Öneri, C.1,S.5
Haziran, 1996, ss.123-133.

INFLATION-ADJUSTED MANAGEMENT ACCOUNTING

Dr.Joachim BEHRENDT

M.Ü., Almanca İşletme, Öğretim Görevlisi

ÖZET: Klasik yöntemler üzerine kurulu olan muhasebenin, yönetim için almacak kararlarda, yardimcı bir araç olarak kullanılması Türkiye gibi yüksek enflasyonun hakim olduğu ülkeler için hayli sakıncalıdır. Buna rağmen kullanılması muhasebenin sabit para değeri ve istikrarlı bir gelecek varsayımlardan dolayı yanlış kararlarla sonuclanacaktır.

Aşağıdaki makalemiz maliyet muhasebesinde muhasebeden gelen verilerin kısa vadeli kararlar için, örneğin fiyat belirlenmesinde kullanılmasının sakıncalarını göstermektedir. Ayrıca enflasyona uyarlanan yönetim muhasebe sistemlerinin içermesi gereken temel şartlar belirtilmiştir.

I. INTRODUCTION

In the last issue of *Öneri*, we explained some of the inflation-related problems which Turkish companies have to face when managing their financial and operational tasks[1]. One conclusion was that "in the end, high inflation leads to the failure of nearly every conventional idea about accounting, controlling and financial management since nearly every instrument from these areas assumes a constant price level and certainty about future developments"[2].

Despite of the problems which can be caused by the use of misleading accounting figures for managerial decisions, a great number of Turkish managers seem to base their decisions on those figures instead of using an inflation-adjusted management information system. A typical example is the type of the cost (or management) accounting system used in Turkish companies. Following classical textbook knowledge, the purposes of a management accounting system are threefold:

- Calculation of production costs for financial statements;
- Cost control;
- Decision supporting by calculation of production costs for sales decisions and of relevant costs for other short-term decisions[3].

Following a survey of *Tığ* from 1995 carried through with nearly 500 Turkish companies of different sizes and different areas of business, only 46.73% (229 companies) are using a cost accounting system whereas the other 53.27% (261 companies) do not have such a system[4]. From the 229 companies using a cost accounting system, only 51 (or 10.41% of all companies) use a separate cost accounting system; the other companies have introduced their systems as part of the financial accounting system (7A/7B-alternatives)[5]. Consequently, 89.59% of the companies which took part in the survey seems not to be able to make proper calculations of future market prices or to support other short-term business decisons with the relevant costs since future-oriented decisions require future, inflation-adjusted cost figures which are normally not delivered by cost accounting systems installed as a part of the financial accounting system (7A/7B-based cost accounting systems). The main reason for not using a future-oriented management accounting system seems to be the unshakeable belief in accounting figures and in the manager's experience or intuiton which allows them to control their companies without a management accounting system. This belief leads to statements like "the costs of a management accounting system are much higher than its benefits" or "a management accounting system is unnecessary"[6].

The purpose of this paper is twofold. First, it wants to answer the questions how and why the use of financial-accouting-based figures for managerial decision making can be misleading in an inflationary environment like Turkey. Since inflation-related problems can be divided in three single problems "pure inflation", "shifts of relative prices" and "increased risk" as will be shown later, these questions will be answered separately for each area in parts II, III and IV of the paper. For the second purpose, remaining part V of the paper shows a few simple ideas what should be done to install an inflation-adjusted management accounting system for a better supporting of managerial decisions.

II. PROBLEM #1: PURE INFLATION

Inflation is defined as the continuous rise, exceeding a minimum level, of the whole price level of the national economy[7]. Since this definition requires the rise of all prices of the national economy by the same rate at the same point of time, this process can be imagined like the change from winter time to summer time: At one special date, at 2 o'clock in the night, all prices rise by the same rate of inflation, e.g. 5% for the current month. This

more or less theoretical idea shall be named *pure inflation.*

Unfortunately, the condition of a rise of all economic prices with the same rate at the same point of time will probably never be met in reality. Instead of this, prices rise by different rates at different points of time. Therefore, the relationship between prices changes temporarily or permanently - the price of one good, compared with another good, increases, for example, by 2% if its price goes up by 5%, compared with a rise of only 3% for the other good[8]. The results of different price increases for different goods are called *shifts of relative prices.* Empirical work shows that increased rates of inflation are connected with increased shifts of relative prices[9]. Therefore, shifts of relative prices - e.g. between import and domestic prices - constitute the second inflation-related problem for the management of Turkish companies.

The third problem is caused by the increased volatility of inflation rates which is empirically connected with an increase of the level of inflation rates too: The higher the inflation rates, the higher the volatility of inflation rates[10]. Since inflation rates are connected with other economic variables like unemployment rates, economic growth etc., their volatility may increase too, leading generally to an increased uncertainty about the economic future and, therefore, to *increased risk*, the third inflation-related problem for the Turkish manager. Since those three problems are related, but solutions are different, we will examine them one after another.

For considering the problems caused by pure inflation, we will start with a simple example. At the 1.1.1996, buying costs for a special good are given with 100.000 TL. Since these goods are sold for 125.000 TL, the contribution margin for each good is 25.000 TL or 20% of the selling price. For a uniform, pure inflation of 10% per month, buying prices p_b, selling prices p_s, and the contribution margin c (in TL and in %) are shown in Table 1.

	1.1.	1.2.	1.3.	1.4.	1.5.
p_b (TL)	100.000	110.000	121.000	133.100	146.410
p_s (TL)	125.000	137.500	151.250	166.375	183.012
c(TL)	25.000	27.500	30.250	33.275	36.602
c(%)	20%	20%	20%	20%	20%

Table 1: Pure inflation and price calculation

As a result of pure inflation, all TL-based figures (p_b, p_s and c(TL)) increase month after month whereas the contribution margin in % remains the same all the time. In this example, buying and selling take place at the same point of time. If, on the other hand, purchasing will take place at 1.2.1996 and selling at 1.3.1996, and if prices are increased corresponding to the pure inflation rate, buying price p_b will be 110.000 TL whereas selling price p_s will be 151.250 TL. Consequently, the contribution margin is 41.250 TL or 27.27% and not 20% any more.

To calculate the real value of the contribution margin, prices have to be comparable, and that means they have to be compared at the same point of time with the same purchasing power of the money. More simply, they have to be corrected by the inflation rate. The real buying price, based on the value of money at 1.1.1996, is (110.000 TL : (1 + 0.10)) = 100.000 TL, the real selling price for the same point of time (151.250 TL : $(1 + 0.1)^2$) = 125.000 TL, and, therefore, the real margin in TL at calculation date 1.1.1996 is 25.000 TL or 20% - and not 27.27%. The reason for the difference between the nominal and the real contribution margin in % is simply the loss of purchasing power of the TL: When the value of money is not constant over time, the calculation of figures based on TL-values of different dates lead to the same unreasonable results as calculating a contribution margin by comparing buying prices in $ with selling prices in TL without converting them one into the other. This problem is shown in fig.1: If the price level is constant, the contribution margin is 20%, independent from the buying and selling dates. If, on the contrary, the price level is not constant, a comparison between buying and selling prices of different points of time results in misleading figures.

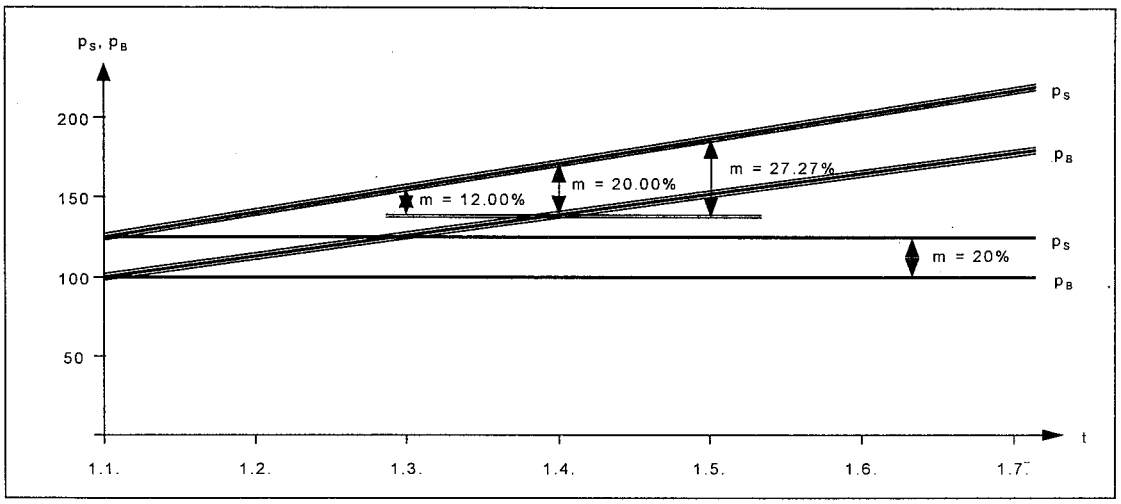

Fig. 1: Price calculation and inflation

The same problem arises if the company tries to fix the margin at nominally 20%. If buying takes place at 1.2. (buying price 110.000 TL), selling price, in such a case, will be (110.000 TL · (1 + 0.25)) = 137.500 TL to get a margin of 27.500 TL, equal to 20% of the selling price. The real margin, on the other hand, is only 12% and, therefore, much smaller than expected[11] - calculations with TL-based figures from different points of time without conversion leads to more or less absurd results. Since all accounting figures are based on the assumption of a constant value of the money (constant purchasing power), figures of the accounting system have to be corrected if this condition is not met. If calculations shall be made with figures of different points of time, a "standardization" (conversion of all figures to one unique point of time, e.g. the beginning of the year) by eliminating the inflation between this reference point and the relevant point of time is necessary.

Although this principle looks very simple, there are much violations against it in the daily work of Turkish companies. Profits or turnovers of one quarter of the year, for example, are often calculated by simply (and wrongly) adding the profits or turnovers of the three according months, sometimes correcting them by the cumulated inflation rate of the first quarter. To get real figures, calculation must be different: Profits or turnovers of every month (or - better - every week or every day) have to be corrected by the inflation between the beginning of the quarter and the point of time they are realized before adding these corrected figures.

The same problem can be observed with budgeted figures, especially with overhead costs like depreciation. Instead of considering the increasing inflation during the year, overhead costs are very often spread equally over the year. As an example, the depreciation of a special machine with an annual rate of 120 at the end of 1995 and an forecasted annual rate of 180 (inflation rate: 50%) for the end of 1996 has not to be allocated over the year with equal rates of 15 from January to December. Instead of this, monthly inflation p_m has to be considered - depreciation for January[12] is (120:12) · (1 + 0.0344) = 10.34, for February (120:12) · $(1 + 0.0344)^2$ = 10.70, and, in the end, for December (120:12) · $(1 + 0.0344)^{12}$ = 15. If, instead of this, an equal depreciation rate of 15 is calculated for every month, calculated selling prices are higher than they should be, especially at the beginning of the year.

III. PROBLEM #2: SHIFTS OF RELATIVE PRICES

In addition to pure inflation, Turkish companies have to face the problem of increased shifts of relative prices. Some resulting problems and ideas can again be demonstrated using a simple example.

Supposed a Turkish dealer is importing some goods from Germany and selling them in the Turkish market. For simplicity, it should be assumed that the purchasing price in German Mark is constant (inflation rate in Germany is zero), that the exporter is not depending on the Turkish market and that prices on the selling market in Turkey follow the general consumer price index in Turkey. In such a case, purchasing prices in Turkey follow the exchange rate between TL and German Mark whereas selling prices follow the Turkish CPI. Resulting prices are shown in fig. 2[13].

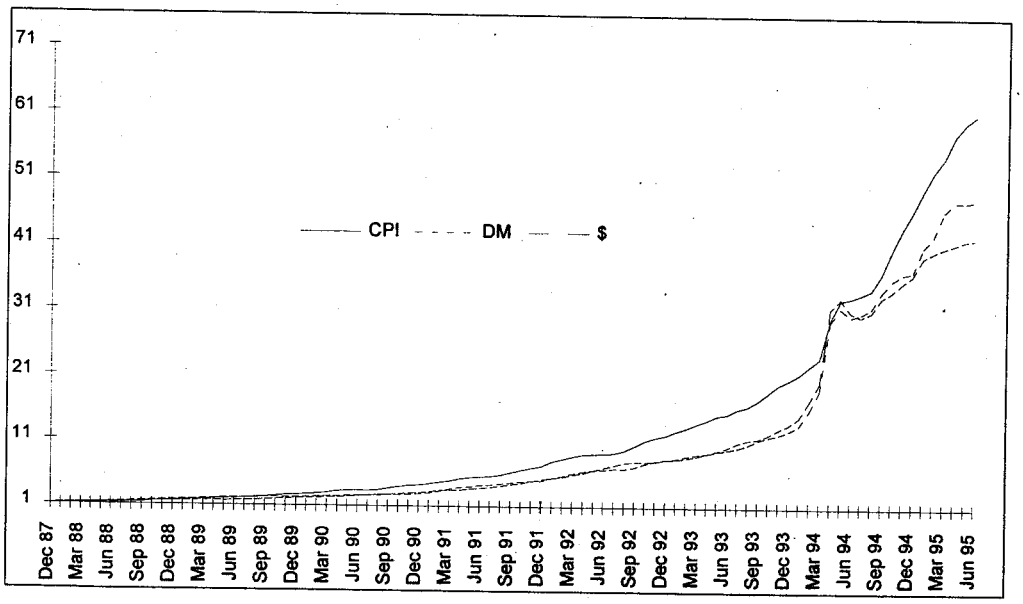

Fig. 2: Exchange Rates and Inflation

As explained in detail in *Öneri* of January 1996, inflation rates on one hand and exchange rates on the other hand shows the same trend over a longer period of time (purchasing power parity)[14]. On the short run, unfortunately, purchasing power theory does not work: Between 1991 and spring of 1994, rises in the CPI were much higher than the corresponding increase of exchange rates; in spring 1994, things were the other way around. For the dealer mentioned in the example, this means a decrease of the relative prices of his purchases compared with his sales between 1991 and spring 1994 and an increase of them in spring 1994. Consequently, his contribution margin and probably his profits has grown between 1991 and 1994 and shrink in spring 1994 only caused by shifts of relative prices.

If market prices follow other laws, things are not that simple. If, for example, the sales market of the dealer is strongly depending on imported goods, the price level of this market - for example mobile phones - may follow the exchange rate changes instead of following the domestic CPI. If the German supplier is partly depending on the Turkish market, he will change his selling prices not only considering German inflation but considering changes in exchange rates and inflation rates in Turkey too.

Similar observations are possible for the cost of capital, expressed by the nominal interest rates. Following the Fisher hypothesis, the nominal interest rate can be calculated as the sum of (expected) real interest rate, (expected) inflation rate and the product of real interest rate and inflation rate[15]. Consequently, the real costs of capital which are necessary for calculating financing costs as part of the product costs are determined by the real interest rates. A short example shall be given: If, in an environment without inflation, a dealer purchases a good at the 1.1. for 100 and wants to sell it without real losses or earnings one month later, he will sell it for 100 at the 1.2. If the deal shall be financed with the help of a credit with a real interest rate of 1% per month, a credit of 100 will be taken at 1.1. and paid back with 101 (including interest of 1) at 1.2. Without inflation, financing costs are 1 or 1% of the credit sum.

With inflation, nominal interest rate - if it follows the Fisher hypothesis - will be 6.05%.[16] The good will be purchased at 100 at 1.1., and a credit of the same amount will be taken at 1.1. too. One month later, the good shall be sold without real losses or earnings. Since inflation for the month is 5%, selling price has to be 105 to achieve this goal. This price increase does not mean a profit of 5 - the value of the good remains the same, only the value of the measuring unit "money" decreases by 5% within that time. At 1.2., the credit and the interest of 6.05 will be paid back too. Therefore, cash outflow at 1.2. will be (105 - 106.05) = - 1.05 (1.05%) in nominal terms or -1 (-1.05 : (1 + 0.05)) equals 1% in real terms. At this point, another typical mistake of management accounting systems without inflation adjustment can be observed: Instead of using real rates of interests for cost calculation purposes, the (much higher) nominal rates of interests are taken,

leading to financing costs which are much too high. In an inflationary world, real financing costs - for example for financing stocks - are the same like in a world without inflation[17].

Without shifts of relative prices, real interest rates in Turkey should have been constant for past periods. Fig. 3 shows the reality for overnight interest rates, compared with the CPI[18].

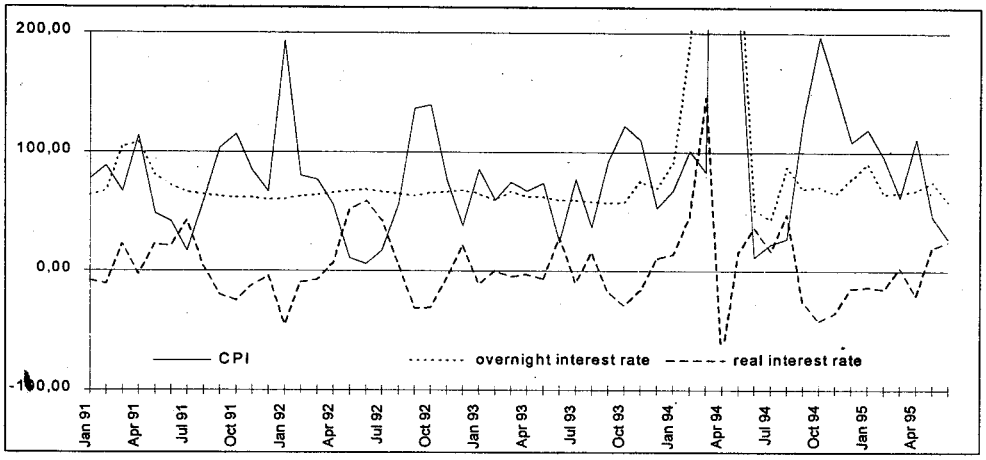

Fig. 3: Inflation and real rate of interest

It can be observed that the real rate is anything but constant. Sometimes it reaches a few percent above zero, sometimes it exceeds 100%, and sometimes it falls below zero. For the time from January 1991 to June 1995, the average real interest rate was approximately 4%, a more or less reasonable rate. For the single months, on the other hand, relative price of capital fluctuated strongly, tending to fall in times of higher inflation rates and to rise in times of lower inflation rates.

Since shifts in relative prices can not only be observed for imported and exported goods or for capital, an inflation-adjusted management accounting system has to consider

- different inflation indices for his different purchasing and selling markets
- and questions of market power, especially comparing purchasing and selling markets.
- As a first step, it has to be checked which purchasing and selling markets are relevant for the company and which inflation indices for those different markets show the changes of their prices best (fig. 4)[19]. For the purchasing markets, not only markets for raw materials but every market including markets for investment goods, for capital etc. has to considered. Consequently, the management accounting system should not only correct nominal values of the financial accounting system by using one single inflation index but, moreover, consider different inflation indices for the forecast of different sorts of payments for the future. More exactly, there has to be two steps for the consideration of inflation in the calculations of a management accounting system used for future-oriented decisions:
- Forecast of future prices for the different purchasing and selling markets, based on forecasts of different inflation indices which are relevant for those markets;
- Correction of the calculated results by using one single inflation rate ("main index"), e.g. the general CPI, for all calculated or forecasted future figures as shown above for the case of pure inflation.

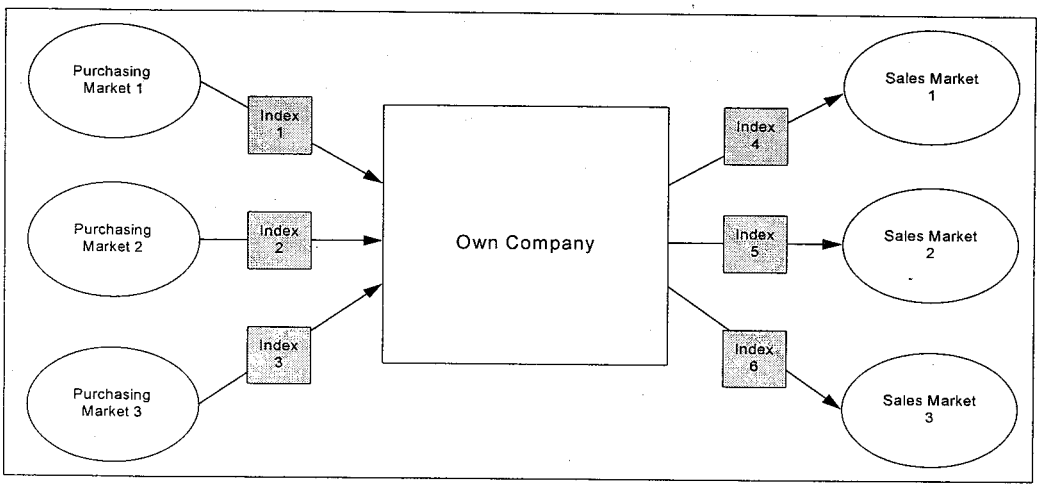

Fig. 4: Different inflation indices

The most interesting figures for considering shifts of relative prices are composed indices for all purchasing markets and all sales markets, respectively, calculated by multiplying the single purchasing and sales markets indices and weighting them with the estimated amounts of cash outflows (purchasing markets) or cash inflows (sales markets), respectively. As a result, "composed" buying and selling prices, based on these composed indices, can be forecasted for the future to show expected changes in the contribution margin for the whole company caused by shifts of relative prices (fig. 5).

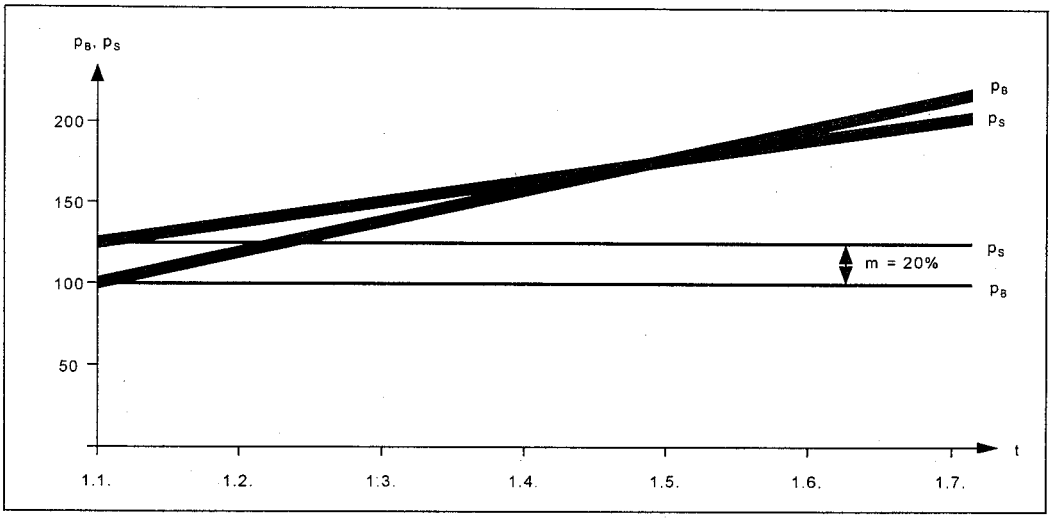

Fig. 5: Different inflation indices, prices and profits

As can be seen in fig. 5, a forecasted stronger increase of the cumulated purchasing price index p_b, compared with a lower increase of the cumulated selling price index p_s, means an increase of the relative prices of the purchasings and, consequently, a shrinking and - after the 1.5. of the year - negative contribution margin. Therefore, the consideration of shifts of relative prices within the management accounting system, especially the use of cumulated purchasing and selling indices, can help to foresee future problems caused by those shifts.

It depends on market powers if, in such a case, problems of shrinking contribution margins due to shifts of relative prices can easily be solved or not. As an example, after the Second World War in Germany, every good which was purchased or produced by companies could easily be sold. In such a situation with so-called seller's markets, the main problem for the companies was

to buy or produce goods whereas selling was easy. Planning, therefore, had to start with the bottleneck of the buying or production process since this bottleneck determined company's profits. Today, things in Germany and in other industrialized countries are the other way around: It is more or less easy to purchase or produce goods but difficult to sell them. In this situation of buyer's markets, sales are the bottleneck which determines the company's profits. In Turkey, the situation of the most areas of business is currently somewhere between this two extremes. But with an increase of living standards in Turkey and with the opening of the Turkish markets, the bottleneck will move, in our opinion, in the direction of buyer's markets in nearly every area. Therefore, the sucess on its sales markets will more and more determine company's profits.

Prices on selling and purchasing markets are often following the market pressure caused by buyer's or seller's markets, respectively. If strong buyer's markets exists, it is much more difficult to increase the own selling prices than to lower purchasing prices as it can be observed, for example, in the most markets for consumer's goods. In such a case, a foreseen situation as shown in fig. 5 has to be solved by renegotiating contracts and prices with the suppliers - spoken figuratively, the trend of the lower increasing line p_b has to be broken by lowering the slope of that line. If, on the other hand, a situation with strong seller's markets - e.g. for crude oil in the seventies - is given, the same situation should be solved by trying to rise the own sales prices instead of renegotiating with the suppliers (increasing the slope of the upper increasing line p_s in fig. 5). In both cases, chances to solve the foreseen problem caused by shifts of relative prices are relatively high. If, on the other hand, a company is faced with buyer's markets for its sales and seller's markets for its purchases like it may be the case for the supply industry for automobiles, those chances are much smaller. Compared with a situation without that much inflation, such companies are much more and more frequently under pressure of suppliers and buyers since they have to fight for their market position every time prices change and, therefore, nearly every day in an inflationary environment with daily changes of real prices.

Consideration of market forces leads to another conclusion for an inflation-adjusted management accounting system. At the beginning of part 3, we explained the two steps which are necessary for the consideration of shifts of relative prices as well as of pure inflation: Firstly, a forecast for future prices, based on different price indices for every market, and, secondly, the correction of the calculated results by using one single inflation rate, a main index, to get comparable and real values for a special point of time. The question which inflation index should be used as main index has remained open. Our examination of the relationship of market power and profits helps to answer this question: Since the bottleneck - special purchasing markets or, probably, sales markets - determine the profits, the inflation index which gives the closest possible approximation of past price increases for that "bottleneck market" should be used as main index. If, for example, a company that produces machineries faces buyer's markets, the wholesale price index for manufacturing, especially for the manufacturing of machineries, can be used for that purpose. If, on the other hand, a company that operates supermarkets faces buyer's markets, consumer price indices for food or - better - a weighted consumer price index, calculated by the different consumer price indices for the different articles like food, cleaing products or personal care and weighted with their share in total turnover, may be the best approximation for the company's main inflation index[20]. The use of such a special index instead of the general WPI or CPI allows the separation of changes of the relative prices of the relevant markets for the company from changes of the general price index and, therefore, a better review of management's performance[21].

IV. PROBLEM #3: INCREASED RISK

The third inflation-related problem, increased risk, is not only a problem of the management accounting system but of a risk management system too. Managerial decisions are future-oriented. Therefore, planned or forecasted cost and price figures for future points of time has to be used for a proper supporting of these decisions. Since reality in the future will not always follow own forecasts and plans, there may be deviations between forecasted or planned figures on one hand and realized figures on the other hand which may result in missing achieved goals of the company.

To avoid such problems, management has to look for a deviation between planned and realized figures as small as possible. One way is to look for guarantees that the planned figure - e.g. an exchange rate - will be met by reality, with other words to reduce risk. This can be done by hedging or buying and selling risks - in this example an exchange rate risk - at the capital markets using modern financial instruments. Another possibility is to install some hedges within the own company: If, for example, cash inflow in US-$ and cash outflow in US-$ at a special future date of time are the same, there remains no exchange rate risk for US-$ for that point of time; the risk is totally hedged. If cash inflow is in CAN-$ instead of US-§, exchange rate risk is not totally hedged but

reduced since the correlation between US-$ and CAN-$ is much closer than the correlation between US-§ and TL. The same principle can be used for prices which are depending on different inflation indices: Risk can be calculated and be hedged by considering the correlation between future cash inflows and cash outflows which are depending on different inflation indices. To manage the different types of risk, the introduction of a centralized risk management system is recommended. Since this paper is concerned only with the management accounting system, questions of a risk management system etc. shall not be dealt with[22].

The second - additonal - way to reduce deviations is to make best use of present available information by using forecasting models as good as possible. Within an inflation-adjusted management accounting system, forecasting tools are necessary to forecast inflation indices for the different purchasing and selling markets as described above. Based on inflation index forecasts, future prices and, therefore, future costs can be calculated more exactly than using one single inflation rate.

Different forecasting tools are available. The most common instruments are time series models, most often used in the form of calculating the moving average of past inflation rates for the relevant inflation index. Since forecasts based on very short periods (e.g. the previous month) are leading to strong volatilities of the forecasted figures due to strong monthly influences and since, on the other hand, forecasts based on longer periods (e.g. one or more year) consists partly of old data and obsolete information, a useful compromise for the basic period has to be chosen. Better instruments like exponential smoothing or least square and some experiments with seasonal adjustments may produce better results[23].

Another way to forecast inflation is based on correlations between inflation and other economic variables. Since, for example, participants in the capital markets have to forecast inflation to fix nominal interest rates for future-oriented credit agreements (Fisher-hypothesis), knowledge of agreed nominal interest rates for future periods, together with assumptions concerning the real rate of interest, can be used to calculate the average expected inflation rate of the capital market and, therefore, to forecast future inflation rates with the help of interest rates[24]. A comparison between forecasts for the general CPI for the following month, based on a moving-average-model of the last six months, and based on overnight interest rates, is shown in fig. 6.

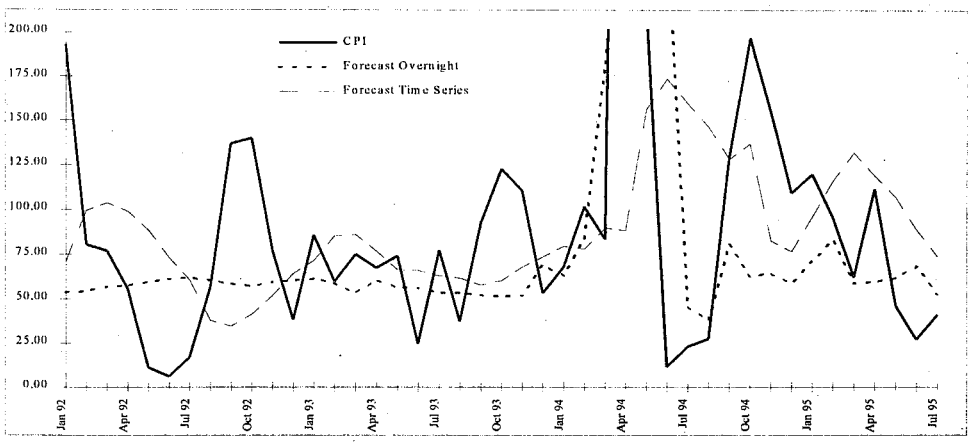

Fig. 6: Different inflation forecasts[25]

As can be seen in fig. 6, the use of forecasts based on overnight rates seem to be slightly better than forecasts based on time series of the last six months[26]. Another way for using correlations between inflation and other economic variables to forecast future inflation rates is the use of regression analysis between money supply and inflation since these figures tend to correlate very close in the long run[27]. To find the best forecast model for the different inflation indices of a company may require some statistical work, but, as a result, the risk of misleading decisions may decrease.

V. INFLATION-ADJUSTED MANAGEMENT ACCOUNTING: BASIC REQUIREMENTS

Considering the examinations above, a list of basic requirements for an inflation-adjusted management accounting system can be formulated. Firstly, *requirements for cost control and decision supporting* purposes which are independent from the problem of

inflation but not realized in most of the Turkish management accounting systems shall be repeated[28]:

- Recording of two types of costs (historical and planned costs) as a basis for cost control purposes;
- Features for cost variance analysis (price variance, efficiency variance, and production volume variance);
- Separation of variable and fixed costs and possible separation of fixed costs on different levels;
- Possibility of separation of relevant from irrelevant costs for different sorts of decisions.

Secondly, *requirements for pure inflation adjustment (problem #1)* shall be summarized:

- Separation of the cost accounting system for financial statement purposes from the management accounting system for control and decision supporting purposes;
- Use of future-oriented, planned costs;
- Adjustment of all nominal figures to real figures for the same point of time, based on the difference between reference date and payment date with an uniform "main inflation index";
- No equal allocation of fixed costs (e.g. depreciation) over the year.
- Thirdly, concerning the *requirements for an adjustment for the consideration of shifts of relative prices (problem #2)*, the following points have been mentioned:
- Use of different inflation indices for different purchasing and selling markets, for financing costs, etc.;
- Use of exchange rates and foreign inflation rates for imported and exported goods;
- Use of real interest rates instead of nominal interest rates for calculating financing costs;
- Frequent control of surcharges in percent (e.g. overhead costs)[29];
- Analysis of market powers to foresee possible problems due to shifts of relative prices;
- Calculation of cumulated purchasing and selling inflation indices for the own company to foresee future decreases of the contribution margin;
- Frequent control of all price-based decisions (e.g. economic order quantities, safety stock levels, etc.).

Lastly, we gave a brief introduction in the *requirements for supporting the risk management system (problem #3)* as following:

- Best use of present available information by developing best-fitting inflation forecasting models for the different inflation indices which are relevant for the own company;
- Analysis of related prices (correlation between different inflation indices) for the preparation of hedging measures;
- Introduction of a centralized risk management.

A second time, the survey of *Tığ* shall be used to compare these requirements with the Turkish reality. As it may be remembered, only 10.41% of the participants of the survey use a separate cost accounting system. Moreover, only 2.04% (10 companies!) are using planned costs instead of historical or standarized historical costs[30]. Asked for the usage of the cost accounting system for different possible purposes, answers of the managers where as shown in fig. 7[31].

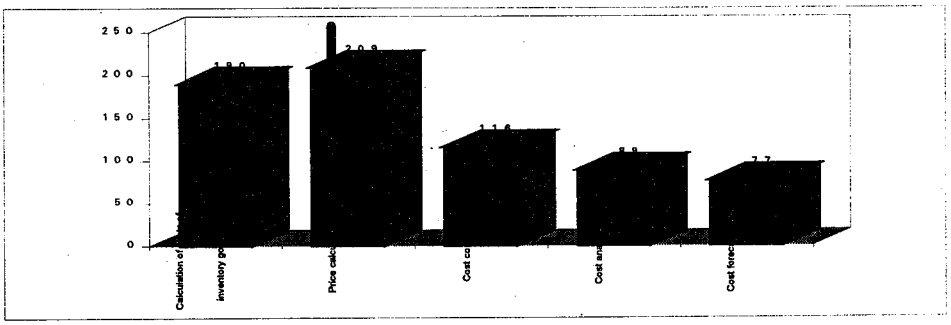

Fig. 7: Usage of the cost accounting system

Considering the basic requirements we have just formulated, one simple question arrives when studying fig. 7: Of what quality are managerial decisions of 208 managers in the area of price calculation, 116 managers for the cost control etc. when only 51 companies use a separate management accounting system and only 10 of them future-oriented, planned costs? In our opinion, many of the problems Turkish managers are facing in their daily work could been solved better if proper-working, inflation-adjusted management accounting systems will be installed in their companies. Within an environment with increasing competition (for example from the customs union with the European Union), Turkish managers should take the necessary steps as fast as possible - otherwise the market may solve their problems by forcing them to close their companies.

Selected Literature

Bechler, E. (1981): Geld und Währung, vol. 2: Zahlungsbilanz und Währungspolitik, München 1981

Behrendt, J. (1995): Inflation in Turkey - A Money Machine?, in: Öneri, Marmara Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, Haziran 1995, p.93 f.

Behrendt, J. (1996): Financial Management under Inflationary Conditions in Turkey, in: Öneri, Marmara Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, Ocak 1996, p.233 f.

Brealey, R.A./Myers, S.C. (1991): Principles of Corporate Finance, 4.ed., New York/NY et.al. 1991

Bukics, R.M.L./Katz, B.S. (Eds.) (1991): International Financial Management, Chicago 1991

Cassel, D. (1984): Inflation, in: Bender, D. u.a. (eds.), Vahlens Kompendium der Wirtschaftstheorie und Wirtschaftspolitik, vol. 1, München 1984, p.255 f.

Eisele, W. (1993): Technik des betrieblichen Rechnungswesens, 5.ed., München 1993

Fama, E.F. (1975): Short-Term Interest Rates as Predictors of Inflation, in: American Economic Review 1975, p.269 f.

Gebauer, W. (1982): Realzins, Inflation und Kapitalzins, Berlin et.al. 1982

Fisher, I. (1896): Appreciation and Interest, New York 1896, reprint 1970

Haberstock, L. (1987): Kostenrechnung I, 8.ed., Hamburg 1987, reprint 1990

Hafer, R.W./Hein, S.E. (1990): Forecasting Inflation Using Interest-Rate and Time-Series Models: Some International Evidence, in: Journal of Business 1990, p.1 f.

Hess, P.J./Bicksler, J.L. (1975): Capital Asset Prices versus Time Series Models as Predictors of Inflation, Journal of Financial Economics 1975, p.341 f.

Horngren, Ch.T./Harrison, W.T. (1989): Accounting, 4.ed., Englewood Cliffs/NJ 1989

Issing, O. (1987): Einführung in die Geldtheorie, 6.ed., München 1987

Külp, B. (1978): Außenwirtschaftspolitik, Tübingen 1978

Monks, J.G. (1987): Operations Management, New York/NY et.al. 1987

Mundell, R. (1963): Inflation and Real Interest, in: Journal of Political Economy 1963, p.280 f.

Nelson, C.R./Schwert, G.W. (1977): Short-Term Interest Rates as Predictors of Inflation: On Testing the Hypothesis that the Real Rate of Interest is Constant, in: American Economic Review 1977, p.478 f.

Pohl, R. (1981): Theorie der Inflation, München 1981

Shapiro, A.C. (1994): Foundations of Multinational Financial Management, 2.ed., Needham Heights/MS 1994

Ströbele, W. (1984): Inflation, 2.ed., München/Wien 1984

Tığ, O. (1995): Survey of the use of cost management systems in Turkey, mimeographed, University of Duisburg / Germany, Industriebetriebslehre, Lotharstraße 65-LB141, D-47057 Duisburg, 1995

Thiemer, A. (1987): Der Zusammenhang zwischen Realzins und Inflationserwartung, Bergisch Gladbach/Köln 1987

Titman, S./Warga, A. (1989): Stock Returns, Predictors of Interest Rates and Inflation, Journal of Financial and Quantitative Analysis 1989, p.47 f.

Türkiye Cumhuriyet Merkez Bankasi (1995): Üc Aylik Bülten, II/1995 (Nisan - Haziran)

Türkiye Devlet Istatistik Enstitüsü (1995): Türkiye Ekonomisi: Istatistik ve Yorumler, Eylül 1995

Willms, M. (1984): Zahlungsbilanz, Wechselkurs und Währungssysteme, in: Bender, D. u.a. (eds.), Vahlens Kompendium der Wirtschaftstheorie und Wirtschaftspolitik, vol. 1, München, p.215 f.

1) See Behrendt (1996), p.233 f.
2) Behrendt (1996), p.242.

3) See Eisele (1993), p.565 f.; Haberstock (1987), p.18 f.; Horngren/Harrison (1989), p.785 f.
4) Source: Unpublished survey of Mr. Osman Tığ (1995).
5) Source: Tığ (1995).
6) Asked for the reasons for not using a management accounting system, 168 managers answer with "figures of the financial management system are sufficient", 101 with "company can be controlled without using a management accounting system", 88 with "costs of a management accounting system are much higher than its benefits" and 55 with "a management accounting system is unnecessary". Source: Tığ (1995).
7) Issing (1987), p.186.
8) Strictly speaking, the increase of the relative price, in such a case, will be 1.94175% and not 2%.
9) See, for example, Ströbele (1984), p.6 f.; Pohl (1981), p.134 f.; Cassel (1984), p.299.
10) Issing (1987), p.208 f., with further references.
11) Real buying price is the same as in the example before (110.000 TL : (1 + 0.1)) = 100.000 TL, real selling price is (137.500 TL : $(1 + 0.1)^2$) = 113.636 TL, and the resulting real margin is 13.636 TL (or 12%).
12) Since yearly inflation p_y = 50%, monthly inflation - equal rates assumed - is $p_m = (1 + p_y)^{1/12} - 1 = 3.44\%$. See Behrendt (1996) for details. The sum of the depreciation rates will, in such a case, not result in the yearly depreciation rate of the financial accounting system (in this case: 180) since the depreciation rate for the financial accounting system is calculated on the basis of prices of the end of the year instead of different prices at the end of the single months.
13) Source: Türkiye Devlet Istatistik Enstitüsü (1995), own calculations.
14) Behrendt (1996), p.240 f.; for details, see Willms (1984), p.237 f.; Külp (1978), p.37 f.; Bechler (1981), p.281 f.
15) See Behrendt (1996) and Behrendt (1995) for a brief explanation; for further details, see Fisher (1896), Mundell (1963), Gebauer (1982) or Thiemer (1987).
16) $i_n = i_r + p + i_r \cdot p$, in this case: $i_n = 1\% + 5\% + 1\% \cdot 5\% = 6.05\%$.
17) Assuming all prices - especially selling prices and interest rates - follow the same pure rate of inflation. Moreover, this statement is not exact since it neglects risk differences which may lead to different real rates of interest.
18) Source: Türkiye Devlet Istatistik Enstitüsü (1995), own calculations.
19) As described in Behrendt (1996), the State Institute of Statistics of the Prime Ministry of the Republic of Turkey offers many different inflation indices for wholesale and consumer prices. Possible sources for getting information about them are: Türkiye Devlet Istatistik Enstitüsü, Türkiye Ekonomisi: Istatistik ve Yorumlar (monthly), or Türkiye Cumhuriyet Merkez Bankasi, Üc Aylık Bülten (quarterly).
20) See Türkiye Devlet Istatistik Enstitüsü (1995) for details and possible indices.
21) Great care is necessary when using the resulting "real" figures since it depends on the purpose of the calculation if they are real or not. If, for example, turnovers ore profits are inflation-adjusted by using the relevant main index for the markets choosed, a comparison with other companies and the separation of nominal and real increases of these figures are possible. If, on the other hand, the owner of a company wants to know something about the "real profit" he can use for consumption, the price index of the goods he wants to consume is necessary to measure the "real" value of the profit instead of the index of the relevant market of the company. In our opinion, this question of the use of profits has to be separated from the problem of the creation of them like it is the case for international operating groups: Performance of the single companies should be measured by their performance within their countries and not by their performance measured in the currency of the group's seat. Differences between the profit created in one country's currency and the profit used in another country's currency are the result of exchange rate changes for which the management in the profit-creating country is not responsible (see Shapiro (1994), p.185 f.).
22) See Brealey/Myers (1991), p.627 f., Bukics/Katz (1991), or Shapiro (1994), p.185 f., for details.
23) For a brief description of different tools available, see, for example, Monks (1987), p.261 f.; for some details of inflation forecasting in Turkey, Behrendt (1996), p.234 f.
24) In the literature, the question if time series or interest rates are better predictors of inflation is not solved until today. Some of the most urgent papers are Fama (1975), Hess/Bicksler (1975), Nelson/Schwert (1977), Titman/Warga (1989), and Hafer/Hein (1990).
25) Source: Türkiye Devlet Istatistik Enstitüsü (1995), own calculations.
26) Standard deviation for 44 observations is 160.15% for the forecast based on interest rates, compared with a standard deviation of 182.47% for the time series model (although both figures are too big for a useful application).
27) See Behrendt (1996), p.236 f.
28) See Eisele (1993), Haberstock (1987); Horngren/Harrison (1989).
29) Different inflation indices for the variable costs and the fixed costs, calculated with a surcharge on the variable costs, require changes in the amount of the surcharge in percent.
30) Source: Tıg (1995).
31) Source: Tıg (1995).