A RADICAL APPROACH TO RISK IN PROJECT FINANCIAL MANAGEMENT

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In construction, the organisation's structure, activities, functions and the environment under which they operate have become highly complex. Despite significant improvement in the sophistication of business analytical tools, the increasing level of uncertainty has placed risk management in the forefront of business activity. However, there is no clear-cut recipe for risk management. Organisational attitude toward risk varies from one extreme to another. It appears that the general recommendation is that risk should be contained and uncertainties minimised. In this paper the concept of risk is considered from a different perspective. It is argued that while all efforts to minimise uncertainties are justified, business risk should also be considered as an instrument for gaining advantage. The paper examines the above contemplation within the context of project financial management and its relation to an organisation's corporate financial objectives. A forecasting model, developed by the author, is used to apply the above notion to a case-example, as a scenario, to a real past school project. The results suggest that a proactive approach to project financial management can yield benefits to all parties involved in the project.

Keywords: cash flow, corporate objectives, financial management, risk

INTRODUCTION

In the light of the increasing level of complexity in today's business environment, the need for a visionary and proactive management has never been so apparent. The question of risk in decision making arises from the fact that there are alternative courses of action each with a different outcome. One of the main responsibilities of the management, particularly at the corporate level, has been to deal with risk and the role of risk as a business imperative has long been recognised. Generally, risk is viewed within the context of probability of different outcomes (Hayes et.al., 1987, The Royal Society, 1983, Hertz and Thomas, 1984, and Smith , 1999). Also, the general attitude towards risk is its identification, evaluation, control and management (Cooper and Chapman 1987, Chapman and Ward 1997, Tummala and Burchett, 1999 and Ward, 1999).

Often, risk is portrayed like a disease, something to be avoided, attacked or eliminated: like many others, in their definition of risk, Beck (1986) and Chicken and Posner (1998) emphasise on the word "*Hazard*". Ward (1999) on the other hand, comments that "*some risk may arise at any time and recur through the life of the project. Such risks require continuous attention unless effective action to remove them can be taken*". However, what has not been fully recognised and forms the premise of this paper, is the potential benefits hidden in the exploitation of unpredictability and risk. If risk is an inevitable part of business decision making, then it can also be seen

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and exploited as a potential source of advantage. Therefore, there may be merits in arguing that risk management should not be limited to the containment of risk but it should be extended to its exploitation and its controlled accommodation in business decisions. With this perspective on risk, this paper examines the function of cash flow forecasting and management and its relationship with the firm's corporate objectives.

In construction, cash flow problems are a major source of insolvency. The problems with the flow of cash along the chain of recipients was formally recognised as early as 1960s when the Banwell Report noted the importance of prompt payments and the need for a procedure to secure the proper flow of money (Banwell Report 1964). Three decades latter similar concerns are echoed by Latham (1994) and Egan (1998). Another consequence of the chain-payment structure is the repercussions of the failure of one party on the other parties. This is true about all actors: the failure of the bank to support the client, the contractor or the sub-contractor, or the contractor' failure to sustain work, are examples where all other parties are affected, each to a various degree ranging from loss of income to a full-blown bankruptcy. Even, in situations where there are no obstacles in the flow of cash along the chain, there is often a considerable delay before those at lower levels receive payments.

Many firms take a risk of insolvency by entering a contract(s) without due consideration to their financial capabilities (Pizzey 1985). On the other hand, there are other firms that follow the advice that they should avoid the risk of insolvency by placing their financial evaluation as the basis of the decision to bid (Ashley and Teicholz, 1977). These two extremes fail to recognise that submission to risk and its avoidance are the two sides of the same coin. Whereas, embracing risk in a composed fashion can yield favourable outcomes.

The above assertion is examined and tested in this paper. To this end, a financial forecasting and management model, developed by the author, is used to forecast project cash flow which is then contrasted against the corporate objectives of the firm. Thenceforth, through the examination of a number of cash flow variables, the contractor prepares for negotiations where concessions are made to other parties. This is also demonstrated by examining a scenario which is based on a real school project.

PROJECT FINANCIAL MANAGEMENT

The issues surrounding project cash flow have had profound impact on the performance of firms in construction industry. These range from low performance to bankruptcy. Cash flow problems can result in the contractor compromising quality leading to claims for defects by the client, Cooke and Jepson (1986). Also, cash flow problems of one project tend to draw attention and resources away from other areas of the firm (Davis 1991). These may include cutting costs, reduction in managerial and other human resources and cash injection. On the extreme side, simply, without payment, a successful firm with good workmanship, good order book and dedicated workforce, "will die". Bird (1992). Liquidity as the ultimate cause of insolvency (Davis1991), has been a major issue in construction, as the contractor or sub-contractors fail to meet their liabilities to the financial institutions and suppliers. Firms often find it difficult to obtain the right amount of funds and at reasonable interest rates (Edge 1988). These are characteristics that exist in depressed as well as buoyant economic periods. During the boom periods, though tempting, over-trading has been a serious source of cash problems, when the capital-base of the company cannot support its rapid growth (Burnett 1991). A firm may enjoy business based on a healthy

workforce, secures Profit and Loss account and in possession of adequate number of projects and yet fall victim of cash flow crisis. The firm may take refuge behind a false sense of security produced by booming sales and high profitability but in shortage of liquid cash to fund the project, as much of the profit is tied up in the work in progress and interest payments. This is particularly true for the low-asset firms. Further, insolvency can take place in a brief period of temporary cash shortage (Clegg1991).

A firm's financial standing is affected by retention, under-valuation, delay in payments, interest charges and a host of other variables. Hillebrandt and Cannon (1990) highlight industry's simplistic attitude towards cash flow analysis and the lack of attention to a range of influential variables.

Forecasting models

In view of its importance, project evaluation from financial perspective received significant attention, particularly during the 1980s. The need to generate a reasonably accurate forecast followed by monitoring and control of the progress resulted in the development of a number of categories of forecasting models. The basic mechanics of forecasting cash flow is simply explained by Harris and McCaffer (1995). They highlight the importance of duration of new projects, the profit margin, the retention, the delay between corresponding receipts and payments, phasing of the project in relation to other projects, settlement of claims, and the credit arrangements with sub-contractors, suppliers and plant providers. In the elemental approach, the level of the accuracy of the forecast is closely associated with the level of detail. However, the time and cost overhead that are required for elemental or activity-based forecasting does not always justify the outcome and there is no evidence suggesting that this approach generates satisfactory results (Gunner, J. and Betts, M. 1990).

The dissatisfaction with the performance of activity or elemental approach led to a surge of research efforts, in the 1970s and 1980s, in search of viable, fast, cheap and easy forecasting models. Subsequently, the mathematical approach gained momentum and provided an opportunity for further experimentation.

Kenley and Wilson (1986) argued that the variation within the 'S' curve of categories or groups of project is too great to warrant a single function representation, thus, each project is unique in its financial behaviour. Nevertheless, several researchers investigated the ability of mathematical models to encapsulate the general laws and principals of various categories of project either within their mathematical expression [e.g. Hardy (1970), Bromilow and Henderson (1977)], or through their parameters driving specific information from a database [e.g. Khosrowshahi 1996].

Proposed model

The model adopted in this work is based on a mathematical expression consisting of three inter-connected modules: the Control module; the Kurtosis module and the Distortion module. These are represented by a three-parameter exponential expression and two 4^{th} degree polynomial expressions respectively (Khosrowshahi 1999). The simulation of the income pattern is carried out by constructing the shape that the income pattern is likely to assume (Khosrowshahi 1996). This is implemented through the identification of the parameters of the mathematical expressions. For a given project definition, the model uses its database to estimate the value of these parameters. (The project is defined in terms of its major characteristics. These consist

of project type, sub-type, form, scope, operation, ground condition, size, access conditions, buildability and possible abnormal events).

Once the forecast is generated, the users can exploit their general experience and their specific knowledge about the project to further improve and refine the forecast. Having defined the 'project parameters' (profit margin, retention, etc.), project cash flow is then generated from the income flow. The results will form the basis of "*what will happen*" which is then contrasted against "*what should happen*".

A RADICAL APPROACH TO CASH FLOW MANAGEMENT

Most companies have some form of corporate cash flow management either as a matter of routine or as a reaction to concern for the financial standing of the firm. Cash flow management takes place at various levels. Normally, a proactive strategic cash flow decision is within the domain of the management at the corporate level. At the project level, the cash flow control is the responsibility of the project team but the corporate management too have distinct interest in project cash flow performance. The evidence suggests that contractors take an "administratively reactive" rather than "managerially proactive" attitude towards financial management and they are more concerned with issues pertaining their current projects (Betts and Gunner 1993). But, leaving corporate objectives at the mercy of projects may hinder the goal-achievement of the company: a lucrative market and potential for high profitability can draw on management's appetite for growth without due consideration to financial requirements and the subsequent implications. Over-trading is a source of adverse credit trap (Pizzey 1985) and problems increase further when management are subjected to excessive pressure arising from unplanned expansion (Burnett 1991).

On the other hand, as an ultimate measure of firms' success, growth should not be repelled and opportunities for growth cannot be missed. All these point in the direction of the need for closer ties between project and corporate cash flow. Indeed, the former should be the function of the latter and all projects should be geared in the direction of corporate objectives. Then, the question remains as to what constitutes a proactive financial management.

A vigorous corporate financial management starts, but is not limited to a good housekeeping. The latter involves the control and reduction of costs associated with waste reduction in the office (stationary, telephone, management expenses, etc.)(Clegg 1991), a balanced approach to stock purchase (Madge 1985), proper accountancy practice (including measures such as discounting cash flows to their present value (Clegg 1991), knowledge acquisition about sub-contractors and clients' reputations and standings, a zealous approach to debt control, (Bird, 1992, views debt collection "*as the most sensitive and critical part of cash flow cycle*".), an efficient purchasing policy and efficient site control system.

However, these cost saving and housekeeping measures, though highly effective, do not address the core issues relating to corporate cash flow: the need for liquid asset to support the organisation for its day to day business and its long term growth. This stems from the fact that projects are the lifeblood of the company. The close association between corporate cash flow management and the firm's management control and practices places the application of cash flow management high on the management's agenda. In other words, project cash flow must be compatible with corporate objectives.

The premise of this paper is based on the assumption that cash flow control is a management function because there are many courses of action that can be taken each producing a different outcome. It is further assumed that the standard forms of contract are means to an end and not the end itself. Therefore, almost every term in these forms and, indeed, some outside these forms, can be negotiated.

The assertion of this paper is also relies on the final assumption that there are two major reasons as to why all parties would welcome extended negotiations prior to the contract. Firstly, in non-adversarial situations, the success of all parties is tied to the success of the project. The insolvency of the client has a direct knock-on effect on the financial standing of the contractor. This in turn affects the sub-contractor and the building merchants. Hillebrandt and Cannon (1991) reported on the domino effect of the financial collapse of Mitchell Construction, during the 1970 Kariba Dam construction, which resulted in the insolvency of several firms dependent on the project.

Secondly, all parties involved in the realisation of a project have their corporate priorities and there is an inter-relating trade-off between their priorities. These priorities are to be implemented through their projects. Therefore, for any project, it is possible for the parties to match and trade-off their priorities in a complementary rather than confrontational fashion. For example, for a given situation, an issue of great importance to the contractor [e.g. cash flow] may be of lesser priority to the client who would welcome an offer of a lower profit margin for a different payment regime. Also, the contractor may, for instance, welcome an offer of a discount from the sub-contractor in return for an immediate payment of say 50% of the sub-contractor's monthly expenditure, with the remaining 50% to be settled after 2 months.

CASE STUDY

In this section a hypothetical scenario is applied to a past project in order to demonstrate that the industry and its main players can mutually benefit from reaching agreements prior to the emergence of the conflict – indeed at the contract stage. This scenario is one of numerous possibilities where mutually-agreed solutions are achieved through negotiation.

In this example, in order to align the project in the direction of its corporate objectives, the contractor combats risk with risk by assuming further risk of revealing their cash flow weakness and willingness to compromise over issues such as profit margin. On the other hand, the contractor demonstrates initiative and awareness about their position and the position of other parties in relation to the project, because they engage the negotiation from an informed position of knowing the extreme decision values (the maximum permissible compromise). The following stages apply:

Generate a forecast of project cash flow [“*what will happen”*]

Compare 1 with own corporate goals [“*what should happen”*]

Identify areas where compromise can be made to match 1 and 2.

For the client, identify areas for compromise and evaluate the extreme values.

Ditto for sub-contractors.

Commence with the negotiations.

The project

Figure 1, shows the forecast of the cash flow relating to the construction of a modern, 2 floor, steel-framed secondary school. The ground condition is *good*, access within the site is *good* in both vertical and horizontal directions, and the total project sum and duration are given as £821,000 and 21 months respectively. The cash flow is based on the usual terms of the contract consisting of 5% retention, 6 months defect liability period, one monthly payment intervals (with two weeks overlapping delay in forwarding the payment), profit margin at 8%, and interest rates for borrowing at 16% and for investment at 9%.

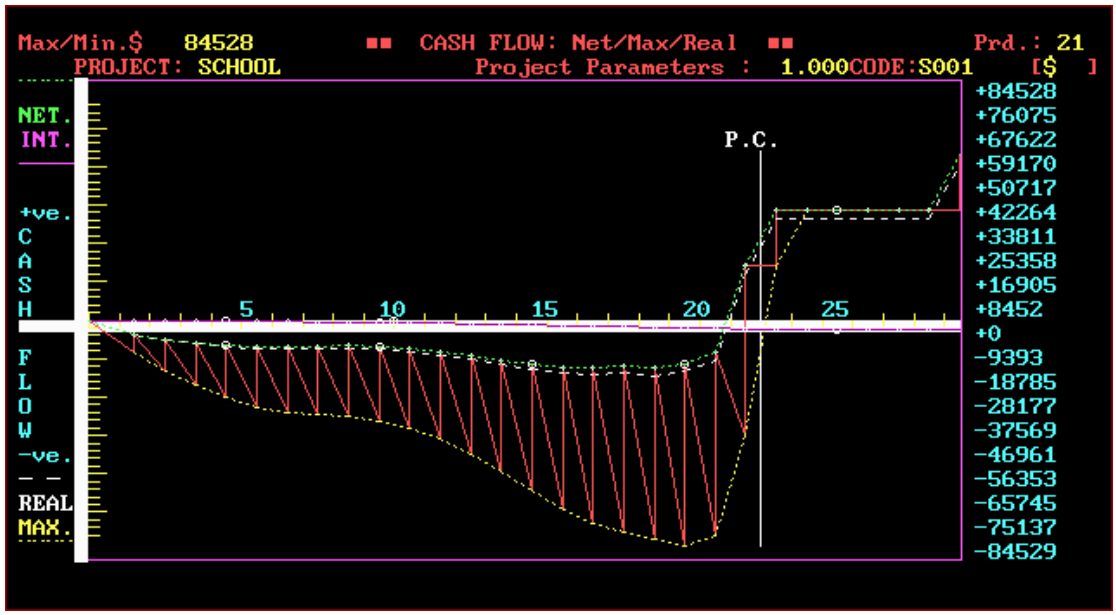

Figure 1: Cash flow prior to intervention

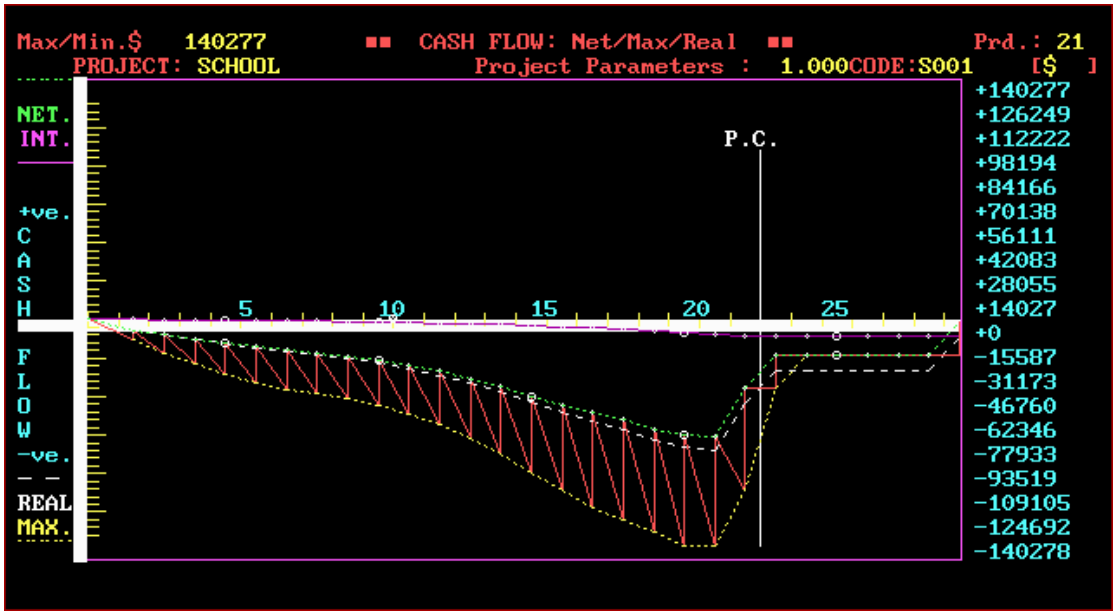

Figure 2: As in figure one but with zero profit margin

Assuming that the cash flow in Figure 1 is not in line with the contractor's corporate priority, the contractor examines possible ways and means of improving the cash flow as well as areas where they need to make concessions. To this end, there are many

alternative scenarios that they can pursue. However, prior to the negotiation, the contractor identifies the extreme decision values. This is carried out through visual simulation of each scenario. For instance, consider an attractive concession of 0% profit margin. This would produce the cash flow shown in Figure 2.

Figure 3 shows a range of possible cash flows for varying first payment interval (normally, it takes four weeks before the first valuation is complete and another two weeks will elapse before the payment is actually made). The graph provides an indication that a first payment delay being 10 days would be the extreme value for this variable. Any value accepted below this would yield additional benefits.

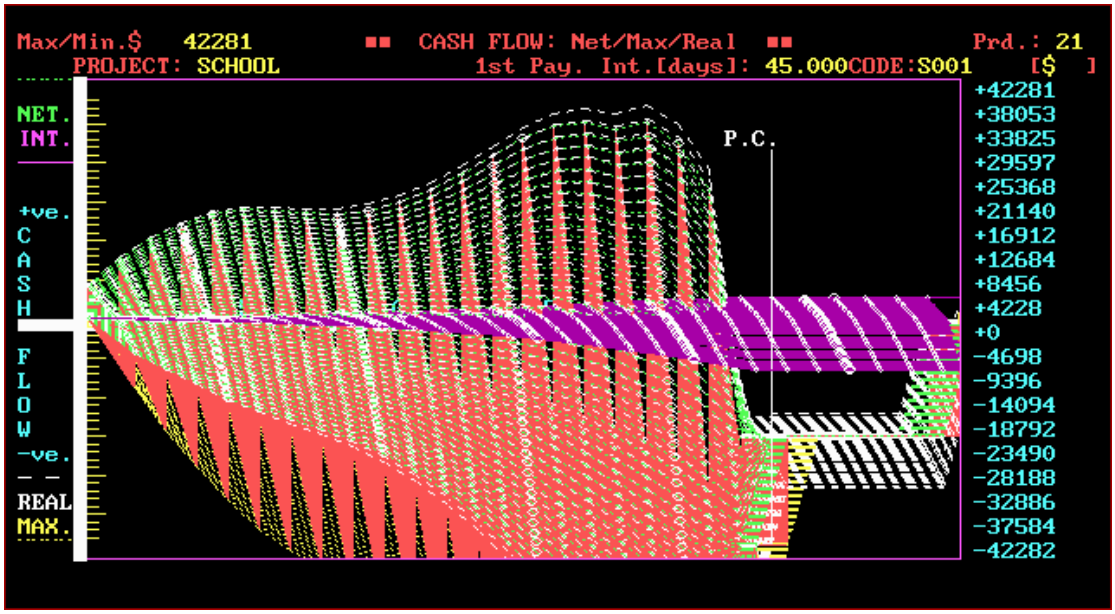

Figure 3: Varying first payment interval

In dealing with the sub-contractor, the contractor would consider the outcome of varying proportion of payment to the sub-contractor with two months delay. This result is demonstrated in Figure 4.

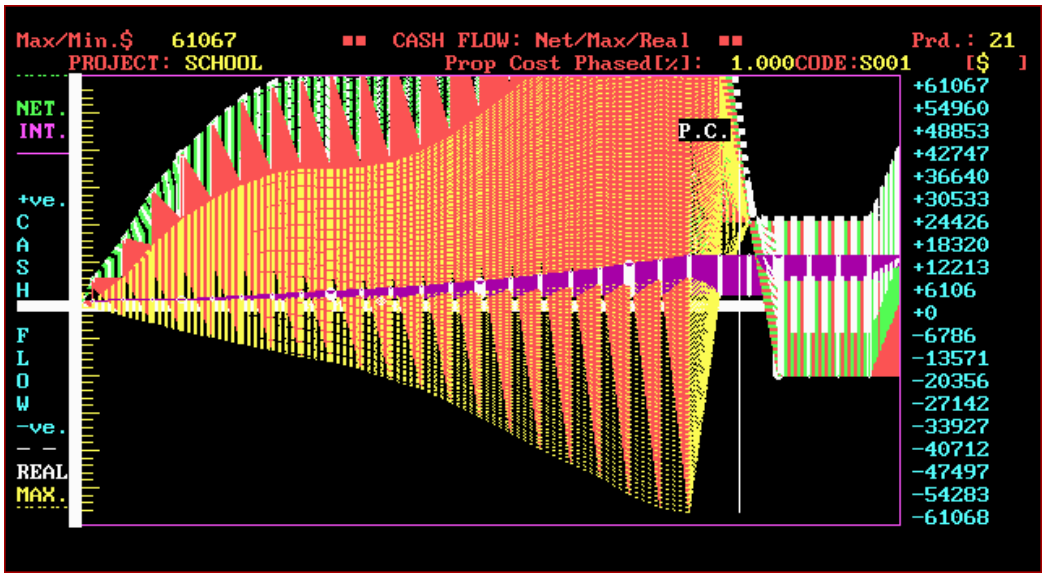

Figure 4:Varying proportion of payment to the sub-contractor with delay

The suggestion is that the extreme value for this variable is 70% and any value above this value would yield further advantages.

Assuming that both the client and sub-contractors have agreed with the contractor's least favourable scenario, the resulting cash flow is shown in Figure 5. Here, the profit margin is 0%, retention parameters are as before, first payment is paid after 10 days, and 70% of sub-contractors' funds are paid with 2 months delay.

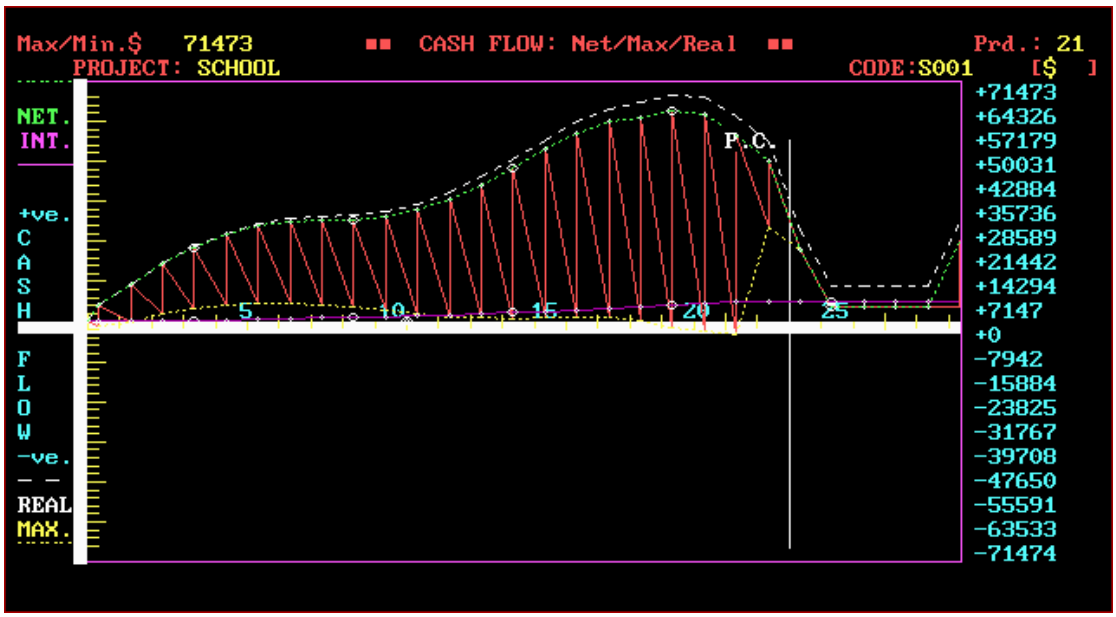

Figure 5: A possible win – win – win scenario

CONCLUSIONS

While construction was shown to be a risky business with high number of bankruptcies, risk was recognised as a potential source for gaining advantages. This assertion was examined within the context of construction project financial management and cash flow management in particular.

Cash flow forecasting is a crystal ball gazing exercise and is not an exact science. In developing a forecast, contractors are almost always faced with numerous variables of unpredictable nature. Hence, the development of an accurate forecast is no more than merely a reflection of current knowledge and past experience. The disadvantage for operating under such diverse, uncertain, complex and fiercely competitive environment has been poor profitability and continuous fear of liquidation. This has created a degree of fear and conservatism, thus, inhibiting organisations from venturing alternative practices.

It was demonstrated that despite various standard forms of contract, the parties involved in the construction phase could agree on mutually beneficial terms. This was based on the assumption that, at any given time, the priorities of each party can be traded-off to complement the priorities of other parties. This was demonstrated by considering one of many scenarios which prepared the contractor for negotiation resulting in a win-win solution.

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