incurred in relation to the assets.

**Realised earnings** are associated with the name of Schmalenbach (see Baricz 1994). The \( R_r \) realised earnings are the residual of the materially realised performance as acknowledged by a third party, and the resources used. Realised earnings \( R_r \) are derived by changes in \( I_r' \) wealth value based on the realisation principle, in times \( t \) and \( t-1 \).

Therefore:

\[ R_r = I_r' - I_{r-1}' \]  \hspace{1cm} (10)

That is

\[ R_r = Inc_r - Ex_r \]  \hspace{1cm} (11)

Where:

- \( Inc_r \) are the materially realised assets during a time period as **acknowledged by third parties**.
- \( Ex_r \) are the costs incurred.

**Monetarily realised earnings** are also based on material realisation but have a further constraint that requires monetary fulfilment. The material exchange of goods or services is not sufficient in this case, and the third party acknowledgement of the counter-value is also not sufficient. A monetary fulfilment is the signal of the earnings in this category. \( R_f \) earnings are the change of monetarily realised wealth \( I_f' \) in times \( t \) and \( t-1 \) such that:

\[ R_f = I_f' - I_{t-1}' \]  \hspace{1cm} (12)

That is

\[ R_f = Inc_f - Ex_f \]  \hspace{1cm} (13)

Where:

- \( Inc_f \) value of assets that are materially realised and monetarily fulfilled.
- \( Ex_f \) are the costs incurred in relation to the assets by the end of the period.

Therefore, the aggregate changes in the wealths \( I \) of the coalition make \( R_a \), the comprehensive earnings of the firm. This means that comprehensive earnings is a sum of the three earnings categories as follows:
\[ R_a = R_m + R_r + R_f \]  
\[ R_T = R_{a1} + R_{a2} + R_{a3} + \ldots + R_{an} \]  

where \((1, 2, 3, \ldots n)\) indicate the reporting period.

Earnings derived at each realisation category have to hold for:

\[ R_T = R_{m1} + R_{m2} + R_{m3} + \ldots + \ldots R_{mn} \]  
\[ R_T = R_{r1} + R_{r2} + R_{r3} + \ldots + R_{rn} \]  
\[ R_T = R_{f1} + R_{f2} + R_{f3} + \ldots + R_{fn} \]  

The aggregate of earnings in any realisation categories have to give \(R_T\), the total income accounting earnings, if taken from beginning to the end of the business lifecycle. This is because at final liquidation of the business, the available cash for the coalition partners is the same regardless of the realisation principle used in valuation.

Let us see the effect of each realisation category on the credibility of the earnings reported by the agents.

4 Credibility and risks of earnings categories

The situation created by the principal-agent problem can have an acceptable category of earnings measurement that lies in the intercept of earnings acknowledged by both principal and agent. We review the implications earnings categories with regards to credibility and the risks it bears.

Measuring coalition earnings for the purpose of performance analysis is laden with informational asymmetry. We introduce earnings categories in discrete periods at different risk levels according to credibility and the inmanipulability. The individual earnings categories with their associated risk factors are summarised in Table 1.
Table 1. Earnings categories and uncertainty levels

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Level of credibility</th>
<th>Cause of Credibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Unrealised earnings</td>
<td>Low credibility</td>
<td>The change of assets relies on an estimate that is practically difficult to verify.</td>
</tr>
<tr>
<td>2</td>
<td>Materially Realised</td>
<td>Medium credibility</td>
<td>The exchange is acknowledged; therefore the asset change is quantified. Monetary realised however is still unrealised.</td>
</tr>
<tr>
<td>3</td>
<td>Monetarily Realised</td>
<td>High credibility</td>
<td>The material exchange is acknowledged, and related liabilities are monetarily settled.</td>
</tr>
</tbody>
</table>

The figure shows that the implementation of the realisation principle provides a natural signal of credibility to participants outside the coalition of the coalition’s earnings at each realisation level. Therefore, earnings presented along the realisation principle is credible at the level of realised, and that enjoys the acknowledgment of third parties. Whereas in the case of unrealised earnings is derived from asset changes that are based on estimates of the coalition partners, and are therefore unauditible to third parties. Maintaining these natural signals provide objective measures with reduced risk of manipulation.

Figure 2a below shows the timeline with different economic transaction that evolve through the phases of realisation. Each transaction starts as unrealised earnings ($R_{rm}$) then become realised ($R_r$) and eventually ends up monetarily realised ($R_f$). If the economic transaction fails to pass to the final $R_f$ level, then we do not consider it accomplished and therefore we do not include it. Throughout the lifecycle of the business enterprise, the total income accounting method will yield the same total earnings as when the earnings of the same categories are aggregated. For the sake of financial reporting, we take the example of the second fiscal year, ending in $t_2$. (Figure 2b) The agent would acknowledge even the lowest realisation standard earnings as a basis of performance measurement as shown in Figure 2b, however, this comes at high agency costs. The principal, in order to reduce agency costs will endeavour to raise the level of credibility by choosing a higher level of realisation. (Figure 2c and 2d)
Each transaction passes the three phases of realisation with time. To report earnings in a fiscal year, only transactions concerning that period are considered. The agent would acknowledge transaction at any realisation stage, but the principle is interested in acknowledging the highest realisation stage which would make the earnings more credible (panel c and d).
5 Impact on agency costs

The concave payout function of the principal and convex shaped payout function of the agent are source of different incentives and aims. This causes that the informational asymmetry be the source of great distrust between the principal and the agent. The effort and costs that accompany the observation and control of the agent are known as agency costs. (Jensen and Meckling 1976) The lower credibility there is in the earnings reported by the agent, the higher the agency costs will be. Therefore, as the principle pushes for more credible earnings, the lower the agency costs will be. This relationship can be demonstrated in Figure 3 below. The diminishing marginal utility known in economics is also applicable to the inverse function between earnings credibility and agency costs.

![Figure 3. The inverse relationship between the credibility of earnings and the associated agency costs.](image)

6 Conclusion

The paper introduces the principal-agent problem from the perspective of informational asymmetry regarding earnings that is often the basis of performance measurement and compensation of the agent. In the case of total accounting such a counting would not pose a problem, however, this theory is inapplicable in most cases where a coalition contract spans several reporting fiscal periods. For this reason there is a need for a reliable signal that accredited the proper distribution of income over these periods. We draw on the realisation principle as to provide natural signals in affirming the coalition’s earnings. Materially realised earnings provides a degree of credibility, as the coalition partner have quantified the change in assets, and therefore earnings may be derived as the difference between the value of assets between two discrete point in time. However, monetary settlement is merely a promise. A higher degree of confirmation of informational clarity and inmanipulability of earnings is the monetarily realised income. The exchange does not only take place physically, but is followed by monetary settlement. In such a case, we see risk coming from earnings manipulation as low. We
conclude that only monetarily realised earnings are the category that satisfies the credibility criteria making it the intersection between the acceptable earnings to both principle and agent. We propose implementing this earnings realisation model in measuring performance and for the agents’ compensation schemes, because principles will be able to minimise agency costs when opting for more credible earnings categories.

Sources


