CHAPTER V

EFFECTS OF ECONOMIC PARAMETERS

Before investigating the effects of Block Ringfencing concept on the return to a concessionaire for various combination models or cases, it is useful to investigate the effects of some economic parameters on the return to a concessionaire for each field size. Knowledge about these effects will allow one to be aware of the influence of various economic parameters, hence reducing chance of misinterpretation for later analysis. The effects of the following economic parameters will be investigated: cost change, cost and price escalation, and capital financing. In studying these effects, only one field size will be used at a time.

Effects of cost change

There is a possibility that the cost will be different, in the future, from what has been predicted at present. Therefore, it is useful to see how this cost change affects the return to a concessionaire. Figure 5-1 shows internal rate of return (IRR) for projects of various field sizes for the base case (cost being as estimated), the 25% increase-in-cost case (cost being 25% higher than estimated), and the 25% decrease-in-cost case (cost being 25% lower than estimated). From this figure, it can be seen that change in cost has a considerable effect on IRR. It seems that decrease in cost has more influence on IRR than increase in cost. That is, IRR decreases about 4% when cost increases 25% but IRR increases up to about 6% when cost decreases 25%. It can also be seen that influence of cost change for each field size is about the same. Therefore, the influence of cost change on IRR does not depend on field sizes.

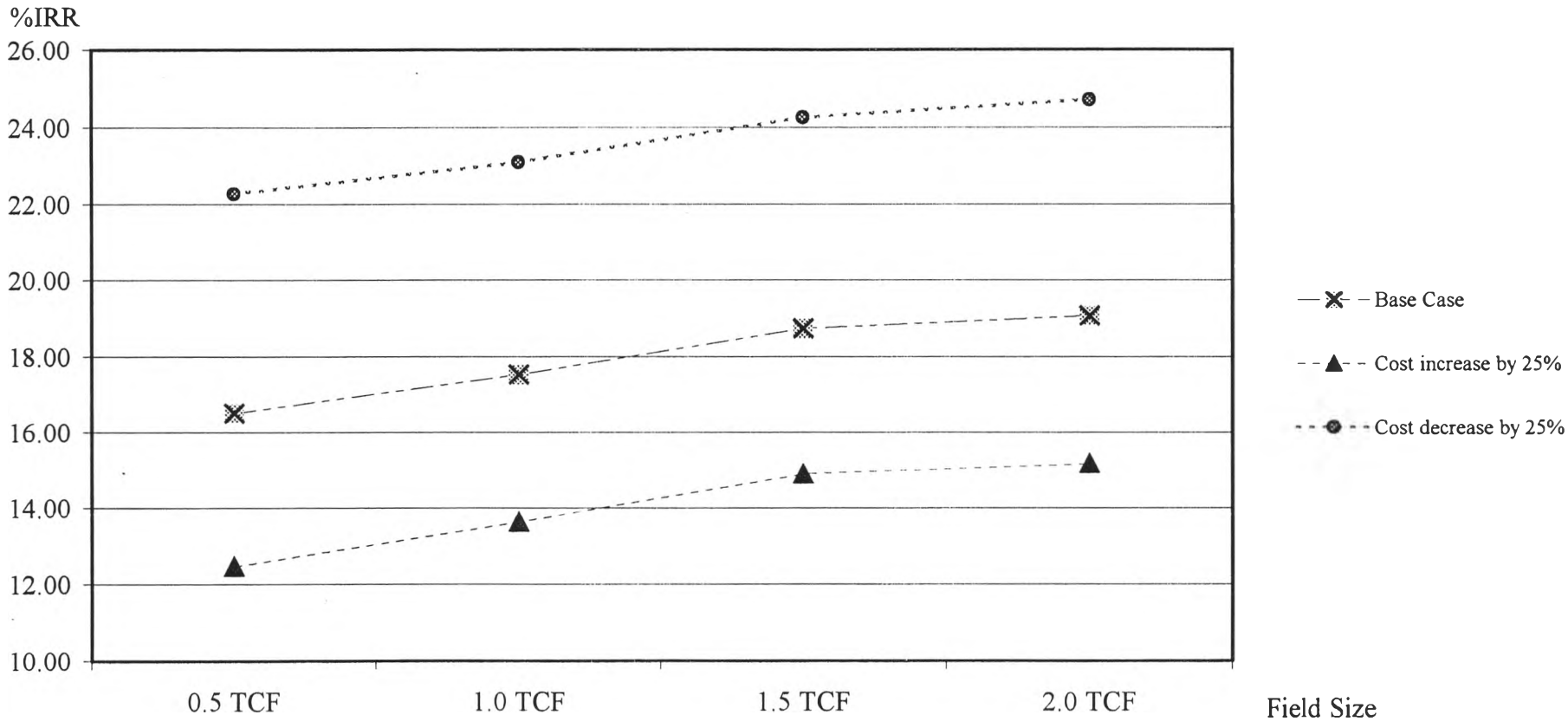

Figure 5-1 Effect of Cost Change on IRR of the Single-Field Project

In addition, considering the base case, one can see that the field as small as 0.5 TCF can be feasibly developed and produced if the concessionaire can accept the 16% rate of return. The increases of IRR from 0.5 to 1.0 TCF and from 1.0 to 1.5 TCF cases are about at the same rate but increase of IRR from 1.5 to 2.0 TCF is at a lower rate. This implies that though larger field sizes give higher IRR, the increase rate of IRR may be smaller for large field sizes. Nevertheless, this conclusion is drawn from the available information in Figure 5-1. It can still be possible that for field sizes larger than 2.0 TCF, the behavior of IRR may not follow what has been discussed here.

Another point worth to be mentioned is that for the case that cost increases by 25%, IRR of all field sizes studied are about or less than 15%. Therefore, if the required IRR for investment of oil companies is greater than 15%, even a 2-TCF gas field will not be feasible. This, in fact, can be considered as risk in the development and production of a gas field in the Gulf of Thailand. With this risk (25% increase in cost), the feasible project may become unfeasible. On the other hand, if the cost decreases by 25%, IRR may be as high as 22% for the 0.5 TCF field size and more than 24% for the 2.0 TCF field size. This can be considered as benefit to the concessionaire. However, it can be considered as risk to the host government. This is because whenever the return to the concessionaire is excessive for any development project concerning natural resources, the host government can be considered as losing its legitimate return.

Nevertheless, when there is risk involved, all parties concerned cannot consider related things in a simple way. The host government should not only try to capture excessive profits the concessionaire receives due to unexpected low cost or

high petroleum price but also try to compensate to the concessionaire (if possible) if the concessionaire earns unreasonable less profits due to unexpected high cost or low petroleum price. If the host government adopts this policy, it then practically accepts to share risk with the concessionaire. This is, in fact, not a bad policy. Sharing risk with the concessionaire does not necessarily imply that the host government has to spend the money out of its pocket if the worst scenario occurs. It may only mean that the host government loses its revenue from collection of royalty and income tax. Nevertheless, if that kind of loss still facilitates the concessionaire to continue to produce petroleum (i.e. reasonable return to the concessionaire), the obvious benefit to the host government or the host country is the increase in the capacity of domestic petroleum production, hence better sign for self sufficiency in petroleum or more petroleum can be exported (for the exporting countries). The indirect benefits include employment, transfer of technology, development of related industries, etc.

Effects of cost and price escalation

To take into account the economic inflation, the effects of cost and price escalation are investigated. In this study, both cost and price are escalated at the same rate. The 3% and 5% escalation are considered. Figure 5-2 shows IRR for 3% and 5% escalation cases compared to the base case. The 3% escalation results in about 2% increase in IRR for all cases (0.5, 1.0, 1.5, and 2.0 TCF). However, the 5% escalation results in only slightly increase in IRR over the case of 3% escalation, with almost no increase for the 2.0 TCF field size. It is expected that for escalation higher than 5%, increase in IRR is probably not much different from the case of 5% escalation.

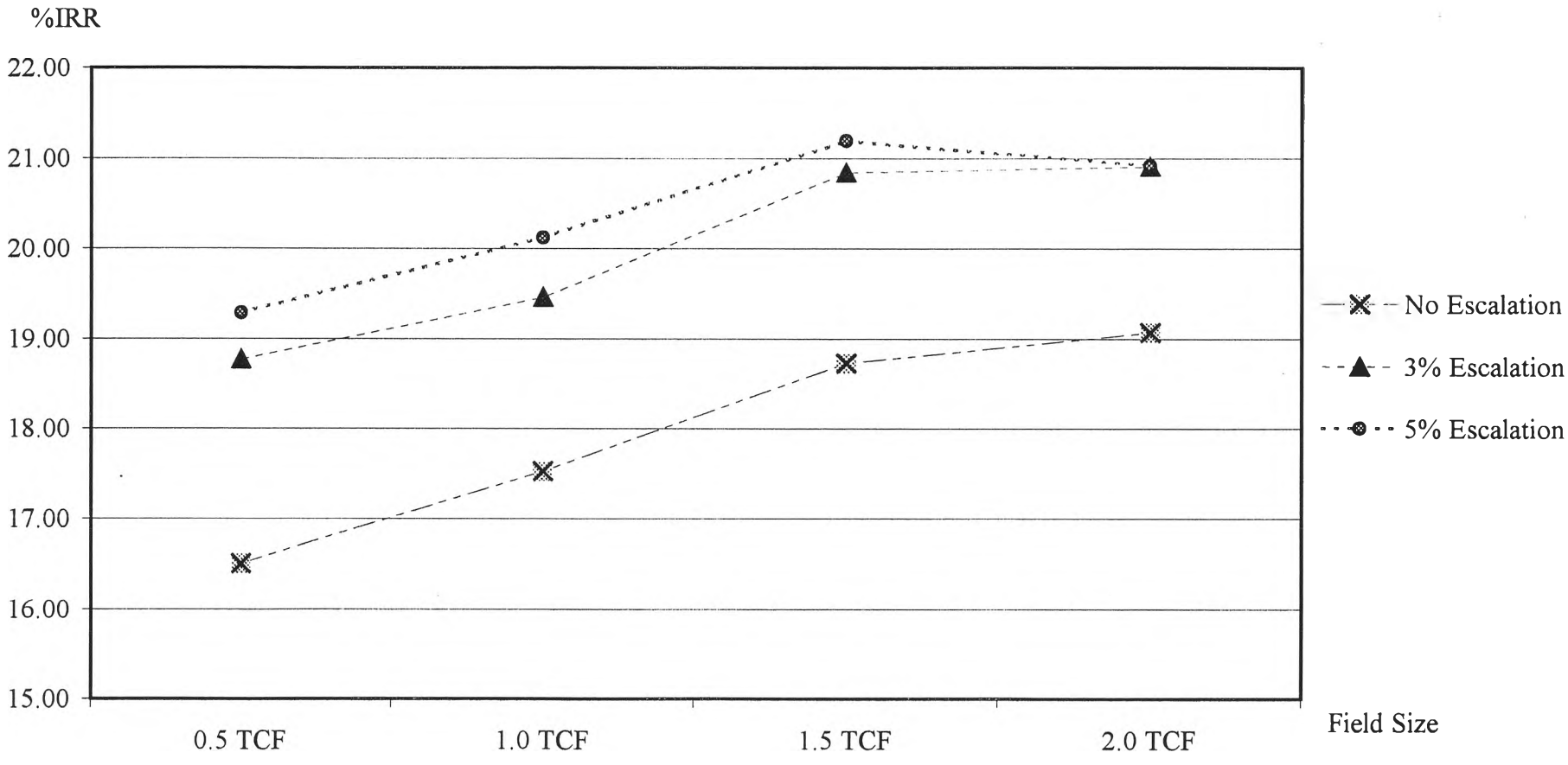

Figure 5-2 Effect of Escalation on IRR of the Single-Field Project

Because escalation in cost and price for all cases studied here has noticeable effect on IRR, it is recommended that the financial analysis be run for the escalation case to see its effect on IRR. As mentioned before the escalation in cost and price is considered in order to take into account the inflation rate. The escalation of cost and price can be estimated plausibly for each item and the resulting IRR will closely and properly reflect what will happen in the future.

Effects of capital financing

Because most petroleum projects are large projects and need high investment, it is common to make loan to finance the projects. This section will investigate the effects of partially financing the project by loans. It is assumed that 30% of the capital cost is financed by the equity and 70 % by loan. The interest rate for loan is 10 %. The payback period is 7 years with 3 years of grace period. The results of the financial analysis for four-field size are shown in Figure 5-3. It should be noticed that partially financing the project by loan gives IRR that is significantly higher than IRR of the case with no loan. As field size increases, the difference in IRR's of the case with loan and without loan also increases. IRR increases (from the case with no loan to the case with loan) about 8% for 0.5 TCF field size and about 35% for 2.0 TCF field size. Therefore, it can be concluded that partially financing the project by loan has significant impact on IRR. It is, then, recommended that the case with partially financing the project by loan is undertaken when conducting feasibility study for a petroleum exploration and production project.

In Figure 5-4, the effects of partially financing the project by loan on the base case, the 25% increase-in-cost case, and the 25% decrease-in-cost case are shown

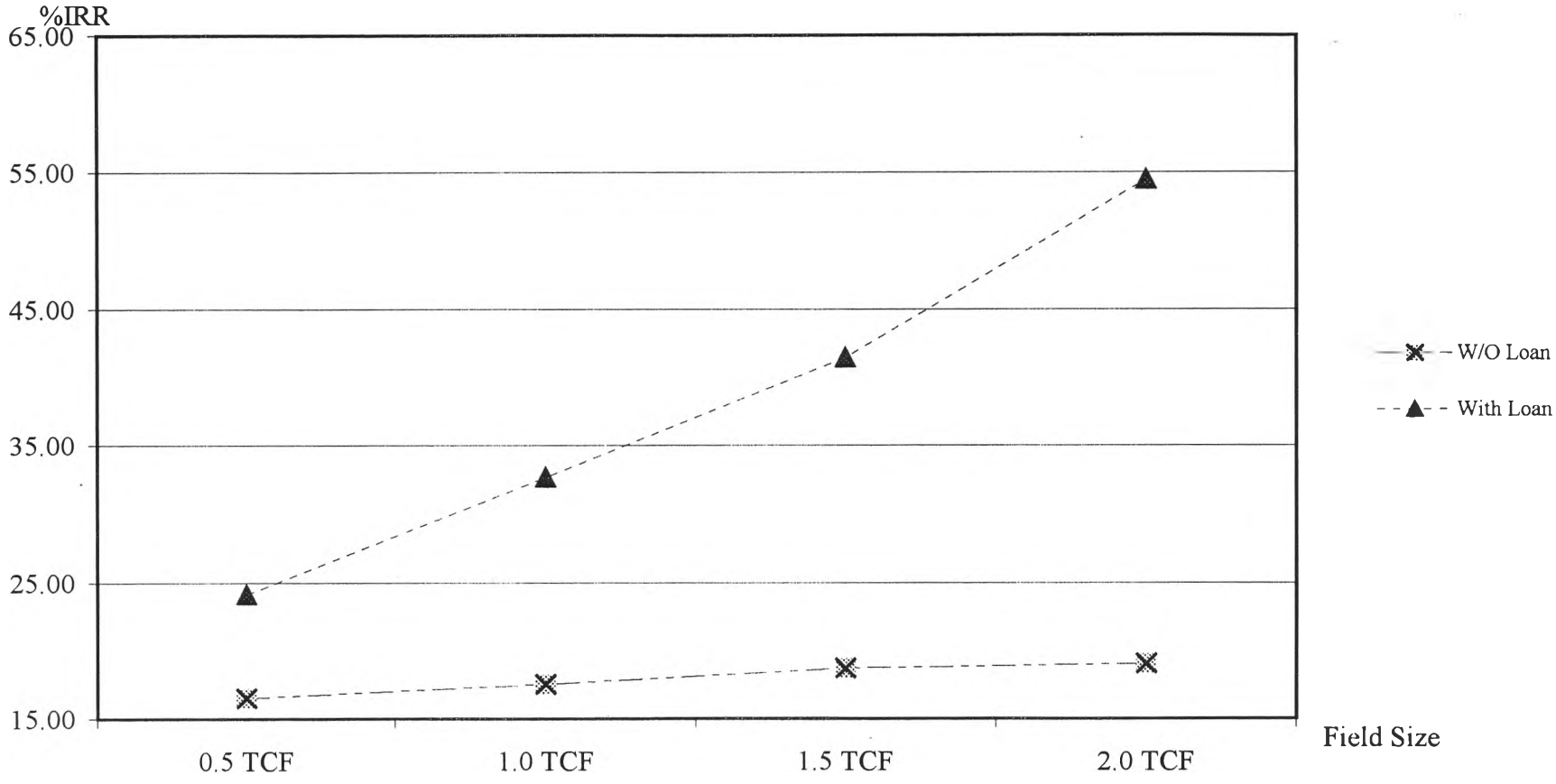

Figure 5-3 Effect of Partially Financing the Project by loan on IRR of the Single-Field Project(Base Case)

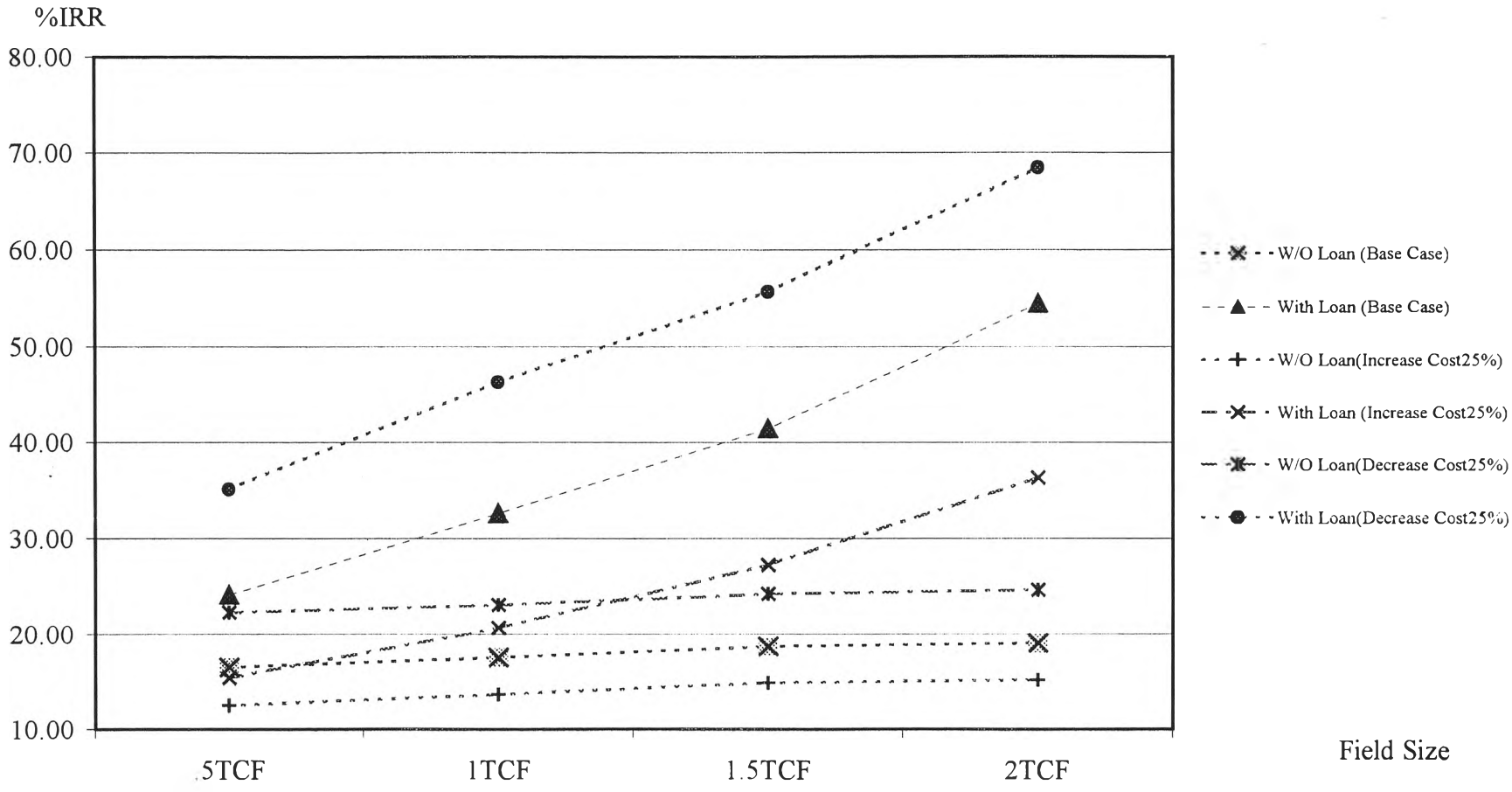

Figure 5-4 Effect of Partially Financing the Project by loan on IRR of the Single-Field Project

in the same figure for easy comparison. It can be seen that when IRR of the case without loan is low, the effect of partially financing the project by loan is also low and when IRR of the case without loan is high, the effect is also high.

Because of the significant effect on IRR of partially financing the project by loan, the host government which has the responsibilities to oversee petroleum exploration and production should include cases with partially financing the project by loan whenever they need to perform feasibility study for the project. This will allow them to thoroughly investigate the feasibility of the project.

The economic parameters – cost change, cost and price escalation, and capital financing – have an impact on return to investment. Effect of cost change from present prediction make the project unfeasible if cost increases. It can be considered as risk in the development and production of gas field. On the other hand, if the cost decreases, effect of cost change will result in more profit to the concessionaire and it can also be considered as risk to the host government as it seems to be losing its legitimate return. The escalation of cost and price which takes into account the economic inflation raises IRR of the project to be higher. The partially financing the project by loan also causes significant rise in IRR of the project.

It is recommended that investigation on effects of these three economic parameters should be undertaken when conducting feasibility study for a petroleum exploration and production project. This would help the host government and the concessionaire to be aware of what would happen if things do not be having as expected. For the results of this study, it is also recommended that the host government should not only try to capture excessive profit the concessionaire receives

due to unexpected low cost or high petroleum price but also try to compensate the concessionaire if the concessionaire gets unreasonable low profits due to unexpected high cost or low petroleum price. In addition, the host government may turn an unfeasible project into a feasible project if it can provide support to a concessionaire in the process of making loan from financial institution.