

**An Analysis of Allocation of Cash Flow and Control Rights in Financial  
Contracts: A Case Study of Tiomin Kenya Limited**

**By**

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**D/61P/7410/03**

**A Research Project Submitted In Partial Fulfillment of the  
Requirements of the Degree of Master of Business Administration,  
School of Business  
University Of Nairobi**

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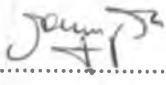


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**November 2008**

### Declaration


The research is my original work and has never been presented for a degree in any other university.

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## **Acknowledgement**

I am greatly indebted to Mr. Kisaka Sifunjo for his invaluable guidance and to Mr. James Karanja for his insightful comments. I am also grateful for the invaluable assistance given by S. Chalwa senior officer at Tiomin Kenya Limited. I cannot adequately express my appreciation for the support received from family members during the entire period of the study. To God be all the glory.

## **Abstract**

This study analyzes the allocation of cash flow rights and control rights in titanium mining project between the government of Kenya and Tiomin Kenya Limited. The study also examines the relationship between cash flow rights and control rights allocation. Empirical studies reviewed shows that division of cash flow rights and control rights are often contingent on certain measure of the projects performance. If the indicator of the company performance is low, the investor obtains control. If performance improves, the entrepreneur obtains more control. In this study, performance, capital contribution and risk are identified as the main factor determining the allocation of cash flow rights. Equity holding and capital contribution have been identified as the factors that determine allocation of control rights. The study reveals that cash flow rights and control rights have been allocated separately.

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## **List of Abbreviations**

<b>GOK</b>	Government of Kenya
<b>TKL</b>	Tiomin Kenya Limited
<b>EN</b>	Entrepreneur
<b>VC</b>	Venture capitalist
<b>MNC</b>	Multinational Corporation
<b>VIF</b>	Variance inflation factor



## Definition of terms

<b>Financial Contract</b>	Financial contracts are agreements that specify the rights and responsibilities of contracting parties.
<b>Cash flow rights</b>	Designated distribution of benefits (cash rights) a party to a contract is entitled to receive.
<b>Control rights</b>	The right to choose some interim action that will affect the profitability of the company
<b>The entrepreneur</b>	The owner of titanium mineral ores (GOK)
<b>Venture capitalist</b>	The party that provides finances to develop the resource.
<b>Incomplete contract</b>	Contracts that do not specify the optimal actions (decision) in every future contingency and leave residual decision making rights without being explicitly contracted.
<b>Optimal Contract</b>	A contract that satisfies the investment needs of contracting parties

## **Chapter One**

### **Introduction**

#### **1.1 Introduction**

The government of Kenya (GOK) and Tiomin Kenya Limited signed a fiscal agreement on July 16 2004 granting Tiomin Kenya Limited to mine titanium ores in Kwale District. The signing of the agreement was a culmination of years of negotiations on the sharing of financial benefits and control of the mining project. In this study, we evaluated the twin issue of optimal cash flow rights and control rights between the government and Tiomin Kenya Limited.

Titanium mining project is a financial contract, a financial deal made between financiers (Tiomin Ltd) and those who need financing (GOK). The objective of GOK and Tiomin Kenya Ltd is to maximize the shared values created by the contract. The paragraphs below provide the nature of contracts and the manner in which sharing of financial benefits and control is determined.

Financial contracts are agreements that specify the rights and responsibilities of contracting parties. In pure competitive markets, the existence of potential gains from trade generates trade automatically with little or no need for legal rules or institutions to facilitate economic exchanges implying that the contract is optimal (Nicita and Panago, 2003). Such a contract specify the optimal actions in every future contingency and leave no residual decision making rights without being explicitly contracted. The contract is said to be optimal in the manner it satisfies the investment needs of contracting parties. An optimal financial contract motivates efficient investment ex-ante and ex-post.

Many financial contracts however do not occur under perfect market conditions. As a result, the contracts are agreed before some uncertainty is resolved (ex-ante) in the hope that assumed conditions will apply or the contract will be enforced ex-post. The main reasons for this phenomenon is that high transaction costs and asymmetrical information acts as a source of market failure resulting in inefficient outcomes. Contracts of this type have been classified as incomplete in the sense that they do not specify the optimal actions in every future contingency and leave residual decision making rights without being explicitly contracted. In such a case the ownership of asset theory gives residual control rights to the owner of assets

the power to take care of unspecified contingencies and to organize the production process involving own assets (Nicita and Panago, 2003).

A study on optimal contracting problem by Cestone (2006) of an early start-up seeking venture capital found that contractible and non-contractible factors are crucial for start-up success. Cestone (2006) argued that an appropriate of financial claims (cash flows) and control rights can enable an entrepreneur have initiative in the venture and to induce an investors support without the investor exercising too much control on the projects/firms. The question is; how can an optimal financial contract (that encourages entrepreneur's initiative and induces investor's support) be determined? How are cash flows and risks in the project allocated? How is control allocated? What are the incentives in the deal? What is the effect of investor's high-powered claims to entrepreneurial initiatives?

In our study, we look at two simple versions of common arrangements for sharing risks and rewards on one hand and sharing control rights in the project on the other. Titanium mining project typifies a venture capital deal. The contract shows increasingly tension ridden as the host government (GOK) and the investing company (Tiomin Kenya Ltd) explores each other's limits in the proposed sharing of financial benefits and control of the project, yet there remains a real mutual interest between the parties to develop the resource and achieve a balance (optimality) in the sharing of benefits.

In our study we use the term financial contract to refer to agreement that allocates cash flow rights and control rights between parties to the contract. Cash flow rights are the designated distribution of benefits (cash rights) a party to a contract is entitled to receive. Control rights are the right to choose some interim action affecting the profitability of the company. Financial contracting is a theory that describes what kind of deal exists between financiers and those who need financing Hart (2001). Our study has two main parties. The entrepreneur (government of Kenya) is the owner of the mineral resource and the investor or venture capitalist who provides finances to develop the resource. The choice of the term venture capitalist is used to embrace other auxiliary services offered under the contract. The main variables used are performance, incentives, risk, and cash flow rights and control rights.

Control rights and cash flow rights (distribution of benefits) in the mining industry have been a major contentious issue in many minerals rich third world countries. Case studies on mineral production by Nkwoke (1987), Mikesell (1971), Cobbe (1979), Bosson and Varon (1978) indicate that, distribution of mineral wealth and control of mineral resources in many third world countries favor foreign investors. This situation has elicited debates for the need to renegotiate mining contracts and redistribute the cash flow rights and control rights in favor of host countries. Indeed nationalization of mineral industries is done to reduce the imbalance by allocating more control rights and cash flow rights in favor of host governments (Mikesell, 1971).

Empirical studies on Third World minerals by Nkwoke (1987) and Mikesell (1971) argues that unequal distribution of cash flow rights and control rights in favor of foreign investors is as a result of lack of authentic ownership and control of mineral industries. Host governments rely on multinational corporations (MNCs) to provide capital, technical skills, managerial and marketing connections to develop mineral resources.

The result of enormous investments in the industry by foreign investors guarantees them ownership and control of crucial facilities needed in the internationalization processes of mineral production. The host government ignorance about the mineral industries gives foreign investors a position to dictate terms of initial agreement that is in their favor (Nkwoke 1987).

Second, the prevailing ideologies that guided government– foreign investor relations in mineral producing countries before and after the Second World War were in favor of the multinational corporations (MNCs). These ideologies constrained independent countries in the third world in their relations with foreign mineral investors by the possibility of diplomatic, economic and/or military intervention by the investor's home governments. The situation was compounded by the fact that mineral investors were able to negotiate and dictate lucrative terms in the initial agreements that favored foreign investors (Nkwoke 1987).

Third, inability to value the mineral property led foreign investors and host governments alike not to agree amicably on the optimal distribution of cash flows and control rights. Reasons advanced by foreign investors who discover the mineral deposits and finance it's operations is that the investor should be richly rewarded by extra-ordinary profits from concession as a

proper compensation for risk. Investors point to the cases of millions of dollars invested in geological surveys and explorations from which the companies have received nil or inadequate returns, and argue that unsuccessful investments should be balanced against high returns from successful operations. The host governments on their part tends consider only the level of company earnings from specific investment projects that have proved successful and argue that the earnings should constitute no more than a reasonable return on invested capital (Mikesell, 1971, p.35). Moreover the government of the host country assumes that it is entitled to a bigger share of the benefits as it holds title to the minerals and subsoil.

Pro-government writers opposed to the enormous cash flow rights and control rights in favor of foreign investors argue that foreign investment companies have a peculiar psychological attitude towards risk (Cecil et al 1961, 1961). They argue that investors believe that the world owes them better than average business returns and use risk as an excuse for economic irresponsibility and as a shield to protect them from criticism (Cecil et al 1961 p.86). For this reason, foreign investors 'unconsciously' think any attempt to measure risk and make it predictable is a threat to their security. In addition, investors are conditioned to the security of risk to the extent that exploration for minerals without proper protection and compensation would be intolerable. When a solution of risk is advanced, investors either ignore it or raise a host of unreasonable and trivial objections to its use (Cecil et al 1961).

The allocation of cash flow rights and control rights in a project reflects the bargaining position of the claimants. Mikesell (1971) and Cobbe (1979) argue that cash flow rights and control rights may change with time or with the level of risk assessment. Investor's stake in the venture is highest at the initial stages and gradually decline as facts of the project unfold and the host government learns more facts about the trade. At later stages that the host government and seeks to capture more cash flow rights through increased taxation and by reduction of concessions granted in the initial agreement. At extremes circumstances, nationalization of the project ensures the host government gains full control of the venture and enjoys maximum cash flow and control benefits (Mikesell, 1971 p. 35).

The analysis of distribution of cash flow rights and control rights in Titanium mining project represents an effort to understand the relationship between the GOK and Tiomin Kenya Ltd and the underlying problem in the exploitation of titanium ores in Kwale District. The study also examines the implication of cash distribution and control rights and suggests an optimal

financial contract between the Government of Kenya and Titanium Mining Company in the venture.

## 1.2 Background to the study

An investor in a mining project views her activities in terms of ensuring a flow of raw materials to downstream operations at acceptable costs and risks of supplying of financial resources for the investment. The host country government may express a mining project in terms of converting the “national wealth in the soil into national wealth in the form of improved gross domestic product” (Cobbe, 1979). From this perspective, the investor and the entrepreneur have reasonably well aligned objectives of making the venture viable. However, maintaining a proper investor incentive to invest and a corresponding entrepreneur initiative to participate in the project is subject to the actual and perceived fairness in the distribution of benefits and control of the project.

Mikesell, (1971) writing on investor-host country relations asks the following question: “Why should a country which holds substantial mineral wealth in the ground ever agree to concession contracts with international companies? Could it not develop the resources itself and thus capture all the cash flows produced by exploration of the resource?” (Mikesell 1971, p.38). Similarly, Vauhkonen, (2003, p. 9) asks: “why the entrepreneur (GOK) which has all bargaining power ex ante and ex post would ever relinquish any control rights to the investor?”<sup>1</sup>

To answer these questions, Mikesell (1971) argues that lack of knowledge and skills about the mining industry and financial constraints compels the entrepreneur (host government) to cede cash flow and control rights to an investor to signal congruence of objectives and induce her to finance the project (Dessein, 2004; Sahlman, 1988). Initially, the government is bound to believe that any positive return from mining is better than nothing and resources that are undeveloped are of no use whatsoever; and that, if developed by an investor who is prepared to accept the risk, any return is a positive gain (Mikesell, 1971). However, many conflicts in the mining industry suggest that initial mining agreement do not address optimal level of cash flows and controls rights.

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<sup>1</sup> “Entrepreneur in this study refers to the government. Investor and venture capitalist are used interchangeably and refer to Tiomin Kenya Limited.

Financial contract literature complements Mikesell's view in part about the control of distribution of gains (Hart, 2001), Aghion and Bolton, (1992), Dessein (2004) and Vauhkonen (2003). These studies conclude that the ability to negotiate for gains in mining ventures depend on the control a party to the contract may have on the cash flows from operations. The distribution of control rights in the contract is a key factor in determining the optimality of the contract.

Dewatripont and Tirole (1994), Kaplan and Stromberg (2001) and Cestone (2006) argue that control and cash flow rights follow a joint pattern in real venture capital contract. However, Hellmann (1988) holds a contrary view that control rights may be allocated independently of cash flow rights, through different sets of covenants. This paper studies the allocation of cash flow and control rights in financial contracts. The study will investigate whether Tiomin Kenya financial contract with the government is consistent with theoretical and empirical studies reviewed above.

### **1.3 Tiomin Kenya Limited and the Titanium Mining Project in Kwale District**

Tiomin Kenya limited is a wholly owned subsidiary of Tiomin Resource Inc. of Canada. The company was granted an exploration license for the Kwale project in 1997. It completed the baseline study in 1999 and initiated work on the environment impact assessment that was finalized in 2000. The enactment of the Environment Management and Co-ordination Act in 2000 required additional work on the assessment. Further issues arose about the settlement of residents affected by mining project. The government also attempted to gain equity participation in the project, which Tiomin Kenya Ltd declined.

In February 2004, the Government agreed that the project should go ahead without its equity participation. The issue of resettlement of local population was settled in June 2004 by the government. A 21-year mining license for rutile and associated minerals was formally approved and signed by the government in July 2004. A fiscal agreement was signed in February 2005 granting Tiomin Resources a fifty percent (50%) reduction in corporate tax rate for first ten years of commercial production, and 2.5 percent gross revenue royalty to the government. Corporate tax is 30 percent

Tiomin Resources has invested about US dollars 20 million since 1997 in exploration, engineering, feasibility and environmental studies on the Kwale project and three other

projects in the same area. Estimated development costs are \$ 120 million to generate cash flows of around \$ 40 million in the first six years with a pay back period of 4-5 years (www.tiomin.com).

Analysis from the above statistics shows that Tiomin Kenya Ltd cash flows rights will be 83 percent against 17 percent for the government in the first ten years. Thereafter, cash flow rights will change to 68 percent for the company against 32 percent for the government. Tiomin Kenya is 100 percent owned by Tiomin resources Inc of Toronto Canada. A Kenyan lawyer acts as Kenya Director with shares held in trust by Tiomin Resources Inc. There are no other Kenyan Shareholders.

#### **1.4 Statement of the Problem**

On January 21, 2001, The Daily Nation high-lightened important issues in its editorial regarding the proposed titanium mining project in Kwale District. The major concern was that the proposed distribution of benefits and the control of the venture was skewed in favor of Tiomin Kenya Ltd. Environmental activists too were concerned that expected monetary returns from the project had overshadowed environmental matters and the plight of local residents displaced by the project.

The concerns expressed above can be attributed to the following factors. First, lack of adequate information and independent valuation of the mineral resource acted as an impediment in the fair analysis of the proposed distribution of benefits between Tiomin Kenya Ltd and the Government. Second, there is an unverifiable input in to the production process that is not contractible; yet, it affects the value of the project. The subjective judgment about the fairness of the reward of the non-contractible inputs by foreign investor relative to the reward for inputs by the government as the famed theory of equity by J. Stacy Adams (Weihrich and Koontz, 1993) would anticipate requires that there be a balance in the outcome-input relationship of the participating parties to forestall the risk of parties overestimating their own contribution and rewards that others receive.

Third, there are non-economic and emotional preferences for government control over foreign-investor control of the project. Yet, the principal (GOK) cannot initiate complex investment decisions because she does not have the right incentives for the project.



To analyze distribution of cash flow rights and control rights between the Government of Kenya (entrepreneur) and Tiomin Kenya Limited (investor or venture capitalist), we use studies on venture capital deals as their design corresponds fairly well to titanium mining project. Theoretical and empirical studies on venture capital contracts conclude that cash flow rights and control rights vary with time, risk associated with states of nature and the level of financing. At the pre-revenue stage when states of nature are unfavorable and the level of uncertainty is high, investor is allocated more cash flow right and control rights.

In this study we also test whether there is any relationship between cash flow rights and control rights. Cestone (2006) argues that control and cash flow rights seem to follow a joint pattern in real venture capital contracts, suggesting that they are strongly interrelated. Studies by Kaplan and Stromberg (2001) and Hellmann (1998) concluded that cash flow rights and control rights are not related and can be allocated separate of each other.

From the above review, it is clear that none of the above studies has looked at the issue of distribution of cash flow rights and control rights in the mining industry in Kenya. Using a case study methodology, this analysis will provide information of how those aspects of financial contracting have been done in Kenya.

### **1.5 Objectives of the study**

1. To determine allocation of cash flows and control rights between the government of Kenya and Tiomin Kenya Limited.
2. To examine the relationship between cash flows rights and control rights in Tiomin Kenya Ltd and GOK contract.

### **1.6 Importance of the study**

Appropriate distributions of cash flow rights and control rights have significant effects on investors by providing the right incentives for project selection. VC's screening process identifies areas where VC's can add value through monitoring and support activities. The design of financial contracts affects the VC's ability and incentives to actually carry out such activities. Studies on mining contracts have shown that inequitable distribution of cash flow and control rights is a major source of conflict. An appropriate design of cash flow rights (financial claim) and control rights can enable entrepreneurs to induce investor capital as well

as maintaining proper investment initiatives. This is based on the idea that motivating effort is done best by rewarding investors on precise measures of their effort, not necessarily on the total value created. Further, incentives for effort and decisions are inextricably tied together (Athey and Roberts, 2001)

## **Chapter Two**

### **Literature review**

#### **2.1 Introduction**

In this study we focus on how cash flow rights and control rights are allocated between the entrepreneur and the investor. The chapter consists of six sections. Section one is introduction. Section two is a review of the theory of optimal financial Contracts. Section three reviews the theoretical models that determine control rights and cash flow rights. Section four analyses cash flow rights under different control mechanisms. Section five is a review of optimal control allocation. Section six is empirical evidence on Control rights and Cash flow rights. Section seven is a summary of study findings.

#### **2.2 Theory of Optimal financial Contracts**

##### **2.2.1 Decision and Control Rights**

Optimal distribution of cash flow rights and control rights in many financial contracts are complicated by three major factors: i) contracts are incomplete, ii) many specific investment projects are often one-shot-large scale investment that cannot be split into small and verifiable sub-investments that would allow the contract to be evaluated in phases, iii) information is costly and sometimes unavailable to the parties at the time of contracting.

The economic reason why a contractual incompleteness matters is that it may constitute a source of insufficiency when it inhibits parento-relevant economic exchanges. According to Williamson (1985), this inefficiency outcome might emerge only when the incomplete contract has to perform investment in specific assets and at least one of the parties in the contract is an opportunist who may want to renegotiate terms of exchange in order to extract additional rent/earnings with respect those contracted ex-ante, while maintaining strong incentive to under-invest in specific assets. The opportunist behavior implies an unwillingness to generate potential quasi rents.

The relevance of incomplete contracts in law and economics stems from the selection of the legal and economic rules and institutions, which might reduce the risk of post contractual opportunist by optimally aligning parties' incentive to generate the highest level of specific investment. This is a second best outcome (Nicita and Panago, 2005). According to William (1985) the solution to the problem of incomplete contracts is to apply vertical integration and to grant authority and residual controls to owners of specific assets to guarantee enforcement

of incomplete contracts. Vertical integration refers to the idea of generating or inducing optimal and appropriate incentives to invest in specific assets by assigning to the investing party the rights to residual income generated once other factors of production have been accounted for.

Authority and residual control right is expounded by Hart (1995) under property rights theory in which he says that in an incomplete contract world, ownership is a source of power. The owner of an asset has a residual control rights over the asset and confers on the owner the power to take care of unspecified contingencies and to organize the production process involving own assets. This power is also defined an authority. The authority relationship from one side reduces the degree of contractual incompleteness by assigning to the owner of specific assets power to decide what to do when contingences arise; from the other, it induces efficient levels of investment from the owner's side, by assigning to the owner all the bargaining power in the ex-post renegotiation stage (Nicita and Panago, 2005).

Financial contract literature by Hart (2005) adds a new dimension to decision (control) inputs. This literature takes as its starting point the ideas that relationship between an entrepreneur and venture capitalist is dynamic rather than static and therefore parties to the contract choose a decision making process in advance to take care of "hard-to anticipate future contingences. One way to do this is the choice of financial structure. Take equity. One feature of most equity is that it comes with votes. That is, equity holders collectively have the right to choose the board of directors; who in turn have the legal formal right to make decision in the firm. Creditors (suppliers of finance) do not have decision-making rights. However in the event that the firm fails to repay debts, they can seize foreclose on the firm assets or put the firm into bankruptcy. Moreover if the firm enters bankruptcy, then creditors often have some of the power of owner – power to make decision.

The reason why allocation of decision making authority matters is that decision rights are important for influencing asset – relation specific investment. If the owner of specific assets controls the project he can implement his ideas without interference from anyone else. This gives him a strong incentive to have an idea. On the other hand if someone else controls the project he will have to get permission from the other person and may to share the fruits of his idea with the other partners -this will dilute his incentives.

### 2.2.2 Control Rights

An optimal financial contract is a function of cash flow and control rights distribution. This is presented as an optimal contract =  $f$  (cash flow rights, Control rights). The contract determines how cash flow rights and control rights are shared between the entrepreneur and the investor. An optimal contract ensures that division of cash flow and control rights are commensurate to efforts and contribution made in the project. Cash flow rights determine how monetary returns from the project are divided between a non-negative transfer to the entrepreneur and the residual allocated to the investor. Monetary returns depend on the realization of certain state of nature (availability of resource and reliability of reserve estimates). A high proportion of both cash flow and control rights reflects the level of risk undertaken or superior bargaining.

Control in a venture reflects the extent of financial risk exposure, contribution in technical, managerial and marketing activities of the project under consideration. The risk exposure in ventures occurs due to high investment capital and funds to develop or upgrade infrastructure. Control in the venture occurs because the project cannot be fully described and optimally contracted upon ex-ante. Therefore the contract must allocate to either entrepreneur (EN) or venture capitalist (VC) the formal control over the project. Control allocation matters because EN and VC preferences over the project selection/interim action are not always aligned. In our case, EN relinquishes control rights by either giving VC more favorable financial or more favorable control terms.

The distribution of cash flow rights and control rights are key issues in a project where two or more parties have an interest. According to Cestone, (2006), control can be absolute. It is useful to consider two polar contracts. The contract is not optimal if one party holds both cash flow rights and control rights. If the entrepreneur has all cash flow rights and control rights the entrepreneur's cash and social objectives are fulfilled. Unfortunately, the investor's cash objective is not fulfilled and may never get her money back. Thus, the contract is thus not feasible. When the investor has all cash flow rights and control rights, the contract maximizes the investor's payoff. However, this contract may lead to the destruction of entrepreneur's private (social) benefits since the investor (described as a ruthless value maximizer) puts all weight on cash flows.

### 2.2.3 Cash flow Rights

In the financial universe, risks and returns are two sides of the same coin and have a significant influence on the decision making processes. Risks are less visible and less intangible than incomes. These uncertainties remains like so until they crystallize into future losses while earnings are a standard output of reporting systems complying with established accounting standards. According to Bessis (2004), such differences create bias towards a systematic view of risks and returns making it more difficult to strike the right balance between them.

Academic models provide foundation for risk modeling, but do not provide proven instrumental tools that can help decision makers. Risk based practices designate these practices using quantified risk measures. Investor's scope extends to risk taking decisions under an ex-ante perspective, and risk monitoring under an ex-post perspective. Under a management perspective, without a balanced view of expected returns and risks investors have a myopic view of the consequences of their business policies in terms of the future losses because it is easier to measure income than to capture the underlying risk. The underlying major issue is to assign a value to risk in order to make them commensurate with income and fully address the risk-return trade-off .This is one reason why investors screen out projects and will accept to undertake a project if she is informed of the payoffs. Indeed it is at this stage that formal control rights turn into effective control when the controlling party has enough information to exercise those rights (Bessis, 2004).

Uncertainty about the prospects of a venture is one aspect of incomplete financial contracts. The contracts future cash flows are estimates both in amounts and timing. The discount rate is unknown. Any two parties analyzing the same deal will hardly agree about future cash flows, the appropriate discount rate to apply, or both. The source of potential disagreements are many and range from simple disagreement based on common knowledge to the fact that parties may be governed by different rules such as tax policies to the possibility that one party is more informed about the project than the other. There will be conflict of interests if one or more of the deal makers is in a position to influence the outcome of the project so as to benefit more at the expense of the other participants: and the terms the contract will affect the nature (amount, timing, and risk) of the cash flow stream (Sahlman, 1990).

In allocating cash flows of the project, VC uses a discount rate that is commensurate with risk involved. The cost of the project is inflated so as to include losses made in other unsuccessful investments. The return is simply the market price for factors even though it may represent a monopoly price from the standpoint of the world market (Mikesell, (1971).

Financial contracting literature by (Sahlman, 1990) proposes that, cash flow rights can be administered by direct share of cash flows from the project. It can also be administered by allocating proportion of equity in the venture to the investor and entrepreneur. The parties must determine what proportion of each future cash flow would provide the expected rate of return to the VC given an initial investment, and to the entrepreneur as the owner of the natural resource. Where the investor has had a string of unsuccessful projects in the past, the discount rate applied to the estimate is higher than the true expected rate of return on the venture capital portfolio. In such a scenario, other than take simple common equity, VC can structure a deal with the entrepreneur to take convertible stocks as they have a prior claim on the earnings of the company, and have a prior claim on liquidation value of the company. Preferential convertible stocks improve the CV's reward-to- risk -ratio by shifting the risk from the venture capitalist to the entrepreneur. Other possible reasons include: 1) by increasing the entrepreneur's risk, the venture capitalist is trying to "smoke out" the entrepreneur, and get the entrepreneur to signal whether she really does believe the forecasts in the business plan; and (2) the venture capitalist is trying to provide the strongest possible incentives for the entrepreneur to do at least as well as projected. If the business exceeds plan, the entrepreneur will share disproportionately in the benefits of doing so. Given the entrepreneur's strong incentives to succeed, structuring the deal this way may actually increase the probability that a favorable outcome will occur (Sahlman, 1990). Under equity sharing, both parties share in a proportionate manner the risks and returns.

### **2.3 Theoretical Models**

In this model there exists an entrepreneur (EN) who possesses a project idea and has the resources and a venture capitalist (VC) who has funds to finance the project. The entrepreneur has to pay set up cost. As the entrepreneur is financially constrained he makes an offer to the VC. The VC's need for the project to break-even and the need to mitigate risks in the venture compels the to play an active role in the firm's management. The EN hopes to derive monetary benefits and to derive utility from running the project. Utility is the psychic benefit of running the venture and the increased human capital that the EN derives from

managing it. In particular, the EN can make non-contractible decision that increases his private benefits at the expense expected profits.

### 2.3.1 Gathering information and project selection.

After paying the set up cost, the entrepreneur exerts a non-verifiable effort to screen among different projects. At a private cost, he learns the payoff of all candidate projects. Simultaneously, the venture capitalist can also exert non-verifiable efforts at a cost, to monitor the entrepreneur’s research activity.

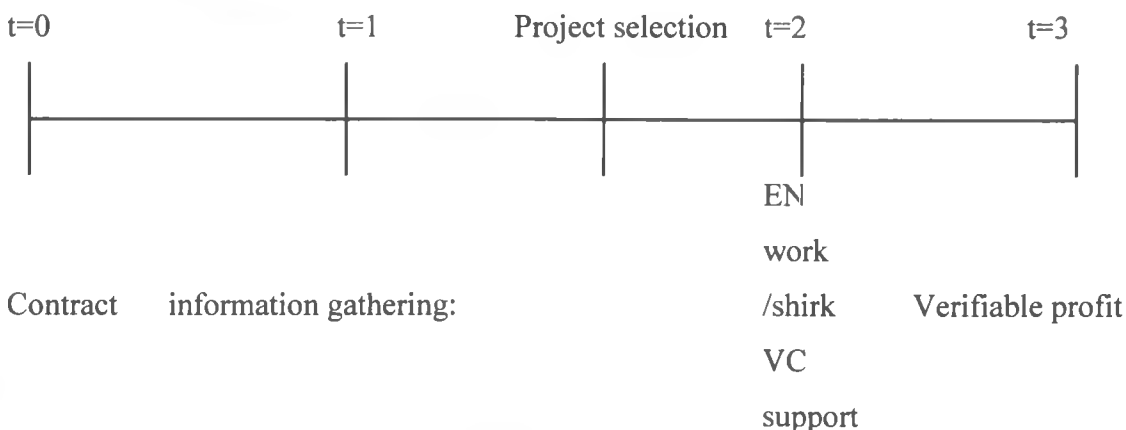
The choice of the project is congruent if both EN and VC have similar objectives and incentives. Under EN-formal control, the entrepreneur has the right to choose his preferred project. Under VC-control, the VC has the right to choose the project. The project has a positive value if neither the VC nor EN has inclination to cannibalize the project.

### 2.3.2 Contracts

The entrepreneur makes an offer to the VC specifying the parties’ cash flow and control-rights. The contract must specify VC’s outlay. Due to non-verifiability of the projects cash flow rights can be contingent on the final outcome but not on the project choice. Hence, cash flow rights specify VC and EN’s payoff as the power of VC’s incentives, in case of failure and success respectively.

In the figure below, EN receives financing from VC in exchange for Cash flow and control rights in the firm. The timing of events is summarized in the following figure:

**Figure 2.1: Timing of events**





At  $t=0$  the entrepreneur receives finance from VC, in exchange for cash flow rights and control in the firm. At the information gathering stage ( $t=1$ ), research is carried out to redefine the initial idea and turn it to a real project. Both VC and EN are actively involved in this stage. However, as research requires specialized technological skills, the VC role is crucial. After a course of action is selected by the party in control, its implementation requires further effort from both the VC and EN. The main issue at this stage is to induce EN and VC to exert optimal amount of effort for the project to succeed. In particular the research activities by the VC are important if the EN knowledge about the project is limited.

At  $t=1$  the main issue is to induce EN and VC to exert the optimal amount of research in order to pick the best available project. However, even when the right project is adopted, its value can be jeopardized if VC does not support its implementation at  $t=2$ . Hence providing incentives to the VC is crucial. Secondly, EN dislikes excessive interference and thus is unwilling to limit VC effective control through an appropriate design of her claims. An optimal venture capital deal should ideally induce VC support while limiting VC interference.

The implementation stage,  $t=2$ , has more to do with converting the ideas into workable project and bringing the product to the market. Hence, VC support becomes crucial at this stage. At  $t=2$  VC plays an active role in determining a start-up success. They are actively engaged in managing the project finances and provide support activities such as recruiting key personnel, advice the EN on strategic decisions and provide introduction to potential customer/suppliers.

The value of the project can be jeopardized if VC does not support project implementation at  $t=2$ . Hence providing incentive to VC is crucial. EN may desire to limit VC effective control through an appropriate design of her claims. The reverse of VC's support is moral hazard. In the case of moral hazard, the VC cannibalizes the project for example by stealing the project ideas and applies them to fund a competitive venture effectively reducing the probability of success of the venture. The EN dilemma is to simultaneously provide VC incentives to support the start up and hedge excessive VC interference as well as reduce the risk of misappropriation of information beyond the contractual relationship. Indeed, the need for VC support imposes an important constraint on the structure of the financial arrangement: the venture capitalist must be given sufficiently risk financial claim for the project to be worth

funding. However, a very risky claim may induce VC to gather too much information and over-interfere with the firm's project selection.

### **2.3.3 Formal versus effective control**

The allocation of formal control in venture capital arrangements does not describe per se who will take the relevant decisions in the start-up's life. Indeed, formal control rights turn into effective control only when the controlling party has enough information and knows the payoffs to propose a project or choose an interim action.

The entrepreneur's research effort or initiative is spurred by the prospects of having real control. Information gathering and increased interference by the venture capitalist can only inhibit such initiative. The extent to which a venture capitalist turns her control rights into real control rights depends on the riskiness of her claim. A riskier claim makes VC more eager to interfere in the project selection process. This in turn reduces entrepreneurial autonomy, hence discouraging initiative.

### **2.3.4 Trade off between VC support and Excessive Interference**

The above analysis shows that-whenver VC is granted control rights over project selection-a trade-off between VC support and excess interference arises. Two crucial factors contribute to turn an entrepreneurial idea into a successful firm. First, the entrepreneur must devote enough resources to analyzing the different projects available, before one is selected (EN's initiative). Second, the venture capitalist must provide sufficient advice and support when the project is implemented (VC's support). The design of VC's claim has two effects. First, it may spur VC's support to the project, which makes a risky claim desirable. Second, it determines her incentives to gather information. The later must be calibrated so as to avoid an "interference-kill-initiative" effect. In this case, a very risky claim may be suboptimal.

## **2.4 Cash Flow Rights Under Different Control Mechanisms**

When entrepreneur has formal control, information-gathering efforts do not depend on the shape of investor's claims. Hence, VC never interferes in the project selection even if she holds arbitrarily risky claims in the start-up. At the optimum, the risk-averse entrepreneur leaves VC with most of the risk compatible with entrepreneur incentives. However, increased monitoring and interference discourages information-gathering effort (initiative), which is the engine for discovering value-enhancing projects. Under VC control, increasing non-verifiable

effort exerted by VC to monitor EN research activities, (e.g. real control) benefits the venture in that VC imposes the value-enhancing projects more often.

#### **2.4.1 Cash flow under VC- control**

When VC has formal control over the project selection, the shape of her financial claim has a crucial impact on the extent of real control she exercises, and thus on entrepreneur initiative. When VC hold risky financial claims, they have stronger incentives to become informed about the firm's prospects and interfere in its decisions. As a consequence, their formal control rights turn into excessive real control (over interference). Entrepreneurial initiative is then discouraged. In other words, when investors' risk exposure is high, the cost of control in terms of entrepreneurial initiative becomes too high. Hence, entrepreneurs granting control rights to venture capitalists should sell them a financial claim that is not too sensitive to the firm's profits.

#### **2.4.2 Cash flow under EN control**

When the EN has formal control, information gathering efforts do not depend on the shape of the investors claim. Hence, VC never interferes in the project selection even if she holds an arbitrarily risky claim in the start-up. At the optimum, the risk averse entrepreneur, leaves VC with most of the risk.

### **2.5 Optimal Control Allocation**

The entrepreneur is not obliged to relinquish formal control to the VC in order to obtain funding. Yet, the entrepreneur may voluntarily give control to VC as the latter will choose the efficient project more often than EN himself would do. However, to prevent excessive control destroying EN's initiative, VC's real control is limited by reducing her incentives for information gathering. This occurs when VC's support is contractible, as it is always optimal to release formal control to VC, and give her relatively safe financial claim in the start-up.

Ideally, the optimal allocations of authority in venture trades-off ex-ante incentives with ex-post efficiency. In Cestone (2006) model, ex-post efficiency requires that VC's project is selected. When VC is in control, she always chooses the efficient projects, whereas EN may chose a suboptimal project when he is in control. When the congruence of interest between the parties is low, it is optimal to give control to the investor, as her objectives are more in line with those of the venture. The solution is then to allocate formal control rights to VC and

appropriately shape VC's financial claim so as to induce the ex ante optimal level of real control. This makes VC control desirable. Whatever is achieved with EN-control can always be achieved by granting formal control to VC and giving her a safe claim so that VC never has any real control.

### **2.5.1 Optimal control and cash-flow rights when VC support is not contractible**

In a case where VC's support is not observable, the need to provide incentive to VC imposes an important constraint on the contract. Under VC formal control, this constraint may bind if private costs are very large and VC has excessive incentives to monitor the start up which in turn has too much real control. This in turn reduces EN's initiative and the value of the venture. The reasoning suggests that when private costs are large, the cost of VC –control in terms of entrepreneur initiative may become too high. Hence it may be optimal to give EN the formal control over the project selection. Therefore, when VC support is costly to provide, it is optimal to grant formal control to EN.

The initial contract must allocate control rights over both actions as well as cash-flow rights over the final profits. Both cash-flow rights and the formal control over the second action can be made contingent upon verifiable signal of project profitability. At the early stage, incentives for information gathering and for project selection crucially depend on how cash-flows rights change upon attainment of good (bad) signal.

## **2.6 Empirical Evidence on Control Rights and Cash flow Rights**

Hart, (2001) summarized the findings of the study by Kaplan and Stromberg, (2001) on venture capital firms and found that venture capitalists can be used to explain the allocation of control rights in real-world financial contracts. Kaplan- Stromberg main findings are as follows:

- i. VC financing allows the parties to allocate separately cash flow rights, voting rights, board rights, liquidation rights and other control rights.
- ii. Allocation of cash flow rights, control rights, and future financing are contingent on observable measure of financial and non-financial performance. For instance, the VC may obtain voting control or board rights from the entrepreneur if the firm's EBIT fall below a pre-specified level or if the firm's net worth falls below a threshold. If the firm performs poorly, the VCs obtain full control. As the performance improves, the entrepreneur retains/obtains more control rights. If the firm performs very well, the

VC retains cash flow rights, but relinquishes most of their control and liquidation rights. The entrepreneur's cash flow rights increase with firm's performance.

iii. VCs have less control in late rounds of financing (i.e. when the project is close to completion).

Hart (2001) also found out that the findings by Kaplan- Stromberg (2001) had resemblance with empirical findings of Aghion-Bolton (1992) model because:

- i) as the model emphasizes cash flow rights and control rights are independent instruments and are used independently. Someone may be allocated significant cash flow rights without significant control rights and vice versa.
- ii) As the Aghion-Bolton (1992) model predicts, to the extent that different events can be identified, the allocation of cash flow rights and control rights will depend on them. Here the events correspond to performance as measured by earnings of product functionality.
- iii) That VCs have fewer control rights in the late financing as the firm requires less cash relative to future profitability and the risk exposure is relatively reduced.

According to Hart (2001), VC is favored to have more control in the venture because the entrepreneur is not the best person to run it. The reasoning is that creativity gets in the way of entrepreneur's professional approach to management (the risk of value-destroying actions) that is most detestable. If the EN is in control and realizes his replacement is imminent, the entrepreneur may have little incentive to work hard to ensure that a good event occurs if his reward is to be replaced by a ruthless investor. In other words, this is a case where the VC should have control if the firm performs well since it is with good events that cash flow are important relative to private benefits.

### **2.6.1 Decision and Control Rights**

Venture capital firms are suppliers of capital in start-up projects. In recent years they have focused their attention on adding value to the companies they finance by providing a variety of services. These services include among others the provision of technical and commercial advice that helps shape the strategies of the project and attract key personnel, (Hellmann, 1998). Kaplan and Stromberg (2001) identify these activities as screening and monitoring. The screening process identifies areas where the venture capitalist expects to add value through monitoring and support activities. The reward to the venture capitalist for his contribution is a share in the gains of the venture. Control is derived from the need to ensure

that the project succeeds and cash flows are sufficiently enough to reward the investor and the entrepreneur.

The study by Aghion and Bolton (1992) is the most cited empirical work on control rights between the investor and entrepreneur. Aghion and Bolton (1992) developed a two-layer model of all-or-nothing shift of control and can be presented in a single binary variable (0 or 1). In this case, the entrepreneur or the investor holds all control rights, and the party in control is changed if the realization of the signal is higher than the threshold level. Therefore, according to Aghion and Bolton (1992) it may be optimal to make allocation of control rights dependent on the signal in the following way. If the realization of the signal is bad, the investor obtains control and if the realization of the signal is good, the entrepreneur retains control. Kaplan and Stromberg (2000) criticized the model on the grounds that changes in control allocation are seldom so abrupt in reality. Rather, the entrepreneur's (investor's) share of various control rights is often continuously increasing (decreasing) in the performance of the firm.

The study by Hellmann (1998) found that investors often hold extensive control rights and sometimes cash flow rights over entrepreneurial companies. The reason for this phenomenon is that investors play a key role in the management of companies they finance including holding key managerial positions and appointment of chief executive officers. Hellmann, (1998) justifies the requirement for investor control because control by the investor provides sufficient incentives to develop objectives without interference from any one else. Control ensures that the entrepreneur does not hold up the investor during implementation of the project after spending effort in search for a viable project. Venture capitalists hold effective control over the board, typically through voting majority, and sometimes through explicit contractual agreements (Sahlman, 1988, 1990). Other reasons for strong investor control and cash flow rights emanate from limited choices in the development of capital projects and lack of relevant knowledge and skills in the concerned industry (Hellmann (1989), Vauhkonen (2003) and Dessein (2004)).

Unlike the findings by Aghion and Bolton (1992), Vauhkonen (2003) model states that control is a divisible right that can be held contracting parties. The parties can agree on the division of many different control rights such as voting rights, board rights and liquidation rights that can be adjusted through contingent provisions. Second, different control rights are

frequently contingent on observable measures of financial and non-financial performance of the firm. If the signal of firm performance is bad, the investor obtains full control of the firm. If the signal is intermediate, the investor and entrepreneur share control (joint control). If the signal is good, the entrepreneur retains/obtains full control. Vauhkonen (2003) showed that the three layered signal contingent control right allocation could dominate other control. This is a modified fashion of Aghion and Bolton 1992 two-layer model

The intuition of the optimality of the three-layered signal contingent control allocation is the following. When the amount of needed finance is sufficiently large, entrepreneur control is not feasible. Full investor control, in turn, is unattractive for the entrepreneur as the investor ignores the entrepreneur's private benefits<sup>2</sup> when choosing the interim action. Under signal contingent control allocation, the expected share of control rights allocated to each party lies between these two extremes. This division of control rights provides both parties some protection from the exploration by the other party. It protects the investor, as the entrepreneur cannot always choose his preferred action yielding high private benefits but low monetary returns. Simultaneously, it protects the entrepreneur from the investor inclined to choose an action that yields high monetary returns but low private benefits.

If the size of needed finance is small, the investor does not need much protection against entrepreneur expropriation. In that case, the entrepreneur can retain all control rights. When the size of needed finance is higher, the investor needs some control rights to guarantee her sufficient returns to her investments. In that case, the three layered signal-contingent control allocation is the optimal mode of control. When the needed finance is very high, the entrepreneur must relinquish all control rights to induce the investor to finance the project.

According to empirical studies of venture capital finance by Kaplan and Stromberg, (2001, 2002) the division of control rights between entrepreneur and venture capitalist is often contingent on certain measures of performance. If the indicator of the company's performance (e.g., earnings before taxes and interest) is low, the venture capital firm obtains full control of the company. If the performance is very good, the venture capitalist relinquishes most of his control rights.

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<sup>2</sup> The entrepreneur here is a public authority. Therefore the word 'private' is a misnomer. It actually means public benefits.

Dessein (2004) explicitly introduces asymmetric information into Aghion-Bolton (1992) type model. His paper develops a theory of control as a signal of congruence of objectives and applies it to financial contracting between the investor and privately informed entrepreneurs. According to Dessein (2004), uncertainty and asymmetrical information by the entrepreneur are shown to be significantly correlated with less entrepreneur control, not more. The paper argues that a privately informed entrepreneur relinquishes control to an investor in order to signal the congruence of their preferences. Dessein's findings are similar to Vauhkonen's (2003) model where control is typically not an indivisible right to be held by one either the investor or the entrepreneur, but resembles a continuous variable adjusted through contingent provisions. Dessein findings are supported by Kaplan and Stromberg (2001) show that formal investor control is- (i) increasing when the level of uncertainty about the venture and the quality of the founder is high (ii) increasing when internal and external risk about which the entrepreneur is unlikely to be better informed. Internal risks relate to management action and management quality and are thus subject to asymmetric information. Both internal and external risks are significantly related with more investor control. (iii) decreasing in entrepreneur's resources, and (iv) increasing in the entrepreneur's incentive conflict.

A salient feature in Dessein's model is the significance of real control over formal control. Dessein (2004) concludes that the entrepreneur does not care about formal control rights per se-he derives private benefits only from having real control, that is, from the venture undertaking certain action. Hence, the entrepreneur has not much to loose by giving up formal control to an investor with similar preferences. In this model the entrepreneur cares about the project being carried out, whereas the investor cares about revenues.

As shown by Aghion and Bolton (1992), the entrepreneur would always like to retain control rights to preserve some private benefits, but the requirement to provide investors a minimum expected return on their investment forces him or her to relinquish control rights. Hart (2001) says that firms' financial structure decisions evolve from acknowledging that managerial actions affect profitability, and hence the firms' value depends to a great extent on the allocation of decisions and control rights. The only reasons why we may observe investor control are financing constraints (Dessein, 2004).



### 2.6.2 Control Rights

One aspect of economic activities is the costs and uncertainties involved in discovering valuable projects such as deposits of minerals. There is an obvious analogy with firms engaged in high technology industries (mostly fixed and specific), which are very research and development intensive, and the problems thrown up are also analogous. According to Mikesell (1971) there is no simple relationship between research and development expenditures and successful innovations or discoveries. These aspects of uncertainty and risk will prompt certain kind of behavior on the part of the firm. First, the firm will seek to reduce the risk it faces, and in particular will be unwilling to invest in exploration or development work unless it is confident of recovering its expenditures, with profits, if it is successful. The incentive to explore is eroded if the investor is not assured of a sufficient return on the investment in the unsuccessful searches as well as the successful.

In order to formulate an optimal distribution of cash flows rights, Cobbe (1979) suggested that entrepreneurs require to be thoroughly informed on the specifics of the project including the profit function available to the firm and how the investing firm reacts to different policy changes. This situation is unfortunate because information deficiency on the part of the entrepreneur inevitably requires the entrepreneur to rely on the investor's know-how.

In Kaplan and Stromberg (2001), investors are able to strategically exploit the associated information asymmetries by conducting researching before deciding whether and when to invest, in order to screen out ex ante unprofitable projects and bad entrepreneurs. The information exchange requirements for an optimal policy, together with the very high probability that there will be incentive for the firm, need not be entirely candid, implying the situation cannot be realistically modeled as a simple optimization problem but inherently involving bargaining.

Cobbe (1979) compares the bargaining process in a venture to game theory which assumes that the structure of pay offs to the players is known, subject to the stochastic nature, and the players have known utility functions and the preference ordering of the payoffs. This formulation of the problem of bargaining, namely that it must involve a form of outguessing game even when reduced to a game in normal form. This is related to another overlooked aspect of financial contract that negotiation on cash flow rights will be carried out by individuals who have their own preferences and interests in the context of a particular

structure of opinions and expectations on the part of outside observers and those affected by the outcome. Finally, there is the role of power in the bargaining process the implication being that other things being equal, the side with more power will do better and obtain more cash flow rights than if it had less power. In a study by Lyon (2004), bargaining power is principally based the information available to the contracting parties. Therefore, inability to identify the worth of a project by an entrepreneur reduces the bargaining ability and usually results in the entrepreneur ceding more cash flow rights and control rights to the investor (Lyon, 2004).

### **2.6.3 Cash flow rights**

Kaplan and Stromberg (2002) studied the relation of VC risk assessment to the financial contracts they utilize in their investment. They found out that: i) greater internal and external risks are associated with more cash flow rights. ii) When internal risk is high, VCs appear to screen entrepreneurs by making funds and equity stakes contingent on explicit milestones. This gives the VC the right to liquidate the venture when the milestones are not met. iii) Greater internal risk is associated with more VC control, while a less noisy external environment are associated with more post-investment information is associated with less VC control. iv) Complexity risk is associated with a decrease in the usefulness of screening. v) In complex ventures, where it is likely that more value is tied up in the founder's human capital, VC liquidation claim are less effective.

### **2.6.4 The Relationship between Control and Cash flow Rights**

Another aspect of financial contract is whether control and cash flow distribution are related. The evidence is inconclusive. Hellmann (1998) argues that investors control right can be allocated independently of cash flow rights through different sets of covenants for instance voting power can be attached to a particular financial instrument. Hellmann, (1998) defined control rights independently of financial claims so that a high equity stake is not associated with control. Control rights in the contract primarily to be exercised by the entrepreneur are relinquished to the investor to give her sufficient incentives to accomplish in her work. The point in Hellmann (1998) study is that the investor's incentives are provided through control rights while cash flow rights (equity) should take care of entrepreneur's incentives.

Kaplan and Stromberg (2001) study found out that VC financing allows the venture capitalist and the entrepreneur to allocate separately cash flow rights, voting rights, board rights,

liquidation rights and other control rights. Cash flows rights and control rights are independent instruments that can be used independently. Someone may be allocated significant cash flow rights without significant control rights and vice versa.

Dewatripont and Tirole (1994) and Cestone (2006) expressed different views on the relationship between control and cash flow rights. Dewatripont and Tirole (1994) rationalize the existence of multiple financial claims such as equity, preferred stock and debt and explain the observed correlation between control and cash flow rights within standard securities like debt or equity used by traditional corporations.

Cestone (2006) point out that control and cash flow rights seem to follow a joint pattern in real VC contracts and suggest that they are interrelated. Cestone predicted that a VC investor should hold a contingent claim with contingent control rights. After a good signal of profitability, the investor's preferred stock should be converted into common stock and control transferred to the entrepreneur. The study by Cestone (2006) supports earlier findings by Kaplan and Stromberg (2003) that while VCs usually take preferred stock in the firms they fund, contractual covenants attach to VCs' preferred stock substantial control rights.

There is a contradicting prediction in Cestone's model that challenges the common idea that risk claims (common stock) should always be associated with to more control rights as it is case in standard securities. Cestone (2006) predicts that when VC support is costly to provide, the venture capitalist holds a class of common stock with no formal control, whereas the entrepreneur holds preferred stock and retains most control rights. When VC support is not very costly, the VC holds preferred stock but is given formal control. The result challenges the textbook assumption that common stock should always be associated to more control rights with respect to preferred stock. Cestone concluded that most venture contracts often display a negative correlation between control rights and riskiness of claims. Cestone's theory explains the use of contingent contracts where the investors superior control rights are reduced and her claim is converted into a riskier one upon attainment of early performance milestones.

#### **2.6.5 Contingent venture capital deals**

Venture capital deals make an extensive use of contingencies. Kaplan and Stromberg (2003) report that cash flow rights, control rights and disbursement of additional finance are made

contingent upon observable measures of performance. Performance milestones are both financial (pre-set EBIT levels) and non financial for instance performance levels. Along the life of a start up, the parties' rights typically evolve in the following way. At the initial stages of financing, the VC usually enjoys superior control. If the company performs poorly, VC obtains full control; but as early performance milestones are attained, VC loses her superior voting, board and liquidation rights. Also upon attainment of performance targets, the VC's preferred stock is converted into common stock. According to theories reviewed in this paper, it is not clear why VC should lose her superior control rights at the time when her preferred stock can be converted into common stock.

#### **2.6.6 Interference in Control Relationship**

Burkart, Gromb and Panunzi (1997) have argued that investor's with high-powered claims are detrimental to entrepreneur initiative, in that it may turn formal control into effective interference. This problem is closely tied and constrained by the characteristics of the environment in which the venture occurs and in particular the information available to all parties.

Repullo and Suarez (2004) argue that inability to observe of the efforts that an entrepreneur and the venture capitalist contribute during the pre-revenue stages of the venture creates moral hazard problems. First, this occurs when the venture capitalist is the single firm's financier and advisor. Second, inability to verify the profitability of the venture in the interim prohibits the possibility of signing a contingent financing contract between the entrepreneur and the venture capitalist. A contingent contract would establish the terms for both the funding of the start-up investment and, contingent on the interim information on profitability, the funding of the expansion investment. In contrast, future financing when the interim information on profitability is not verifiable, it is not possible to directly write the conditions for the continuation of the project into an initial contract, which is hence incomplete and potentially subject to renegotiation. Repullo and Suarez (2004) concluded that moral hazard problem has a strong influence on the structure of the optimal securities.

Venture capitalists are conscious of entrepreneur's ability to interfere with control of the venture once the venture has become successful. Recognizing the political threat, venture capital firms minimize the exposure by increasing the entrepreneur's cost of interfering with the company operations. Shapiro (2002) identifies this aspect as structuring the investment.

The action involves adjusting the operation policies (in production, logistic, exporting, and technology transfer) and the financial policy so as to closely link the value of the project to the venture capitalists continued control. Alternatively, VC raises capital from external financiers because the strategy will elicit an international response to any expropriation move or any adverse action by the entrepreneur as well as addition to spreading risks (Shapiro 2002).

## **2.7 Chapter Summary**

Financial contracts are designed to mitigate conflicts of interest between the venture capitalists and the entrepreneurs. An optimal financial contract provides incentives for the entrepreneur and investor to behave optimally by allocating cash flow rights and control rights between the venture capitalists and entrepreneurs in accordance with the terms of the contract. Empirical evidence on cash flow rights and control rights in the studies reviewed above suggest that venture capitalists require to be allocated more cash flow rights and control rights in the early stages of a venture to protect their interests and to give them sufficient incentives to invest in the venture. As the project progresses and risks and uncertainties decline the level of cash flow rights and control rights to the venture capitalist decline. The reason for high cash flow rights and control rights are not availed to the entrepreneur in the early stages because entrepreneurs may not always act in the interest of the project and private benefits enjoyed by the entrepreneur introduces a potential conflict of interest. The investor is only interested in cash flow and to earn a return that is commensurate to the risk.

Studies reviewed above identify lack of verifiability of project's worth as a major limitation in determining cash flow rights and control rights. Investors' incentives to finance a project and entrepreneurs initiative to support the investment are affected. There are no studies done in Kenya that expound on how investors/entrepreneur can structure financial contract deals.

## Chapter Three

### Research Methodology

#### 3.1 Introduction

The chapter consists of four sections. Section one identifies the conceptual model and variables used in the model. Section two analyses the model used to explain distribution of cash flow rights and control rights. Section three presents the diagnostic tests and uses t-statistics to measure the significance of coefficients and correlation analysis between control rights and cash flow rights. Section four explains data used.

##### 3.1.2 Conceptual Model

This section describes the ingredients of the distribution of cash flow rights and control rights between the investor and entrepreneur. We identified performance and risk as the most important determinants of cash flow rights and control rights.

In the model, VC control and EN control are dummy variables which take on the values 1 and 0 respectively, when the VC and EN is in control respectively. In this study VC has control if the states of nature are uncertain and the prospects to break even are unknown and capital requirements in the project are high. VC control is required to guarantee her sufficient returns to her investments. When the needed finance is high, the EN must relinquish control rights to the investor to induce her to finance the project.

Venture capitalist and entrepreneur's cash flow rights are based on performance (production) and capital investments. Performance is measured by production that the venture capitalist to optimize, capital contribution, and the various tax forms the entrepreneur desires to apply to maximize revenue. Performance is reflected in the profit function of the firm. Tax in its various forms represents entrepreneur cash flow rights. Profits depend on the quantity and quality of mineral reserves, the level of production and time. In this study, we estimate pre-tax profits and estimated production levels to measure performance. Venture capitalist risks are based on the projects ability to break-even. Entrepreneur's risks occurs when the project fails and the projected cash flows from royalty payments and corporate taxes are not realized.

$$VC_{\text{Control}} = f(\text{performance, risk})$$

$$EN_{\text{control}} = f(\text{performance, risk})$$

$TKL_{control} = f(\text{equity holding, capital contribution, risk})$

$GoK_{control} = f(\text{performance, risk})$

$\text{Performance} = f(\text{production, capital contribution, tax, time})$

### 3.2.0 Analytical Model

We used multiple regression models to analyze the variables of performance and risk measures. Venture capitalists' performance is measured by production output (P) and capital invested (K). Risk (R) is measured by standard variation of expected production and expected revenues.

#### 3.2.1 Model for Cash Flows Rights is

a) Tiomin (Cash flow Rights) =  $\alpha_0 + \alpha_1P + \alpha_2K - \alpha_3T + \alpha_4t + \alpha_5C + e$

b) GOK (Cash flow Rights) =  $\beta_0 + \beta_1T + \beta_2RP + \beta_3P - \beta_4C + e$

Where, P is the estimated production in metric tons;

K is capital commitment

T Taxation levels

t economic life of the project

C tax concession

RP royalty payment

e captures the influence of other non-quantifiable factors

The regression  $\alpha$  and  $\beta$  coefficients represent the *independent* contributions of each independent variable to the prediction of the dependent variable.

#### 3.2.2 Model for Control Rights

We identify control as a factor of equity holding (EH), Capital contribution (K).

Tiomin (Control Right) =  $\alpha_0 + \alpha_1EH + \alpha_2K + e$

GOK(control Rights) =  $\beta_0 + \beta_1EH + \beta_2K + e$

The regression  $\alpha$ ,  $\beta$  coefficients represent the *independent* contributions of each independent variable to the prediction of the dependent variable.

### 3.3 Diagnostic Tests

The data was analyzed using quantitative and descriptive statistics. Correlation analysis was done using Pearson correlation coefficient ( $r$ ). Multiple regression analysis was done to derive the model. Step wise method was used. The model integrity was diagnosed using an ANOVA with a significance level of the F statistic at 0.05. An analysis of Multicollinearity which causes the standard error of the regression coefficients to be inflated was done. The model was acceptable when the variance inflation factor (VIF) was less than 2. A histogram was also used to check if the assumption that the error term follows a normal curve was violated.

### 3.4 Data

The data was collected from Tiomin Kenya limited (TKL) website, the feasibility report and entrepreneur available information in public domain. All variables are yearly and span for the first fourteen years of production. All monetary variables are in US dollars.

#### Production

Production is measured in metric tons to be produced on a production schedule known as the time profile of extraction rates. TKL has estimated a time profile of extraction rate in a way that marginal revenue from a small change in extraction rates is equal to the sum of instantaneous marginal cost for a change in extraction rate. The titanium ores are processed into three separable products, ilmenite, rutile and zircon.

#### Time

Time is in years and reflects the economic life of the project. The study utilized data for fourteen years. The project is expected to be productive for 21 years. This implies that the firm has decided on a production schedule known as the time profile of extraction rates that ensures profitable production during the entire period. The importance of time is that the profit-maximizing rule for a mining firm has a special feature in that ore that is mined is no longer available to mine at some future date.



### Capital (Investment outlay)

Capital is required for per-investment activities in exploration, engineering feasibility, environmental studies and capital for developing proven reserves and creating necessary infrastructure. The actual mining business is typically associated with various kinds of processing installation to prepare the ore for shipment, with power installations, maintenance of equipments and transport infrastructure and infrastructure for work force. It is reasonable to assume that the size of capital stock sets a limit to the rate of extraction so that the level of capital stock becomes a new constraint.

### Equity Holding

Equity holding represents the voting power of the owners of equity if the firm has other classes of capital. Equity holding enables representation on the board of directors in the policy-making of the operating firm. The party with majority equity is most of the time assumed to be in control of the firm. Our study reveals that Tiomin Kenya Limited holds 100% equity.

### Taxation

Taxes in mining industries are of kinds. The first tax is 'royalties' that is based on tonnage of minerals mined or on sales revenue. The second form of tax is corporate tax based on profits from operations. The tax function on the firm depends on accounting profits, which themselves depend on amount of ore deposits, the rate of extraction and on time. Time is included in the tax function since taxes themselves may change over time. Corporate tax rate is 30%. The importance of tax is its implication on the cash flows available to the firm and how it affects the behavior of Tiomin. Marginal tax rates affect the effort of firms and their efficiency. High levels of tax produce a disincentive to invest. The government uses tax as a policy tool to alter schedules of extraction adopted by the firm.

### Risk

Risk in the project occurs when the company fails to break-even within the expect time while the government (entrepreneurs) risk occurs if the firm fails to achieve its revenue based as a result of poor performance.

## **Chapter Four**

### **Data Analysis and Interpretation**

#### **4.1 Introduction**

The chapter consists of four sections. Section one is introduction. Section two is summary of research findings. Section three estimates Tiomin and GOK cash flows. Section four analyses the control rights allocation.

#### **4.2 Summary statistics**

The analysis of cash flow rights and control rights produced the following results: Cash flow rights are influenced by the level of production and capital investment. This is illustrated in Table 4.1 Table 4.8 for Tiomin and GoK respectively. Table 4.1 shows that Tiomin cash flow is positively affected by an increase the production of ilmenite. Higher production of ilmenite leads to a better cash flow for Tiomin. Table 4.8 shows that GoK cash flow is positively affected by an increase the production of ilmenite and Zircon. Distribution of control rights was determined under the terms of the contract. This is captured in our model where Tiomin control rights are determined by equity holding and capital contribution. Control is not related to production or profitability of the venture but on active participation in the production and contribution of capital of which GoK is perceived to be an inactive partner. Overall Tiomin Kenya Limited enjoys superior cash flow rights and control rights in the project. However, cash flow rights and control rights have been determined independent of each other.

#### **4.3 Determination of Cash flow Rights**

##### **4.3.1 Determination of Tiomin (K) Cash flows**

Correlation analysis was used to determine whether a change in the independent variable is accompanied by a change in cash flows. Pearson's correlation coefficient, were computed between the cash flow and each of the independent variables identified in the model. Table 4.1 shows the results.

**Table 4.1: Correlation between Tiomin Cash Flow and other variables**

Independent Variables	Tiomin Cash flow vs. independent variables
	Pearson correlation (r)
Production of ilmenite	0.921
Production of rutile	0.748
Production of zircon	0.562
Capital	-0.245
Variable cost	0.792
Royalty	0.999
Tax	0.999
Concession	-0.144

**Source: Research data**

Table 4.1 shows that the variables most correlated with Tiomin's cash flow were tax ( $r=0.999$ ) and royalty payments ( $r=0.999$ ). This is because they were tax rates levied by the government and were proportions pegged on Tiomin's cash flow. There was also a strong positive correlation ( $r=0.921$ ) between the company's cash flow and the production ilmenite mineral. This implies that increase in the production of the mineral triggers an almost proportionate increase in cash flow. It can further be seen that Capital investment ( $r=-0.245$ ) was negatively correlated with Tiomin's cash flow. This is probably an indication that capital expenditure was obtained from the cash flow implying that capital increased as a result in a decrease in cash flow. Tax concession was pegged at 15% in the first ten years of production and zero in the subsequent years. During this period, Tiomin cash flow improved steadily. The negative correlation ( $r=-0.144$ ) between Tiomin cash flow and Tax concession therefore explains this relationship pattern.

**Table 4.2: Model summary**

Statistic	Value
R	0.995
R Square	0.990
Std. Error of the Estimate	893070
F	151.2
Sig.	0.000

**Source: Research data**

As shown in Table 4.2, the significance value of the F statistic is less than 0.05 (95% confidence interval). This implies that the variation explained by the model is not due to chance. Table 4.2 also shows that *R*, the multiple correlation coefficient has a value of 0.995. This signifies a strong linear correlation between the observed and model-predicted values of the dependent variable. *R* square, the coefficient of determination yielded a value of 0.990. This implies that 99% of the variation in Tiomin's cash flow is explained by the model.

Table 4.3 shows the coefficients of the independent variables in the model.

**Table 4.3: Coefficients**

Model	$\alpha$	Std. Error	t	Sig.
(Constant)	1280529	1588435	0.806	0.443
Production of ilmenite	91.34	15.8	6.016	0.000
Production of rutile	481.76	62.7	7.688	0.000
Production of zircon	510.38	58.13	8.781	0.000
Capital	-0.006	0.006	-1.003	0.345
Variable cost	-31.464	8.112	-3.879	0.005

**Source: Research data**

Table 4.3 shows that even though the model fit looks good some of the variables included in the model were not significant ( $\text{sig} < 0.05$ , 95% CI). Such variables do not contribute much to the model. Before the model could be accepted as final, it was subjected to multicollinearity diagnosis to establish the extent of correlation amongst the predictors (independent variables). The collinearity statistics are presented in Table 4.4 below.

**Table 4.4: Collinearity Statistics**

Independent variables	Tolerance	VIF
(Constant)		
Production of ilmenite	0.14	7.23
Production of rutile	0.20	5.08
Production of zircon	0.46	2.17
Capital	0.86	1.17
Variable cost	0.15	6.88

**Source: Research data**

Tolerance is the percentage of the variance in a given predictor that cannot be explained by the other predictors. Tolerances close to 0 indicate high multicollinearity. Multicollinearity causes the standard error of the regression coefficients to be inflated. A variance inflation factor (VIF) shows the factor by which the coefficients are inflated. The recommended VIF is less than 2.

The findings in Table 4.4 show that the independent variables in the derived model are very much correlated to each other. The model is therefore unacceptable. To correct for this, the independent variables were normalized using the Z-scores. Linear regression was then redone with the cash flow as the dependent variable and Z scores of the independent variables. The new model coefficients are shown in Table 4.5.

**Table 4.5: Variables in the new Model**

Model	Un-standardized Coefficients			
	$\alpha$	Std. Error	t	Sig.
(Constant)	32,221,092	740017.8	24.263	0.000
Z score: Production of ilmenite	6,309,411	767952.7	2.360	0.046

**Source: Research data**

As shown in Table 4.5, the stepwise algorithm chose Production of ilmenite as the only influential dependent variable predictor. It can therefore be said that the Tiomin cash flow is

positively affected by an increase the production of ilmenite. It can thus be concluded that higher production of ilmenite leads to a better cash flow for Tiomin.

The linear model can therefore be expressed as:

$$\text{Tiomin Cash flow} = 6,309,411 * \text{Production of ilmenite} + 32,221,092$$

The acceptability of the model was examined from a statistical perspective. The findings are as shown in the ANOVA Table below.

**Table 4.6: ANOVA**

Model		Sum of Squares	df	F	Sig.	R	R Square	Std. Error of the Estimate
1	Regression	5.17 X 10 <sup>14</sup>	1	67.50	0.00	0.921	0.849	2768892.98
	Residual	9.2 X 10 <sup>13</sup>	12					
	Total	6.1 X 10 <sup>14</sup>	13					

**Source: Research data**

As shown in Table 4.6, the ANOVA table reports that the significance value of the F statistic is less than 0.05. This implies that the variation explained by the model is not due to chance.

The model summary reports the strength of the relationship between the model and the dependent variable. Table 4.6 shows that *R*, the multiple correlation coefficient has a value of 0.921. This signifies a strong linear correlation between the observed and model-predicted values of the dependent variable. *R* square, the coefficient of determination yields a value of 0.849. This implies that 84.9% of the variation in Tiomins' cash flow is explained by the model. Table resultant model for determining government cash flow is as shown in the table below. The results of multicollinearity tests are presented in Table 4.7

**Table 4.7: Multicollinearity**

Correlations			Collinearity Statistics	
Zero-order	Partial	Part	Tolerance	VIF
0.921	0.921	0.921	1.000	1.000

**Source: Research data**

As shown in Table 4.7, the large tolerances shows that none of the variance in the predictor can be explained by the other predictors. This is because the new model had a single predictor which therefore preempts the possibility of multicollinearity. The residuals of the model were also tested for normality.

The residual for a given product is the observed value of the error term for that product. The residual for Tiomin Kenya Limited cash flow shown in Figure 1 was used to check the assumption of normality of the error term.

**Figure 4.1: Normality of the Error term**

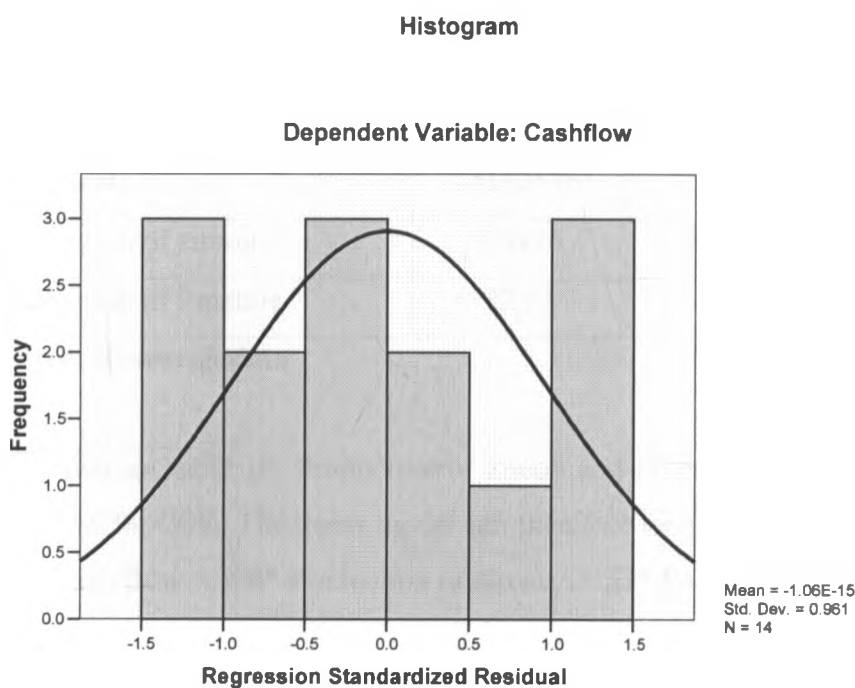


Figure 4.1 illustrates that the shape of the histogram does not approximately follow the shape of the normal curve but the extent to which normality is violated is minimal.

### 4.3.2 The Determinant of GoK Cash flows

**Table 4.8: Correlation between GoK Cash Flow and other variables**

Independent Variables	GoK Cash flow vs. independent variables
	Pearson correlation (r)
Production of ilmenite	0.651
Production of rutile	0.188
Production of zircon	0.739

**Source: Research data**

Table 4.8 shows the correlation between GoK cash flow and production variables. It can be seen that there was a strong positive correlation between the production of zircon ( $r=0.739$ ) and Ilmenite (0.651). Although rutile was also positively correlated with GoK cash flow, the strength of the correlation was weak. Linear regression was again used to derive a linear model describing the relationship between production and cash flow for GoK. The resulting model is as shown below.

The model summary table below reports the strength of the relationship between the model and the dependent variable.

**Table 4.9: Variables in the new Model**

Model	Un-standardized Coefficients			Sig.
	$\beta$	Std. Error	t	
(Constant)	-4160576	2345078	-1.774	.104
Production of zircon	306.26	96.99	3.157	.009
Production of ilmenite	32.63	13.89	2.349	.039

**Source: Research data**

As shown in Table 10, Production of zircon and ilmenite were the significant predictors of cash flow for GoK. The linear model can therefore be expressed as:

$$\text{GoK Cash flow} = 306 * \text{Production of zircon} + 33 * \text{Production of ilmenite} - 4,160,576$$

The model summary is as shown in the table below:

**Table 4.10: Model Summary**

Model	R	R Square	Std. Error of the Estimate
1	0.835	0.698	2015021.9

**Source: Research data**

Table 4.10 shows that  $R$ , the multiple correlation coefficient has a value of 0.835 implying a strong linear correlation between the observed and model-predicted values of the dependent variable.  $R$  square = 0.698 also implies that 69.8 % of the variation in GOK cash flow is explained by the model.



**4.3.3 The Results of multicollinearity tests are presented in Table 4.11**

**Table 4.11: Multicollinearity**

Correlations			Collinearity Statistics	
Zero-order	Partial	Part	Tolerance	VIF
0.74	0.69	0.52	0.84	1.19
0.65	0.58	0.39	0.84	1.19

**Source: Research data**

As shown in Table 4.11, the large tolerances shows that none of the variance in the predictor can be explained by the other predictors.

**4.3.4 The residual of the model were also tested for normality**

The residual for a given product is the observed value of the error term for that product. The residual for Tiomin Kenya Limited cash flow shown in Figure 1 was used to check the assumption of normality of the error term.

**Figure 4.2: Normality of the Error term**

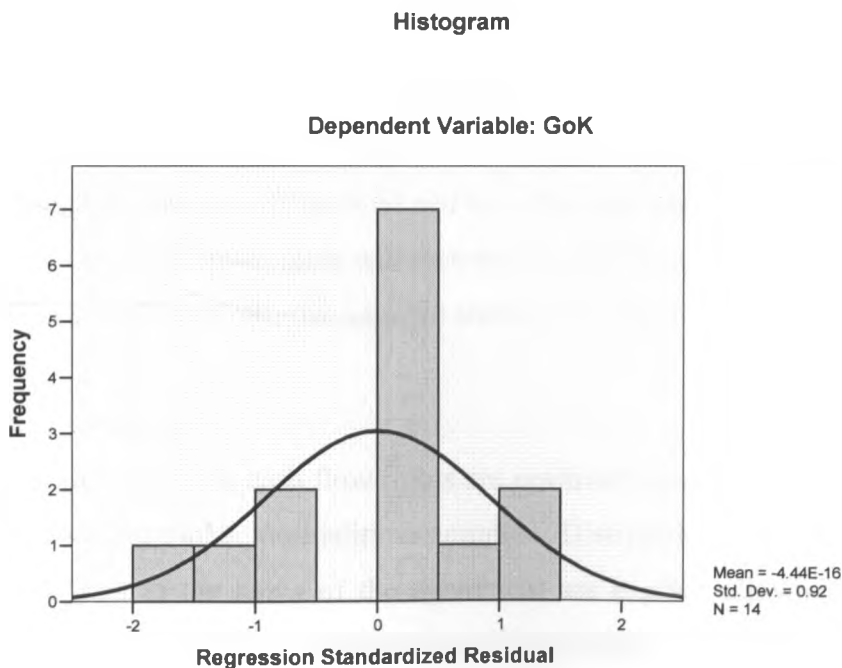


Figure 4.2 illustrates that the shape of the histogram approximately follows the shape of the normal curve. This histogram is acceptably close to the normal curve indicating that the normality assumption is not violated.

#### **4.4 Allocation of Control rights**

In our analytical model, control was identified as a factor of equity holding, capital contribution and production. According to Aghion and Bolton (1992) two-layer model of all or nothing shift of control is represented in a single binary dummy variable 0 or 1 respectively when VC and EN is in control respectively. Tiomin Kenya Limited own 100% equity in return for its capital contribution, production, processing and marketing of mineral ores. Control in the firm is absolute in favor of Tiomin Kenya limited because of the financing and managerial constraints by the government. GoK control is limited to supervisory work of ensuring that quantities produced are accounted for, environmental regulations are adhered to during production and rehabilitation of land. Relating the facts of ownership structure to our conceptual model, Tiomin Kenya limited has control level of (1) with the GoK with (0). Control in the project is more of board room decision based on bargaining skills.

#### **4.5 Relationship between cash flow rights and control rights**

Tiomin's cash flow rights are high and control rights are absolute. However, there is no correlation between cash flow rights and control. These supports empirical evidence that allows contracting parties to allocate separately cash flow rights and control rights separately. The allocation of cash flow rights, control rights, and future financing are not contingent on observable measure of financial and non-financial performance. Therefore it is not expected that GOK cash flows rights will increase beyond the terms of the contract nor will control in the hands of Tiomin Kenya Limited shrink with improved performance.

#### **4.6 Summary**

Tiomin's and GoK cash flow rights are positively related to performance. Data is acceptable and does not violate normality assumption. Distribution of control rights were not subjected to analysis as the terms of the agreement are explicit allowing Tiomin Kenya Limited to control production and management of the venture. On the overall Tiomin Kenya Limited enjoys superior cash flow rights and control rights.

## Chapter Five

### Summary, Conclusion and Recommendations

#### 5.1 Introduction

The chapter consists of five sections. Section one is introduction. Section two is summary of the study. Section three is conclusion. Section four is limitation of the study. Section five is recommendation for further study.

#### 5.2 Summary of the Study

The objectives of the study was to determine how the proposed allocation of cash flow rights and control rights was done in the titanium mining project between GoK and Tiomin Kenya Limited and examine if there is relationship between cash flow rights and control rights allocation. Our model predicted that performance, capital contribution and risk are identified as the main factor determining the allocation of cash flow rights. Equity holding and capital contribution have been identified as the factors that determine allocation of control rights.

The study found out that TKL and GOK cash flows are related to performance and capital contribution. The correlation analysis revealed that there was a strong positive correlation between the Tiomin cash flow and the production ilmenite mineral. This was interpreted to imply that implies that increase in the production of the mineral triggers an almost proportionate increase in cash flow.

As regards the cash flow of GoK, the correlation analysis showed that there was a strong positive correlation between the production of zircon and Ilmenite. Although rutile was also positively correlated with GoK cash flow, the strength of the correlation were weak. The study also found out that the production of zircon and ilmenite were the significant predictors of cash flow for GoK.

The study reveals that control rights have been determine through contract negotiation. Control rights are not related to the projects performance. Cash flow rights and control rights have been allocated separately.

### **5.3 Conclusion**

This study has analyzed how cash flow rights and control rights have been determined in the titanium mining project between the GoK and Tiomin Kenya Limited. The study provides a powerful theoretical framework to explain how cash flow rights and control rights can be allocated in project when the owner of natural resources is financially constrained. In the study TKL acquired controlling rights to mitigate risks in the project and to offer appropriate incentive to invest in specific assets. Control also forestalls any opportunist tendencies of renegotiating the contract ex-ante. There is also the power in the bargaining process, the implication being that other things being equal, TKL with more information about the mineral resource, financial and technical power was able to negotiate superior cash flow rights and control rights than if it had less power. GOK inability to gain significant control rights and cash flow rights can partly be attributed to weak bargaining power and partly to outdated Mining Act. The issues encountered during the negotiation of the mining contract make it desirable to make an excursion into the background of Kenya's mining policies and legislation and to improve technical skills in the industry-.

### **5.4 Limitations of the study**

Titanium mining has not commenced production and much of the information is considered confidential to the extent that the data cannot be easily authenticated. Lack of similar projects and local studies in mining projects constrained comparison to be made. Regulatory standards and outdated mining policy on mining are lacking which could have formed the benchmark for our study. The data used was extracted from a technical report based on feasibility study done in year 2000 and 2004. Summary data is available on the company website [www.tiomin.com](http://www.tiomin.com). Since the discovery of titanium at Kwale District, several other titanium mineral mines have been discovered in other parts of the world effectively reducing the distinctiveness of the Kwale mines. A senior official at TKL confirmed that increase in supplies of titanium ores and delays to implement the project have affected earlier estimates of costs and revenue. The company is conducting a diligent study to assess the effects of these variations.

### **5.5 Recommendations for Further Study**

It was found that some minerals have relatively more influence in determination of GoK cash flow. It is recommended that the government proposes a weighted system based on this fact while negotiating for allocation of control rights with Tiomin. Tiomin needs to explore and

optimize the production of ilmenite as it was found to be the single mineral that best predicts its (Tiomin) cash flow. It is also recommended that in future, the government retains some stake (equity) in the companies that may seek to extract mineral resources. This way the government can be guaranteed of a perpetual income that is commensurate to the market rates of the mineral resource. The government invests in research activities to know the value of its mineral resources before granting mining licenses to investors. Information on value of mineral resources will enable appropriate basis for sharing benefits and control. Review the mining Act of 1940. The ideological considerations emanating from it continue to influence strongly economic policies to the present day. Since the pay back period is six years, the concession should be could be reduced from ten year to boost the government's revenue

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<http://www.tiomin.com/s/Home.asp>



## Appendix I: Letter of Transmittal

The Manager  
Tiomin Kenya Ltd  
P.O BOX 1214  
UKUNDA

Dear Sir

### RE: ACADEMIC RESEARCH –PROPOSED PRODUCTION STATISTICS FOR TIOMIN LIMITED

I am a part time student at University of Nairobi. I am doing my project on financial contracting and have chosen Tiomin Kenya Limited for my study. In the study i wish to derive an equation to predict how the projected cash flows relates to level of production, investment in capital and investment in variable costs for the period the company has been licensed to mine the ores.

In the company's website <http://www.tiomin.com> there is consolidated data extracts with a title "Technical Report on Kwale-dated August 24 2004 that is base on the 2000 feasibility study by Ausenco Ltd and LTA Process Engineering Ltd on overall capital costs and operating expenditure.

For the purpose of my study I require some detailed data like the one contained in the feasibility study. I understand the information i require is confidential and I will take every care to use it for academic purposes. The details I require are contained in the table below. I would also appreciate other statistics which are in the report related the mineral ores

year	Projected Production	Projected Capital investment	Projected Avg.operating costs	Projected Cash flows	Tax levels	Royalty payments
1						
2						
3						
4						
5						
6						
7						
8						

9						
10						
11						
12						
13						
14						

- 2.0 What role will the GOK play in the project?
- 3.0 How will delay of project implementation have on costs and revenues?
- 4.0 On what basis it did your company require control of the project and superior cash flow benefits?
- 5.0 What are the chances of your company acquiring a similar financial contract?

I believe that that you will favor me with the information from your records. I will appreciate your response to the questions.

Thank you for time.

Yours faithfully

Francis Njinu  
 Reg. D/61/P/7430/03

**Appendix II: Projected Data Used**

Year	p ilmenite	p rutile	p zircon	K-Capital	Variable cost	Cashflow	GOK	Zp_ilmenite	zp rutile	zp zircon	zKapital	Z Variable cost	zCashflow	ZGOK
1	135015	31106	17459	1.65E+08	321265	26395286	4465176	-0.30024	-0.35686	-0.6703	3.474396	0.003758	-0.85082	-0.84382
2	174202	40375	22521	0	414922	34259480	5795881	0.593166	0.683697	0.135638	-0.26726	1.173422	0.297692	-0.4493
3	219512	47841	26569	0	514364	42160406	7131885	1.626168	1.521842	0.78013	-0.26726	2.415334	1.451564	-0.05321
4	108318	29112	13951	0	257348	23477591	3976467	-0.90889	-0.58071	-1.22881	-0.26726	-0.79449	-1.27692	-0.98871
5	108318	29112	13951	0	257348	23224812	3933178	-0.90889	-0.58071	-1.22881	-0.26726	-0.79449	-1.31384	-1.00154
6	108318	29112	13951	0	254320	24883534	4217753	-0.90889	-0.58071	-1.22881	-0.26726	-0.8323	-1.0716	-0.91718
7	129420	36015	15202	0	298051	30225654	5125102	-0.4278	0.194237	-1.02964	-0.26726	-0.28616	-0.29142	-0.64817
8	132912	40815	17926	0	297062	33738524	5726850	-0.34819	0.733092	-0.59594	-0.26726	-0.29851	0.22161	-0.46976
9	134692	39518	22521	0	295097	34200843	5806359	-0.3076	0.587489	0.135638	-0.26726	-0.32305	0.289128	-0.44619
10	120215	27416	27689	0	262980	30897049	9726317	-0.63766	-0.7711	0.958448	-0.26726	-0.72415	-0.19337	0.715981
11	118723	22629	32727	0	261119	31657996	9968509	-0.67167	-1.3085	1.76056	-0.26726	-0.74739	-0.08224	0.787785
12	135817	18237	29132	0	265620	29567999	9303505	-0.28196	-1.80155	1.188191	-0.26726	-0.69118	-0.38746	0.590627
13	230397	45781	25230	0	421971	43869179	13794488	1.87433	1.290583	0.566944	-0.26726	1.261456	1.701118	1.922095
14	218721	42918	24538	0	372030	42536932	13387356	1.608134	0.969178	0.456769	-0.26726	0.637752	1.506553	1.80139

Source: Tiomin Kenya Limited