Corporate financial patterns in industrialising economies: a comparative international study

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Financing Corporate Growth in Industrialising Economies : The Effects of Inflation on Accounting Ratios

1. Introduction

In the first large-scale comparative studies of corporate financing patterns of large firms in leading developing countries (DCs), Singh and Hamid (1992) and Singh (1995) arrived at some rather surprising conclusions. This research showed that although there are variations in corporate financing patterns among developing countries, in general, corporations in the sample countries rely very heavily on (a) external funds, and (b) new share issues on the stockmarket to finance the growth of their net assets. These findings are opposite to what most economists would predict. In view of the low level of development of DC capital markets and their greater imperfections, one would expect these corporations to rely much more on internal, rather than external finance. Moreover, for the same reasons, one would also expect them to resort to the stockmarket to a very small degree, if at all, to raise finance. The Singh and Hamid conclusions also run contrary to the "pecking order" pattern of finance which is thought to characterize advanced country corporations, whereby the latter mostly use retained profits to finance their investment needs; if more finance is required, they have recourse to banks or long-term debt, and go to the stockmarket only as a last resort.

A potentially serious objection to Singh and Hamid's results, noted by the authors themselves, is that they might be distorted by measurement biases. Two of these are particularly significant: (a) the use of the historical cost method of accounting in periods of high inflation; and (b) in the absence of the necessary data, the bias in the indirect method used to assess the contribution of the equity financing variable. It is well known that high inflation rates cause historical cost accounts to produce a misleading picture of corporate performance by, for example, under-stating depreciation charges (which are based on lower historical asset costs rather than higher current costs) and over-stating interest charges (by ignoring the "gain on borrowing" which arises when the real value of debt is eroded by inflation). Since these two effects work in opposite directions, it can readily be appreciated that, as a result of inflation, historical cost accounting may either over-state or under-state real profits and, consequently, the amount of retained profits. Thus, the Singh and Hamid results, which are dependent upon the amount of retained profits, are open to challenge, in those cases in which no adjustment has been made.[1]

[1]Such adjustments were made, as part of standard accounting practice, in Brazil and in Mexico, two of the ten countries in Singh's (1995) sample. The other eight were: Turkey, Korea, Malaysia, Thailand, Jordan, Pakistan, India and Zimbabwe. The sample frame in this study normally consisted of the top hundred listed manufacturing companies in each country. The earlier study, Singh and Hamid (1992), did not include Brazil and was confined to the fifty largest quoted manufacturing companies in each country.

With respect to (b), the basic problem is that in Singh and Hamid's studies, the variable "equity financing of corporate growth" is measured as a residual. The growth of net assets is equal by identity to the growth of internal finance plus the growth of external finance; the latter is equal to the growth of long-term liabilities and the growth of equity. In this research, the growth of internal finance was measured by retained profits from the profit and loss account. The growth of long-term liabilities was proxied by the growth of long-term debt. Equity finance was then measured as the residual from the accounting identity. What this means is that in the Singh and Hamid analysis, the growth of equity will be overstated to the extent that some of the long-term liabilities and provisions (eg. for future tax and pensions) are not included in the debt financing variable. Similarly, revaluations which should be regarded as a part of internal finance would, on this method, get included in equity finance, because they do not pass through the profit and loss account, which is the source of the retained profits measure.

This paper explores the nature and extent of both these potential measurement biases to see whether they are serious enough to overturn Singh and Hamid's anomalous findings. Although the present paper has been motivated by this consideration, it inter alia, also makes a more general contribution. The latter lies in evaluating the impact of inflation on corporate accounts in developing countries, which is of interest in its own right as there are hardly any studies on the subject. Equally importantly, the paper develops and implements a simple and parsimonious method of inflation adjustment which can be applied to other countries.

The paper proceeds as follows. In Section 2, we explain the methodology adopted for making inflation adjustments to the accounts. Section 3 applies the chosen technique to the company sector of Turkey, the country with on of the highest rates of inflation in the Singh and Hamid samples. Section 4 and the Appendix explores the theoretical and empirical consequences of this methodology for the main Singh and Hamid ratios. The question of the possible measurement bias in the indirect estimation of the equity financing variable is examined in Section 5. Section 6 concludes.

2. Adjusting company accounts for inflation

(i) Problems caused by inflation

Accountants have traditionally recorded items in the accounts by reference to the monetary consideration in the transaction which originated them. Thus, assets are recorded at what was paid for them and liabilities are recorded at what was received in exchange for creating them. This is the historical cost method of accounting, and it is still the basis of most financial accounting systems, despite an increasing tendency to modify historical costs to reflect current values.

In a period of general inflation, the relevance of historical costs is brought into question because they do not reflect consistently the current financial position or recent performance of the firm. In so

far as historical costs are established at different dates, when the currency unit represented different real purchasing power, it can be argued that accounts drawn up on this basis create the fundamental measurement error of aggregating heterogenous measurement units.

With regard to monetary items, ie those items which are denominated in nominal money terms which do not vary with inflation, the consequence of inflation is that historical cost accounts fail to recognise the so-called "gain on borrowing" and "loss on holding money". The gain on borrowing arises from the need to re-pay a lender only in nominal units. Thus, if a loan L is taken out at time t and is repaid at time t+1 when the general price index has increased by a factor (1+i), then the gain on borrowing is Li.[2] The loss on holding money is symmetrical with the gain on borrowing: this arises because money and other items denominated in money terms, are not adjusted to compensate for their loss of real purchasing power in a period of inflation. Thus the loss on holding money can be measured as -Mi.[3]

Thus, if a company's monetary assets exceed its liabilities (M>L) in a period of inflation it will have a net loss on these items which will not be recorded in its historical cost accounts. If it is a net borrower (M<L), it will have an unrecorded net gain. Of course, it will also have interest payments and receipts, which will be recorded in the historical cost accounts. If interest rates correctly anticipate inflation (due to the so-called "Fisher effect"[4]), then the "loss on holding money" is best regarded as a deduction from interest received (as the element of interest which compensates for the loss of purchasing power of the principal) and the "gain on borrowing" should similarly be regarded as a deduction from interest paid.

Real assets (those not denominated in money terms) pose a different problem. In this case, it is not possible to assume that their monetary amount is fixed, because their prices in money terms will fluctuate as a response to changing market conditions. There are two alternative approaches to the measurement of real assets in response to changing prices: re-statement by reference to a general price index and re-statement by reference to the market price of the specific asset, which may be approximated by an appropriate specific price index. Under the former approach, general price index adjustment, the historical cost is re-stated by reference to general inflation, so that no real gain or loss can be reported as a result of inflation. Thus, the effects of relative

[2]The real value at t+l of the amount borrowed is L(l+i), but the repayment required is only L, since it is fixed in nominal terms.

[3]Closing amount M, less indexed opening amount M(l+i).

[4]This relates the real interest rate, r, to the nominal interest rate, n as n=(l+r)(l+i) where i is the anticipated inflation rate.

price changes are ignored, but pure inflation is adjusted for. If a specific real (or "non-monetary") asset was bought for N at Time t, and the general price level rises by 1+i at t+1, we re-state the original cost as N = N (1+i), ie we assume that its value has just kept pace with inflation with no real gain or loss in value, preserving the real value of the historical cost of acquisition. Under the alternative method we assume that N has changed as a result of specific market price changes which can be measured by reference to a specific index or price, s, so that N = N (1+s). In this case, there is a gain or loss in real terms if s≠i, and this will be equal to N (1+s)-N (1+i), ie there will be a real gain if s>i and a loss if s<i.[5] This method reflects relative price changes and is therefore a clear departure from historical cost accounting.

An important aspect of many real assets is that they have a limited life, so that their partial consumption during a period must be reflected in a depreciation charge. This was ignored in the previous paragraph, which assumed a non-depreciating asset (such as an investment in land). Once we allow for inflation, both the general index approach and the specific index approach will yield a higher depreciation charge, and hence a lower profit, than historical cost, when prices are rising, since the depreciation charge will be based on the increase in the relevant index (i or s) since the asset was acquired.

A similar adjustment will be made for the cost of stocks consumed during a period. Inflation, or specific rises in the prices of the items in stock, will cause stocks to rise in value between purchase and use. This stock appreciation should be deducted from profit in order to remove price change effects and produce a real measure. As with depreciation, the adjustment can be made by using either a general index (to remove the effects of pure inflation) or a specific index (to remove the effects of the specific price changes on the items held in stock). In either case, the profit figure will be lower, after adjusting for the effects of rising prices, than would be the case under historical cost accounting.

Thus, in summary, general price level changes cause two offsetting effects on monetary assets and liabilities: the gain on borrowing and loss on holding money which result from inflation. The depreciation charge on real (non-monetary) fixed assets will be under-stated in historical cost accounts as a result of inflation, as will the cost of stocks sold. These may be corrected by using either a general or a specific index. If a specific index is applied to real assets, this will capture the change in price of the specific asset and this may exceed the change in the general price

[5]It should be noted that the choice of index is not without difficulty. In the case of the general index, i, we have, for example, a choice between a consumer price index or an "all output" index such as the GDP deflator. In the case of a specific index , we have a choice of buying price and selling price, the problem of allowing for technical progress, and the choice of level of aggregation at which the index is measured.

level (giving rise to a real gain) or fall short of it (giving rise to a real loss).

(ii) Possible inflation accounting systems[6]

It will be apparent from the above discussion that there are several alternative methods of accounting which will deal with the distortions caused to historical cost accounting by inflation. Three basic alternatives are outlined below. These are Constant Purchasing Power (CPP), Current Cost Accounting (CCA) and Real Terms Accounting (RTA).

Constant Purchasing Power accounting (CPP) retains the historical cost basis of accounting by adjusting only for the effects of general inflation (measured by a general purchasing power index, i). The inflation adjustment can be applied only to the non-monetary items in the accounts, ie those whose amount is not fixed in nominal monetary units. Such items include real assets and shareholders' equity interests. Thus, a gain on borrowing and loss on holding money will be reported as a result of inflation, and the depreciation charge and cost of stocks sold, will be re-stated by using a general index.

Current Cost Accounting (CCA) makes no adjustment for general inflation but, instead, adjusts the non-monetary items to reflect changes in specific prices relevant to the business. Thus, real assets will be measured at current specific prices, and so will the related charges for depreciation and cost of stocks sold. Specific asset revaluations will not, however, appear as profits, because the proprietors' opening capital will re-stated by reference to a specific index, on the ground that the maintenance of the specific assets of the business is an essential condition before recognising a profit. This system has much in common with the economist's method of calculating real GDP after deducting replacement cost depreciation.[7]

Real Terms Accounting (RTA) attempts to combine aspects of CPP and CCA. Like CCA it re-states non-monetary assets by reference to a specific price or index, but the opening value of proprietors' capital, which provides the benchmark for the measurement of gain or loss, is re-stated by reference to a general price index. Thus, the gain on borrowing and loss on holding money appear as in a CPP system, and gains or losses in value of non-monetary assets appear as profit in so far as they are real gains or losses, ie to the extent that they gain or lose relative to the general index. The real gain or loss on a non-monetary asset is N(s-i). The

[6]A full exposition of the alternatives is in Whittington (1983). Strictly, accounting systems which apply only specific price indices are concerned with price changes rather than pure inflation.

[7]There are variants of CCA which adjust for gains and losses on monetary items, using the "gearing adjustment" see Whittington (1983).

balance sheet contains current valuations of assets (by reference to s), as it does in CCA, but in contrast with CPP which uses general indexation of historical cost.

Where full information is available, the RTA method has much to recommend it, because it selects those indices which seem most relevant to the specific items: it is reasonable to assume that proprietors will use a general price index as a benchmark in assessing whether their stake has gained in value, but it also seems reasonable to assess specific non-monetary assets by reference to their current market values rather than historical cost adjusted by a general index.

However, in the present case, we do not have current market values or specific indices available, so that both the CCA and RTA approaches are ruled out by lack of data. We therefore choose the CPP method on grounds of practicality. There are, however, three other arguments in favour of the CPP approach.

(1)CPP adjustments are recommended by the International Accounting Standards Committee (IASC) for use in hyper inflationary economies (IASC standard IAS29, 1989). Moreover, variants of CPP were practised in certain countries which have had sustained periods of high inflation, such as Brazil and Mexico which were included in the Singh and Hamid study.

(2)At higher inflation rates, it might be expected that inflation would have a larger distortionary effect on company accounts compared with that of relative price changes (which are captured by a specific index rather than the general index used in CPP). Thus CPP becomes more useful, the higher the rate of general inflation.

(3)Specific price changes are more important for individual companies than across the company sector in general, across which relative price changes might be expected to average out. In the present study, we are not adjusting the aggregate accounts of the company sector, so that this argument is not totally convincing. However, in so far as we are looking at average effects across individual companies, we might expect the errors due to using a general, rather than a specific index, to cancel out on average, if their distribution is random across companies.

(iii) The CPP method

The essence of full CPP adjustment, as outlined above, is as follows:

(1)Re-state "non-monetary" items in the balance sheet (ie those items not fixed in nominal terms) by indexing historical cost from the date of acquisition or (if relevant) subsequent

revaluation, up to balance sheet date.

(2)Re-state the profit and loss account by making four adjustments:

(i)Depreciation adjustment: This will be proportionate to the re-statement of fixed assets. It reflects depreciation in current prices rather than historical prices at date of acquisition or revaluation.

(ii)Cost of sales adjustment: This eliminates stock appreciation due to the fact that stocks are charged to profit at historical cost rather than their current cost at time of use. It can be based on simple indexation of opening stocks. A more subtle adjustment would allow for changes in stocks during the year (ie some form of average stocks), and an even more subtle method would involve re-statement of both opening and closing stocks to allow for the gap between acquisition date and balance sheet date (which is usually short).

(iii)Gain on borrowing: This is the nominal amount of loans multiplied by the change in the price index over the period. It can be offset against interest paid to give a real interest figure. A subtle version would allow for changes in borrowing during the period, by averaging, whereas a simpler but cruder version would be based on the opening balance sheet figure. Conceptually, a similar adjustment should be made for interest-bearing deposits, or they may be netted out (together with their interest receipts) against borrowing (and interest payments).

(iv)Loss (or gain) on net monetary assets: In its simplest form this is the amount of monetary assets held multiplied by the change in the index for the period. Monetary assets are assets of fixed monetary value, trade debtors being typically the most important element. It is usual to offset these against non-interest-bearing current liabilities (typically, trade creditors) for calculation purposes, although liabilities could be included in the gain on borrowing calculation (3 above), and alternatively there could be an omnibus "net monetary items" adjustment which would combine 3 and 4. There is, of course, the usual option of using the opening balance sheet situation or a mid-period average.

An alternative to the full CPP adjustments is to adjust the profit and loss account by the Brazilian

Method (as described by Martins, 1986). This produces a single omnibus adjustment for inflation, encapsulating 1 to 4 inclusive, by using the basic accounting identity:

N +M ≡L +E

WhereN is non-monetary assets

M is monetary assets

L is liabilities

E is equity interest (share capital and reserves), which constitutes the balancing item (being increased by profits and reduced by losses)

The identity can be rearranged as E ≡N +M -L so that an indexation of equity for the period can be used to remove the inflationary element from profit. However, for this to work, E must be correctly stated in CPP terms, ie it must be calculated from a balance sheet in which historical costs have been indexed up to contemporary price levels. Thus, the Brazilian method is:

Inflation adjustment = N i-E i

where i is the proportionate change in the inflation index over the period t-l,t and f consists of fixed non-monetary assets which were held throughout the period and therefore have to be adjusted from opening purchasing power to closing purchasing power units.

With the Brazilian method, as with the more sophisticated approach described earlier, we can be more sophisticated by allowing for fixed assets (N) and equity finance (E) added or subtracted during the period.

The advantage of the Brazilian method is simplicity: a one line adjustment to profit. The disadvantage is lack of sophistication in attributing the adjustment to different sources (stocks, monetary assets etc.). This can affect the calculation of certain financial ratios (such as the ratio of operating profit to sales) which may be required.

Ideally, to implement the full CPP method, we need the following data:

(1)Both an opening balance sheet and a closing balance sheet for each period, together with a profit and loss account.

(2)Enough detail in each statement to implement the above adjustments, eg we need to be able to separate monetary from non-monetary assets, possibly interest-bearing from non-interest-bearing loans, and, in the profit and loss account, we need to know cost of sales, interest payments, etc.

(3)We also need to know date of acquisition or subsequent revaluation of non-monetary assets, so that

we can index them to the relevant balance sheet date. If we wish to adopt the sophisticated method of allowing for transactions within the year, we ideally need to know the dates (and index levels at the time) of those transactions.

If we had this information, we could build up a consistent time series of CPP accounts for each company, each year's balance sheet being a consistent re-statement of the previous year's and each profit and loss account being the connecting link between opening and closing balance sheets. However, we are unlikely to have complete information in at least three respects:

(1)Opening balance sheets may not be available for the first year of a series, because the accounts usually have profit and loss account and associated closing balance sheet (although prior year comparative figures are usually produced).

(2)Dis-aggregated detail may not be available, eg on the break-down of monetary and non-monetary items (eg stocks and trade debtors may be aggregated together).

(3)Date of acquisition or revaluation will almost certainly not be available. This will be particularly important for fixed assets, which are carried over long periods.

We therefore need a simplified approach. The use of the Brazilian method will avoid problem 2 above, but problems 1 and 3 remain. To deal with them, we propose below what we call the modified Brazilian method.

(iv) <u>The modified Brazilian method</u>

This is the simplest and crudest approach possible. It involves using the Brazilian method, and applying it to the published accounts (profit and loss account and closing balance sheet only) using a crude method of estimating fixed asset age (based on depreciation).

The basic framework of the system is as follows:

(1)<u>Re-state the closing balance sheet</u>: This involves re-stating non-monetary fixed assets by the change in price level index since the date of acquisition. The net (of depreciation) increase due to inflation is added to fixed assets and to a revaluation reserve which is part of equity (share capital plus reserves).

(2)<u>Calculate a one-line inflation adjustment to profit and loss account</u>: This should ideally be based on the average balance sheet structure, but closing balance sheet is most available, and

most relevant if there has been a re-structuring (eg a major acquisition). If we can accept the closing balance sheet as our base, we can infer backwards the inflation adjustment. For an asset which is simply held during the period, we would adjust opening value: N (l+i)=N . If we observe only N (closing balance sheet), we can

work back to the opening value:

$$N_{t-1} = \frac{N_t}{(1+i)}$$

and the difference,

$$_t\text{-}N_{t-1} \text{ is } N_t \left(1-\frac{1}{(1+i)}\right)$$

This type of adjustment is applied to two items:

(1)Non monetary fixed assets: This should be based on the closing (re-stated in closing prices) amount, net of any depreciation to date (we have effectively disposed of the depreciation component, so that it no longer exists by the end of the period).

(2)Equity: This should be based on the closing amount (including the revaluation reserve) of share capital and reserves.

Clearly (1) is an addition to profit, when prices are rising (i>0), and (2) is a deduction. The net amount is an approximation to the Brazilian Inflation Adjustment and should be added to historical cost profit when (1) > (2) or deducted when (2) > (1)

This process relies on the date of acquisition of fixed assets being known, and this is not stated in the accounts. However, we can estimate it from evidence which does appear in the accounts.

There are three types of evidence available for dating:

(1)General revaluations: When it is known that there has been a general revaluation (as was the case in Turkey in 1982), it is reasonable to assume that all assets in existence at this date are expressed in prices as of that date.

(2)Transactions of previous years: This is the usual way to build up an age profile, but it requires data for several earlier years to build up the opening position in the first year of the series. Moreover, there may be breaks in the series, eg due to major acquisitions or disposals, which make a "continuous inventory" of assets difficult to measure without further details. However, this method has some possible applications, eg in the Turkish case, if we can assume that 1982 assets are all in 1982 prices, we can date subsequent changes approximately by changes in balance sheet figures (but not precisely, because there are problems to do with writing back depreciation of assets disposed of). Equally, we have a problem with non-depreciating fixed assets, such as investments in other companies (this is important in countries like Turkey where systematic consolidation of subsidiaries is not general practice), and these might only be dealt with by this method: we have no depreciation charge and the assets are often acquired in a lumpy way (a big investment to acquire a new company) rather than at a steady state.

(3)Inference from depreciation rates: This is crude but possible if we can make a few assumptions. These are, that we know the pattern of depreciation, that we can ignore scrap values (or non depreciating components, such as the land element of premises), and that we can assume a steady acquisition pattern of the assets. This is elaborated below.

Inferring asset age from depreciation

The simplest depreciation pattern, and probably the most common, is the straight line method:

$$= \frac{C-S}{n}$$

where D is annual charge, C is cost of asset, S is expected scrap value, and n is length of life of asset. If we can ignore S, this reduces to D = C/n. Accounts show us gross (undepreciated) cost, C and annual charge for depreciation, D. We can thus infer that n = C/D. This will tend to be an over-estimate because S will be positive, and sometimes large.

Having estimated n, the average length of life of the assets, we can also estimate the average age of the assets, by looking at the

accumulated depreciation figure ΣD, in the balance sheet. The ratio ΣD/C shows us the proportion of the assets which has been written

off, at balance sheet date. If we can, once again, ignore scrap values, this shows us the proportion of the assets' life which has expired.

(Scrap values will tend to cause us to under-estimate the proportion expired). Thus, the proportion unexpired is $\left(- \frac{\Sigma D}{C} \right)$4and the amount of life unexpired is$\left(- \frac{\Sigma D}{C} \right)$5 which we estimate as

$$\overline{D} \left(- \frac{\Sigma D}{C} \right) = \frac{- \Sigma D}{D}6$$

(Note that we assume S to be zero. Positive S results in an upward bias in the estimate of unexpired life).

The proportion of life expired is ΣD/C, the total life is C/D and the amount of life expired is n(ΣD/C)

which we can calculate as $\frac{}{D}\left(\frac{\Sigma D}{C}\right) = \frac{\Sigma D}{D}$7

Note that S does not appear (implicitly or explicitly) in this calculation, so that no bias is present. There is, however, a possible error if some assets do not have a depreciation charge: they will, if aggregated with depreciating assets, be assigned the same age as the depreciating assets, but there is no evidence to support this (although it may seem to be plausible).

Thus, we can estimate average life and average age of the assets. We then need to consider the age profile of the assets. It would be most simple to assume that they were all acquired at the same time, ie all were of the average age. This does not allow for the fact that similar average ages may be associated with different profiles of individual ages which should ideally require different price adjustments when prices have changed at different rates over different periods. However, since we are intent on simplicity and feasibility, our calculation is based on average life, with no sophisticated adjustments, ie we take the ratio of accumulated depreciation in the balance sheet (ΣD) to the current depreciation charge in the profit and loss account (D) as indicating average age of assets in years, and apply the change in the general price level index over that period to adjust C, ΣD and D to current prices.

The algorithm used to implement this approach is summarised below.

(v) Basic algorithm for CPP re-statement in year-end monetary units using the Brazilian method

(1)Date fixed assets

(a)If there has been a major revaluation in the year, assume assets are already in year-end monetary units. Therefore, proceed direct to (3) below.

Otherwise do re-statement on estimated age.

(b)Estimated age is $\frac{\sum D_t}{D_t}$8

where ΣD is accumulated depreciation from closing Balance Sheet.

D is depreciation charge in Profit and Loss Account

(2)Up-date fixed asset values

Assume all fixed assets are of average age.

Thus, the re-stated amount is A(l+i) , where A is the current net (post-depreciation) carrying amount of fixed assets and (l+i) is the percentage increase in the chosen general price index during the period since acquisition.

The revised fixed asset values will be substituted for the original values, increasing total assets by A.i . This will be compensated by a similar increase in shareholders' net worth. If a revaluation reserve is recorded, A.i should be reduced by this amount, subject to A.i never being negative. The Balance Sheet is now re-stated in constant (end of year) monetary units.

(3)Calculate profit and loss adjustment

Using the re-stated closing balance sheet figures from (2) above, calculate:

$$(N_t - E_t)\left(1 - \frac{1}{(1+i)_t}\right)$$

where N is non-monetary fixed assets and E is shareholders' net worth, both measured from the closing balance sheet and i is the rate of inflation for the year. This adjustment should be added to (if positive) or subtracted from (if negative) the profit for the year attributable to ordinary shareholders, ie post-interest deduction profit. It can be regarded as an adjustment of the net interest figure, ie if positive it is a reduction of net interest paid due to the gain on net borrowing.

3. Adjusting the accounts of Turkish companies for inflation

We now turn to the specific case of Turkey. The Turkish economy had an average annual rate of inflation of 38 per cent per annum over the period 1982-87, which was covered by the original study by Singh and Hamid(1992). This was the highest rate of inflation of the countries studied, with the exception of Mexico (Singh and Hamid, Table III.9) which did have a form of inflation adjustment in its company accounts. Singh(1995) covered a longer period(1982-90) and it also included more corporations - a total of 45. The latter number represented all the companies which were quoted throughout the reference period. For this longer period also, Turkey had the highest average rate of inflation (49% p.a.) of all the ten countries in the sample except Mexico and Brazil. Both of the latter two countries had inflation adjusted accounts, although the method of adjustment is rather different in each case.[8]

[8] Essentially, Mexico used a variant of Current Cost Accounting and Brazil the CPP method of inflation adjustment.

It is notable that both in Singh and Hamid (1992) and Singh(1995) the Turkish companies had by far the highest average accounting rates of return (in excess of 30 per cent per annum). It seems likely that this reflects the impact of inflation on historical cost accounts. Thus, Turkey is the obvious test case to use in order to investigate whether the Singh and Hamid results were affected by measurement bias due to inflation.

(i)Data

The data used in this paper are essentially those analysed in Singh(1995), enhanced as follows. The detail available in the original data was improved by the addition of information obtained from the published balance sheets of Turkish companies[9]. In particular, this was helpful in providing figures for accumulated depreciation, which was required for the estimation of asset age (discussed further below). However, this further information was available only for 37 of the 45 companies in the Singh (1995) sample.

(ii)Application of the Brazilian method of adjustment

The"Brazilian method" algorithm described in (2)(iv) above was used as the framework for adjusting the Turkish accounts, but even that highly simplified method could not be applied without difficulty. The reason for this was that the annual depreciation charge was not reported before 1988, when the level of disclosure in Turkish accounts was improved. Another complication, but one which helped rather than hindered the adjustment process, was the occurrence of revaluations in company accounts: there was a general revaluation in 1982, applying to all companies, and occasional revaluations in individual companies in subsequent years. Revaluations lead to asset values being re-stated in current purchasing power units, so that stages (1) and (2) of the adjustment algorithm are unnecessary.

A series of rules were devised in order to estimate re-stated fixed assets from the information available. These were based on three principles:

(1)In a year in which fixed assets were revalued (ie 1982 for all companies, and subsequent years for a sub-set of companies) no re-statement is required.

(2)For 1988-90, in which full depreciation information is available, in the absence of revaluation, re-statement of fixed assets is required and should be done using stages (1) and (2) of the algorithm.

[9]We are grateful to Selim Soudemir of the Capital Markets Research Board, Ankara for providing copies of these.

(3)For the years 1982-87, in which depreciation charges are unknown, stage (1) of the algorithm (dating of fixed assets) cannot be implemented. Thus, when re-statement is required (because there has not been a revaluation) estimate the age by linear interpolation between 1982 (when the age can be regarded as zero, for valuation purposes, because of the universal revaluation) and 1988 (when the age can be estimated using stage (1) of the algorithm). For years in this period which are bounded by revaluations (such as 1983 if there was a specific revaluation in 1984, in addition to the general revaluation in 1982), age of assets could not be inferred using the above method, and an alternative approach (the "Net Asset Rule") was used. This indexed the earlier revaluation forward, and proved to be robust when subject to a sensitivity test[10].

4. The Effects of Inflation Adjustment on the Variables in the Two Studies

(i)Inflation adjustment of the ratios

The Brazilian method of adjustment, as described above, gives us an estimate of the inflation-adjusted value of these assets at the end of a year (step (2) of the algorithm in 2 (iv)) and the profit for the year. These measures are expressed in current purchasing power units as at the end of the particular year. Thus for the purpose of summing or comparing accounting numbers over a period, we need to inflate all numbers to end-of-period measurement units by applying the index (l+i) , which is the change in price between the year t (to which the particular accounting numbers relate) and the end of the period (at which the current purchasing power unit is measured).

The detailed implications for each of the variables in the two studies (see Appendix E in Singh (1995) and Appendix D in Singh and Hamid(1992)) are explained in the Appendix to this paper.

(ii)Testing the plausibility of the results

Table 1 reports results for rates of return and growth rates on the adjusted basis. These are used to test the plausibility of the results of applying the Brazilian method of inflation adjustment. In Table 2 these results are compared with those for the ten countries reported in Singh (1995). As already noted, and as is evident in Table 2, Turkey had the highest (in nominal accounting terms, unadjusted for inflation) corporate rates of return - either in pre- or post-tax terms. One

[10]This rule is described in a working paper by Victoria Saporta (1995), who carried out all of the computational work described in the present paper.

would expect the real rates of return for Turkish firms, adjusted for inflation, to be lower than this, as well as the corresponding unadjusted rates reported in either Table 1 or Table 2. [There is a slight difference in the "unadjusted" figures reported in the two Tables - this arises from the fact that the sample size in Table 1 is 37 and in Table 2 is 45].

This expectation is confirmed by the figures for real rates of return in Table 1. The average pre-tax rate of return on net assets was 32.4 per cent per annum before adjustment for inflation and 12.3 per cent after adjustment. The post-tax (and interest) return on net worth (ie shareholders' funds) fell from 25.5 per cent unadjusted to 9.4 per cent when adjusted for inflation. These are not only changes in the right direction (the rate of return being lower post-adjustment), but they are of a plausible order of magnitude. In terms of the pre-tax return on net assets, the adjustment for inflation places Turkey (12.3%) slightly below the average (13.8%) of the 10 countries in the Singh (1995) sample (see Table 2). Similarly, with respect to the post-tax return on net worth, inflation adjustment reduces Turkey from being at the top of the list to below average of the sample countries. Bearing in mind the fact that all of these countries experienced some degree of inflation, and only two had inflation-adjusted accounts, this result is consistent with our inflation adjustment for these variables being of the right order of magnitude, although a further test, reported below, suggests that our inflation adjustment of net assets may be incomplete, so that even the adjusted rate of return may be over-stated. In comparative terms this may not be important, since inflation adjustments in other countries will be similarly inadequate: Brazil uses a similar method to ours, and countries with low inflation make no adjustment at all.

The further test of our adjustment method is provided by the growth measures. The Growth of Net Assets has a mean of 57.7% pa and a median of 53.8% pa in its unadjusted form, and this high level is presumably due in part to inflation: sustained real growth of this magnitude is implausible. The inflation-adjusted measure is lower, with a mean of 28.7% pa and a median of 31.4% pa: these are still high for real growth rates and although the adjustment is in the right direction, this suggests that it may not have removed the effects of inflation completely. A rough test of this view is provided by looking at Sales Growth. We would expect sales to grow roughly in line with assets and sales is a much simpler variable to adjust for inflation, because it is measured in currency units of the year in which it occurred. Table 1 shows that Sales Growth in its unadjusted form (including inflation) was in fact very close to (unadjusted) Net Asset Growth, with a mean of 56.2% pa and a median of 53.6% pa. Inflation adjustment lowers Sales Growth below Net Asset Growth, with a mean of 3.2% pa and a median of 3.0% pa. These are more plausible real growth rates and suggest that our adjustment method failed to eliminate all of the inflation included in Net Asset Growth. This may be due to the fact that we relied on the 1982 revaluation: if this was done on a conservative basis our adjusted opening net asset estimate may be under-stated relative to closing net assets, thus over-stating growth.

Thus, our inflation adjustment clearly operates in the right direction although, as might be expected from the strong assumptions on which it is based, it is less than perfect. The extent of the adjustment is very large. This is indicated by the Average Net Assets figure, which has a mean of 394,178,000 TL unadjusted and 2,776,241,000 TL adjusted: a more than seven-fold increase.

(iii)Testing for bias in the main results of Singh (1995)

Having tested our adjustment and found it to be reasonably robust, we now turn to the central purpose of the exercise: to assess whether the surprising results of Singh and Hamid (1992) and Singh (1995) with respect to the financing of corporate growth still hold when we attempt to remove the measurement errors caused by inflation. We will confine our attention to Singh (1995) as it is much the more comprehensive of the two studies. It covers a later and longer time period, normally from the early 1980s to 1990; it is also based on much larger samples - normally the 100 largest quoted manufacturing companies in each of the countries.[11]

The Singh (1995) results in Table 2 indicate that in five out of the ten sample countries (Mexico, South Korea, Thailand, Turkey and Malaysia), more than 70% of the growth of corporate net assets during the past decade was financed from external funds. In another two (India and Brazil), the external financing proportion was more than half. Similarly, the importance of equity financing for the developing country corporations in Singh's study is indicated by the fact that in five of the nine sample countries for which relevant data was available (South Korea, Mexico, Turkey, Malaysia and Zimbabwe), more than 40% of the growth of net assets in the 1980s was financed by new share issues. In another two countries (Jordan and Brazil) equity finance accounted for more than 25% of corporate growth in the reference period. These results may be contrasted with the widely accepted stylised facts about the financing of corporate investment in advanced countries. Corbett and Jenkinson's (1994) research for Germany, Japan, UK and the USA, showed that in line with the "pecking order" model, corporations in these countries financed their investment needs overwhelmingly from internal sources, followed by bank finance and relied on the stockmarket for new equity and bonds only to a very small extent.[12]

Hence the significance of the question as to whether the theoretically anomalous results for developing country corporations reported above, could have arisen from measurement biases caused by the use of historic cost accounting data. Table 3 provides an answer to this question with respect

[11]For some countries there are less than 100 companies in the sample, as for example in the case of Turkey. The total number of Turkish companies quoted on the stockmarket throughout the period 1982-1990 was only 45. All of these are included in the Turkish sample.

[12]The Corbett and Jenkinson results are not based on corporate accounts but on the flow-of-funds data. Therefore, their conclusions are not strictly comparable with those of the Singh and Hamid studies. For a fuller discussion of this issue, see Singh (1995).

to Turkey. Adjustment for inflation reinforces the Singh and Hamid conclusions and in no way undermines them. Adjusted figures show internal finance to be even less important and external equity finance correspondingly more important as a source of funds for corporate growth, than suggested by the unadjusted data.

Table 3 indicates that with inflation adjustment, 86% of Turkish corporate growth between 1982 and 1990 was accounted for by new share issues. This adjusted figure places Turkey at the top of the list for equity financing in Singh(1995) sample of ten countries - a full 20 percentage points higher than Mexico, the next highest country on the list. This raises the question whether such a high degree of equity financing for the large Turkish corporations is plausible? There are two main reasons for thinking that there is an affirmative answer to this question. First the Turkish stockmarket has behaved erratically in the reference period. The primary market boomed in the early 1980s following financial liberalization and the consequent steep rise in interest rates. Subsequently, in the wake of the financial crisis arising from the bankruptcy of leading finance houses in 1982/83, both the primary and secondary markets remained flat during the mid-1980s.[13] The market again boomed towards the end of the decade. The share price index rose from 171 in 1986 to 314 in 1988, to 2218 in 1989 and to 3256 in 1990[14]. The price-earnings ratio went up from 2 in 1988 to 16.5 in 1989 and to 13.2 in 1990 (IFC (1996)). New share floatation on the stockmarket in 1990 amounted to 1% of GDP, a far higher level than in the mid-1980s. Although this aggregate figure is small by standards of other leading emerging markets[15], it is more than likely that much of this new equity investment was carried out by the small number of very large quoted firms in the Turkish sample.

Secondly, it is important to appreciate that the real Turkish rate of corporate growth during the 1980s was most likely quite low. The inflation-adjusted average rate of growth of sales - which, for reasons mentioned earlier, is a better proxy for real corporate growth than the adjusted figures for net asset growth - of the Turkish companies in the reference period was only 3.2% p.a. It is also likely that much of this growth occurred in 1990, the year when real GDP increased by nearly 10%. It is therefore possible that the giant Turkish companies financed much the greater part of this small overall growth during the reference period by equity issues, most of which are likely to have been carried out either at the beginning or towards the end of the period.

Nevertheless, despite being exonerated from the inflation accounting bias, as well as being plausible in principle for the specific time period and the sample of corporations studied, it is still possible

[13]For a fuller analysis of the financial events of the period and its impact on the Turkish financial system, see Akuyz (1989).

[14]Turkey experienced very high rates of inflation during this period. Consumer prices rose by 34.6% in 1986, 38.8% in 1987, 73.7% in 1988, 63.3% in 1989 and 60.3% in 1990. The rise in share prices clearly greatly exceeded the rise in general level of prices between 1986-1990.

[15]See further Mullin (1993) and UNCTAD (1993).

that the very high Turkish figures for external and equity financing are overstated due to the second measurement bias. This was referred to in the Introduction - it arises from the use of the indirect method of estimating the contribution of equity in Singh and Hamid (1992) and Singh (1995). This issue will be taken up in Section 5 below.

Table 4 provides unadjusted as well as adjusted figures for Turkish corporations with respect to the stock and flow indicators of "gearing". Both the stock indicators (the long term debt to net assets ratio, and the long term debt to equity ratio) fall substantially as a result of the adjustment for inflation. This adjustment is again in the right direction, showing lower gearing because net assets are higher after inflation adjustment, and a comparison with Table C6 in Singh (1995) shows that the adjusted Turkish figures are very much within the plausible range. The Turkish corporations' adjusted debt to net assets ratio averaged 9.7, this may be compared with the Singh (1995) figures of 10 for Brazil, 12.9 for Mexico, 15.0 for Malaysia, 12.3 for Zimbabwe and 13.9 for Jordan.

The figures for the adjusted Turkish debt equity ratios tell a similar story when these are compared with the comparative data for other countries in Singh (1995). The same holds for the flow measures of gearing, although the adjustment for these indicators is not as large as that for the stock measures.

Table 5 reports in an abbreviated form, adjusted figures for the PE ratio and dividend return. Inflation adjustment leads to a sharp fall in the average value of the dividend return and brings the figure much more in line with those of other countries reported in Singh (1995). To the extent that the unadjusted earnings figures have been overstated in historic cost accounting, inflation adjustment should lead to a rise in the price-earnings ratio, which is what is observed.

5. Analysis of the Measurement Bias in the Equity Financing Variable

As indicated in the Introduction, the striking results of the research by Singh and Hamid with respect to the heavy reliance on equity funds by developing country corporations to finance growth, are subject to another potentially serious bias. The latter could arise from the fact that, the two studies have used an indirect method of estimating the contribution of equity finance. Equity finance has been measured as a residual from the accounting identity which makes the growth of corporate net assets equal to the growth of internal finance plus the growth of external finance; the latter is decomposed into long-term liabilities and equity. The growth of internal finance was measured by retained profits from the profits and loss accounts and the growth of long-term liabilities was proxied by the growth of long-term debt. The consequence of this residual estimation of the equity financing variable is that it is likely to have an upward bias due to the fact that (a) revaluations, and (b) some of the provisions for long-term liabilities other than long-term debt, will get included in it.

To check the quantitative significance of this bias, we experimented with a more direct method of measuring the equity finance variable for a subset of firms for three countries - Malaysia, Korea and Turkey. In this alternative method we have tried to measure equity finance independently, added other long-term liabilities to long-term debt finance and made internal finance the residual. It will be appreciated that direct information on the value of the new equity funds that a firm has raised during the course of the accounting year is not always available in company accounts. We therefore estimated this variable by calculating the number of new shares issued during the year (other than those due to bonus issues). In the absence of the information on the exact dates and prices at which the shares were issued, we used the average of the highest and the lowest share price during the year was used. The results of the exercises for the three countries are shown in tables 6 to 8.

Table 6 for Malaysia indicates that there was indeed some overstatement of the equity financing variable but it was relatively small, 38.8% with the new method versus 46.6% in Singh(1995). Similarly, there was relatively small understatement of the debt and the internal financing variable. In view of the high standard deviation none of the differences are statistically significant. Even at 38.8% the contribution of equity to corporate growth for Malaysian companies is quite high as compared with what one might have expected a priori for a developing stock market.

Table 7 tells a broadly similar story with respect to Korea. However, Table 8 does show that in the case of Turkey, the residual method of estimating the contribution of the equity financing variable did have a large and statistically significant bias - the contribution of equity was only 37.4% on the alternative method versus 65.1% in Singh(1995). Nevertheless, as pointed out above, the figure of 37.4% is still in economic terms a high figure for this variable for a country where the stockmarket is not yet fully developed. So, if we crudely combine the results of the two exercises carried out in this and the previous section we arrive at the following conclusion. The residual method of estimating the contribution of equity finance overstated the mean value of that variable by 27.7 (65.1%-38.8%) percentage points; non-adjustment of the historic cost accounting data for inflation on the other hand understated the average value of the variable by 21.5 (86.6%-65.1%) percentage points because growth due to retained profits was over-stated. All this suggests that even in the case of Turkey, which had one of the highest rates of inflation among the sample countries and where government-sanctioned general revaluations were carried out by the corporate sector during the reference period, the two biases broadly speaking cancel each other out. This lends confidence to the Singh and Hamid results as being more or less accurate representations of the contributions of different sources of finance to corporate growth.[16]

6. Conclusion

This paper has examined two important possible sources of measurement bias in the Singh and Hamid

[16] For an economic analysis of these anomalous findings for developing country corporations, see Singh (1994; Forthcoming).

studies. The main conclusion is that these biases do not vitiate the surprising empirical findings of their research with respect to financing of corporate growth in developing countries. However, the present paper has also put forward inter alia a parsimonious method of inflation accounting and demonstrated how it can be used in the developing country context. The latter contribution is therefore of interest in its own right.

APPENDIX

The effects of inflation adjustment on the Singh and Hamid ratios

The ratios are defined in Singh and Hamid (1992), Appendix D. Below we give summary definitions (in brackets), explain the inflation adjustment, and, where appropriate, indicate the direction of the adjustment.

1Net Assets

(Assets less current liabilities)

For any particular year, re-statement in constant prices of that year involves adding the inflation adjustment applied to non-monetary fixed assets. Historical cost under-states Net Assets by this amount.

2Aggregate Net Assets

(over the period)

This involves summing over years. Thus, for correct weighting, we not only have to apply the adjustment in 1 above, but we also need to adjust the individual year figures by (l+i) , where the change in the price level between that year (t) and the end of the period. Otherwise, in a period of inflation, the early years will have insufficient weight.

The new formula is:

$$\tfrac{1}{2}(\text{Net Assets})\ (1+i) + \tfrac{1}{2}(\text{Net Assets}) + \sum_{t=p+1}^{m-1} (\text{Net Assets})\ (1+i)$$

where Net Assets include the fixed asset re-statement necessary to state them in consistent prices of year t, m is the final date and p is the opening date of the period. This adjusted measure of aggregate net assets divided by n-l will give us adjusted average net assets.

3Opening Net Assets

As in 1 above, the fixed asset adjustment must be made. Then, as in 2, a further general inflation adjustment must be made for comparison with other years. Otherwise, opening assets would be under-stated relative to closing assets because of inflation.

The new formula is (Net Assets) (l+i) .

4Closing Net Assets

If these are measured in the re-stated form, ie including fixed non-monetary asset re-statement, no further adjustment is necessary, as they are expressed at closing price levels of the period.

5Net Assets Growth

This should be based on Closing Net Assets as in 4 above and Opening Net Assets as in 3 above. The effect of fixed asset re-statement is unclear, as it affects both the numerator and the denominator in indeterminate ways. The effect of the general price level adjustment of the opening figure (3

above) is to reduce growth rates in periods of inflation, relative to unadjusted measures.

6Return on Net Assets

(Pre-tax rate of return on net assets, averaged over the period)

The denominator is 2 above. This is increased by inflation adjustment (assuming positive inflation), relative to historical cost measures.

The numerator, Earnings Before Tax (EBT), requires two adjustments. First, the inflation adjustment for the year (based on indexing net assets, in the Brazilian method) is deducted from (or added to if N>E) each year's profit. Note that there is an inconsistency here because interest paid on long-term loans is not deducted from EBT. The monetary adjustment applies strictly only to the post-tax rate of return on net worth (see below). Secondly, inter-year inflation must be allowed for by re-stating earlier years' profits in end of period prices:

$$\sum_{t=p+1}^{m} 11 \quad EBT \quad (1+i)$$

This will compensate for the inflation weighting of the denominator, increasing the rate of return.

The post-tax Return on Net Worth is adjusted using the same principles as for Return on Net Assets. As noted above, this measure avoids the inconsistency which arises in the treatment of the gain on borrowing when we apply the Brazilian method to the Rate of Return on Net Assets.

7Change in Rates of Return

If the two rates of return are for individual years, there is no need to translate both into end of period prices, provided we use the Brazilian method to produce inflation adjusted profits and assets of the individual year: there is no point in multiplying both the numerator and the denominator of the beginning return by the same factor (1+i) . In the present definition (Singh & Hamid) two years are averaged, but the weighting problem is unlikely to be so serious as to require further adjustment.

8Retention Ratio

(Retained profits after tax and dividends, EAT, divided by pre-tax profits, EBT)

There are two adjustments here. Firstly, the "Brazilian" profit adjustment is applied to both the numerator and the denominator. As with 6 above, there may be a problem because EBT is calculated before charging interest: the gain on borrowing is strictly a deduction from the interest charge and should not be included in profits before interest deduction.

The second adjustment is to adjust the weighting for price changes between years:

$$\frac{\sum_{=p+1} 12\ (\text{EAT-DIV})\ \ (1+i)}{\sum_{=p+1} 13\ (\text{EBT})\ \ (1+i)}$$

9Internal Finance of Growth

(Proportion of Growth of Net Assets funded by retained profits)

The numerator is adjusted as in the numerator of 8 above, to give a constant price measure of retentions.

The denominator is calculated by differencing closing and opening net assets, as measured in 3 and 4 above. This should reduce (but not necessarily eliminate) the "revaluation bias", which under-states the internal financing proportion (by over-stating growth). The elimination of the revaluation bias will be imperfect because of the approximate nature of our adjustments, notably the use of a general price index (rather than specific prices of the assets held) and the very rough approximation used to estimate the age of the assets.

10External Finance of Growth (long-term debt)

(Proportion of Growth of Net Assets funded by long-term debt finance)

The numerator can be found by differencing indexed opening liabilities (L (1+i)) and closing liabilities L .

The denominator is as in 9 above.

Clearly, the numerator will be lower under inflation adjustment, but so will be the denominator.

Hence, the direction is not determinate.

External Finance of Growth (Equity) is derived from the previous two measures and reflects the adjustments to them.

11Capital Gearing

(Proportion of Net Assets or Net Worth financed by long-term debt)

The denominator should be re-stated in constant prices of the year as in 1 above.

The numerator and denominator are indexed by inflation to correct the weighting. If this were calculated by averaging annual figures, indexation would cancel out and be unnecessary, but it is calculated by summation over the years, before division.

12Income Gearing

(Ratio of interest payments to earnings before tax, EBT)

The denominator is the EBT measure, after inflation adjustment, used in the Rate of Return on Net Assets, measure 6. In the case of the second income gearing measure, the depreciation charge is added back, and this has been increased in the same proportion as the asset values are increased when they are re-stated in constant currency units of the year.

Finally both numerator and denominator are converted to end of period currency units by multiplying each year's observation by $(1+i)$.

13Price-Earnings Ratio

(Ratio of market value of shares to after-tax earnings)

The denominator is earnings after charging interest. Hence the full Brazilian income adjustment for monetary gains or losses must be added to or subtracted from the earnings of each year.

Finally, both the numerator and the denominator are translated into end-of-period currency units by multiplying each year's observation by $(1+i)$. This corrects the weighting problem caused by summing across years before calculating the ratio.

14Valuation Ratio

(Ratio of market value of shares to book value of net worth)

Net Worth must be re-stated in end of year currency units, as for the Capital Gearing measure.

Both numerator and denominator are then re-stated in end-of-period currency units by the usual $(1+i)$ adjustment.

15Dividend Return

(Ratio of dividends to Net Worth)

The denominator is adjusted to end-of-period prices for the denominator of Net Worth. The numerator is adjusted by the usual $(1+i)$ multiplier to be

$$\sum_{=p+1}^{} 14(\text{Dividends}) \quad (1+i)$$

Table 1 Turkey: Top 37 Companies, 1982-1990

Quartile Distributions of Size, Growth and Profitability

Unadjusted and Adjusted for Inflation

		AVERAGE NET ASSETS (1000 TL)	NET ASSETS GROWTH(%)	SALES GROWTH (%)	EBT/ NET ASSETS (%)	EAT/ NET WORTH (%)
UNADJUSTED						
Q1	MEDIAN	108505	45.1	49.5	15.8	15.8
Q2		219310	53.8	53.6	36.0	27.0
Q3		345068	69.4	62.3	46.7	37.8
Q4		4342683	114.2	121.1	76.8	58.2
MEAN		394178	57.7	56.2	32.4	25.5
STD		721448	18.3	18.0	22.5	21.3
ADJUSTED						
Q1	MEDIAN	905665	18.0	0.2	5.6	4.5
Q2		1918753	31.4	3.0	11.0	7.4
Q3		3561052	37.2	7.4	15.2	11.5
Q4		20474986	69.1	25.6	36.6	34.8
MEAN		2776241	28.7	3.2	12.3	9.4
STD		3457221	16.9	10.2	7.8	7.9

Notes

EAT is Earnings after tax and interest
EBT is Earnings before tax and interest
Net Assets includes long-term liabilities
Net Worth excludes long-term liabilities

Q4 refers to the highest observation
STD is standard deviation

Table 3

Turkey: Top 37 Companies, 1982-1990
Quartile Distributions of Indicators of Financing Corporate Growth:
Before and after Tax Retention Ratios. Internal and External
Financing of Growth.

Unadjusted and Adjusted Values

		RETENTION RATIO (BT) L.T. (%)	INTERNAL FINANCE L.T. (%)	EXTERNAL FINANCE EQUITY (%)	EXTERNAL FINANCE LTD (%)
UNADJUSTED					
Q1	MEDIAN	21.5	11.0	50.5	10.2
Q2		35.9	14.3	62.1	17.1
Q3		43.0	25.7	71.7	27.0
Q4		73.5	40.6	90.5	53.5
MEAN		10.6	17.3	61.9	21.2
STD		107.3	10.3	14.4	14.0
ADJUSTED					
Q1	MEDIAN	15.7	2.3	82.6	1.4
Q2		30.3	4.6	93.8	0.9
Q3		46.6	11.6	96.7	2.2
Q4		120.4	125.6	104.9	9.0
MEAN		32.7	12.4	86.4	0.6
STD		35.8	23.8	23.1	4.0
Memorandum					
SINGH (1995)*					

MEAN		36.3	15.3	65.1	19.6
STD		14.6	14.6	16.5	15.4

* The Singh (1995) results for Turkish corporations, are based on the top 45 quoted companies for the period 1982-1990.

Table 4

Turkey: Top 37 Companies, 1982-1990
Quartile Distributions of Indicators of Corporate Capital Structure:
Stock and Flow Measures of Gearing.

Unadjusted and Adjusted Values

		LTD/ NET ASST L.T. (%)	LTD/ EQUITY L.T. (%)	INT/EBIT L.T. (%)
UNADJUSTED				
Q1	MEDIAN	12.6	14.5	13.2
Q2		20.3	26.1	32.9
Q3		29.0	40.8	65.1
Q4		55.2	125.6	216.5
MEAN		22.8	34.7	44.6
STD		13.7	29.0	42.9
ADJUSTED				
Q1	MEDIAN	4.1	4.3	22.3
Q2		7.6	8.2	28.9
Q3		12.1	14.1	60.4
Q4		33.1	50.3	79.4
MEAN		9.7	11.8	37.7
STD		7.7	11.1	23.9
Memorandum				
SINGH (1995)*				

MEAN	23.1	34.6	47.8
STD	13.5	28.8	55.5

* The Singh (1995) results for Turkish corporations, are based on the top 45 quoted companies for the period 1982-1990.