

The Relation of Indirect Tax Changes to Price Changes in Pakistan

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Introduction

This study examines the effects of indirect taxes on prices in Pakistan. It is not a thorough study of the incidence of indirect taxes. It is an attempt to determine the relationship between changes in indirect tax rates and price changes. There have been several changes in the rates of sales and excise taxes in Pakistan in the past few years. The standard rate of sales tax was increased from 10 per cent to 12.5 per cent in 1960, and to 15 per cent in 1963. The rates of excises have been modified from time to time. It should be of great practical interest to see whether these taxes have been shifted to consumers or borne by producers and sellers.

Since one study of the effect of import duties on domestic prices of imports has been done recently in the Pakistan Institute of Development Economics [4], and further study of that aspect of the matter is going on, this study covers only sales and excise taxes.

The Problem

It is generally held that sales and excise taxes are shifted to consumers either fully or partly. This belief is based on the argument that the imposition of a tax (or an increase in the rate of an existing tax) increases the marginal cost of each firm in the industry and that producers receive less profits (some marginal firms may even suffer losses). The lower profit induces them to restrict output which, given the demand, raises the price of the taxed commodity.

Generally, the tax shifting process is determined by the slopes of demand and supply curves or, more simply, whether and to what extent supply can advantageously be restricted. The lower the slope of the supply curve (*i.e.*, the lower the absolute supply regressiveness), the less forward shifting there will be (given the slope of the demand curve). If supply elasticity is zero over the relevant range, taxes would not be shifted forward.

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In Pakistan the elasticity of supply of most locally produced goods seems to be extremely low. Owing to the controls on imports, the maximum amount of consumer goods, capital goods and raw materials that can be imported is fixed for a given period of time. As the supply of most locally produced goods depends on the availability of imported capital goods and raw materials, the (artificially created) scarcity of these goods restricts the supply of domestically produced goods and the maximum supply becomes almost fixed. When demand at that fixed supply considerably exceeds the normal supply price, producers earn a normal profits¹. In such a situation the imposition of a tax simply causes a reduction in profit but does not affect price and output. This point can be illustrated with the help of the following diagram.

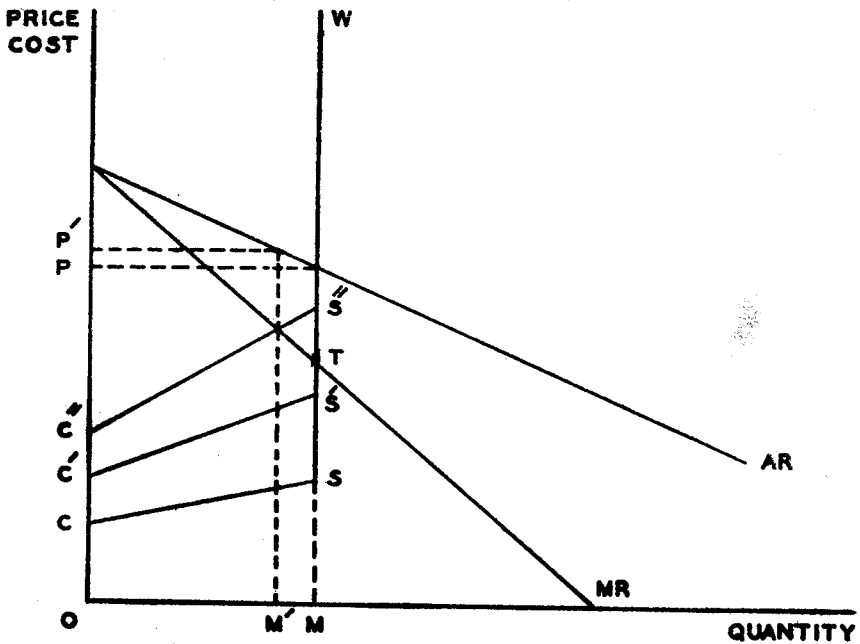


Figure 1. Indirect Tax Incidence with Limited Supply

Suppose OM is the maximum output, beyond which the producer is incapable of extending production due to artificial or licensed supply restrictions on inputs. The marginal cost curve CSW , therefore, becomes vertical at this point and intersects the marginal revenue curve at point T . Hence price before taxation is equal to OP . Suppose an ad valorem tax is imposed resulting in an upward shifting of the lower segment of marginal cost curve from CS to $C'S'$. After the maximum output is reached, the new marginal cost curve $C'S'W$ becomes vertical

¹For a more extended discussion of this point, see Lewis and Qureshi [3]. It is also discussed more fully in Pal [4] and Lewis [2].

in the same way as CSW, and intersects the marginal revenue curve at the same point as before the tax. Price and output remain the same but profit is reduced. However, if the tax is high enough to raise the marginal cost curve from CS to C'S" (i.e., to raise marginal cost above marginal revenue at price P), then both price and output are affected. In Figure 1, price would rise to P' and output (sales) would fall to M'.

The underlying assumption of our hypothesis is that imported capital goods and raw materials have few alternative uses and that the cost structure of various firms within an industry are not significantly dissimilar. Under these conditions, the imposition of a tax on one industry does not lead to a diversion of resources from the taxed industry to other untaxed fields. Even if we drop these assumptions the above figure would be likely to hold true for a group of industries, though it may not hold true for a single industry. Such would be the case because the maximum amount of imported inputs available for the industries as a group is fixed, which tends to make the supply of domestically produced goods inelastic.

The problem is to find a suitable way of testing this hypothesis. We have attempted to do this by examining tax changes and price changes in the past few years, assuming that if an increase in tax has been followed by an increase in price and a decrease in tax has been followed by a decrease in price, then the tax has been shifted forward, but if an increase in the tax has been responded to by a decrease in price or by no change in price, then the tax has not been shifted forward. Prices may rise or fall due to other factors, however. There may be shifts in domestic demand or there may be changes in the flow of imports or exports which have a substantial impact on relative prices. If imports of certain raw materials or capital goods are tightened, then the supply of some domestic commodities using those imports may be reduced, resulting in a rise in price. Or, if licences are issued liberally to import certain consumer goods, then the price of the import as well as the prices of the competing indigenous goods are likely to fall. Similarly, the export bonus scheme and other export promotion measures affect internal prices. Prices of agricultural commodities fluctuate widely. A crop failure of, say, jute or cotton would have serious implications, for not only would prices of jute or cotton rise sharply but they would cause a rise in the prices of commodities using such raw materials.

Changes in other factors, therefore, have great impact on relative prices and they can offset the effect of change in tax on price. Even if we assume that supply is elastic and that taxes always tend to be shifted forward, it is quite conceivable

that an increase in tax could be followed by a fall in price or by no change in price if at the same time demand is decreasing or supply costs are falling. This point is illustrated with the aid of the following diagram.

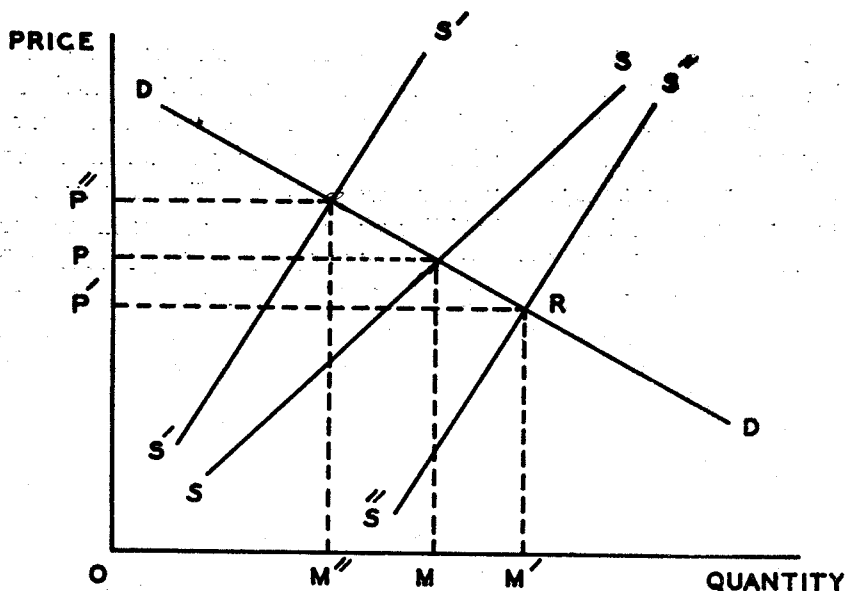


Figure 2. Price Effect of a Combined Tax Increase and Cost Decrease

Let SS be the supply schedule and DD the demand schedule. Then OP is the price before tax. Now an ad valorem tax is imposed which is shown as a shift in supply curve to the left from SS to $S'S'$. But at the same time supply costs fall causing a shift in supply curve to the right from SS to $S''S''$. $S''S''$ intersects DD at point R , hence the after-tax price is OP' , which is lower than OP . In the absence of a change in supply costs, price would have risen to OP'' after the tax, but due to the fall in supply costs, the after-tax price becomes lower than pre-tax price.

Thus, so long as other factors do change a lack of correlation between tax changes and price changes does not necessarily imply that taxes are not "shifted forward", nor does a positive correlation necessarily mean "forward shifting". However, in a study of tax-price relationships a strong positive correlation between these two variables may be taken as an evidence of forward shifting.

The price used in our statistical analysis is wholesale price. We have used all data available, covering all taxable commodities that had tax changes in the years 1959/60, 1960/61, 1963/64 and for which wholesale price indices are given

in the CSO bulletin. Thus our sample is not a random sample. The size of our sample is limited by availability of data, yet the items covered in our sample are responsible for about 63 per cent of total tax revenue (in 1962/63) from indirect taxes.

Our sample consists of 33 observations. These observations are tax rate changes and corresponding price changes for the years 1959/60, 1960/61 and 1963/64. We hypothesize that the effect of tax changes at a given time (if other things are constant) should be reflected in the average price for the following year relative to the average price in the preceding year. For instance, the tax change announced in June or July 1960 is assumed to be reflected in the average price for the year 1960/61 (the fiscal year 1960/61 is from July 1, 1960 to June 30, 1961) relative to average price in 1959/60. It is not unrealistic to assume that output and price adjustments take place within a few months of the announcement of tax change, so that the average price change during the year following should reflect the tax change.

Empirical Findings

We have plotted on a scatter diagram (Figure 3) percentage point changes in tax rates against their corresponding percentage point changes in prices. As shown in the diagram out of thirty-three observations, sixteen observations indicate a positive relationship, that is an increase in tax rate is followed by an increase in price and a decrease in tax rate is followed by a decrease in price. The remaining observations, except two, have negative relationships. On the hypothesis that a positive relationship between tax changes and price changes implies forward shifting, our sample seems to suggest that almost 50 per cent of the time indirect taxes are shifted forward. However, on the basis of this information alone, we can hardly come to any such conclusion.

In order to further examine the relationship between price changes and tax changes we fitted a regression equation, taking price changes as a function of tax changes. This allows us to weight the direction of change by the amount of change. The result is given below.

$$Y = -3.197 + 1.001 X$$

(1.57)

$$R^2 = .30 \quad N = 33$$

The coefficient of regression is not significantly different from zero. The test does not indicate any significant relationship between tax changes and price changes.

The next step in our analysis was to see whether the distribution of changes in prices is significantly different in years in which there were changes in tax rates

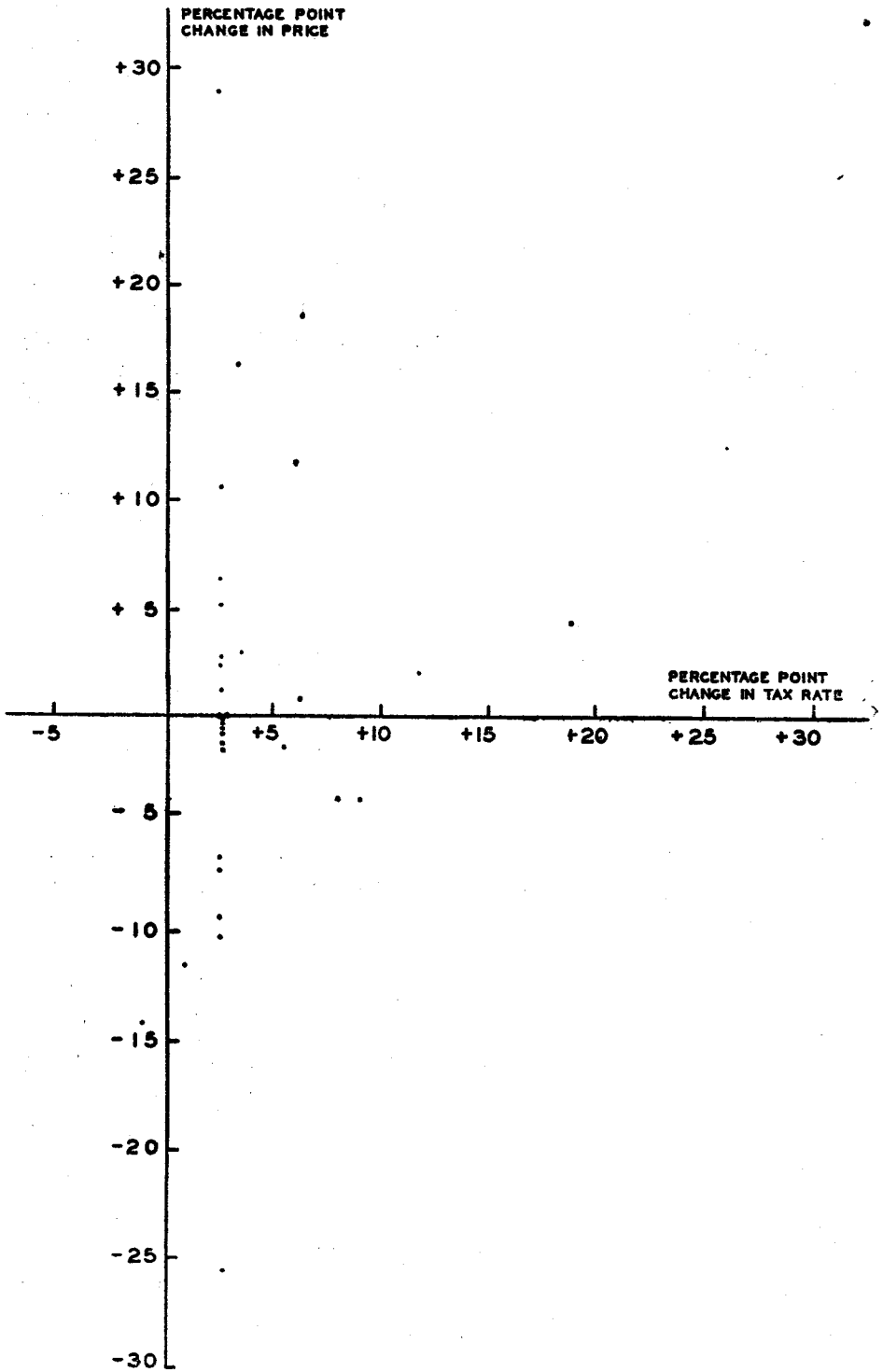


Figure 3. Price Changes in Relation to Tax Changes

than in years in which there were no changes. If taxes have effect on relative prices one would expect the distribution of price changes in tax change years to be significantly different from the distribution of price changes in non-tax change years. To test this, we examined the price changes for the same commodities, for the non-tax change years (1958/59, 1961/62, 1962/63). We got a distribution in which twenty-two out of forty-two observations were plus and the remaining were minus, where plus indicates a rise in price and minus a fall in price. This distribution is strikingly similar to the distribution of changes in prices in those years in which there were changes in tax rates. We cannot infer that the distributions do not belong to the same population, which suggests that the underlying distribution of price changes is such that almost 50 per cent of the time prices rise and 50 per cent of the time prices fall. Thus, there is no evidence that tax changes have any effect on relative prices.

It must be pointed out here that our results would not be different if we analyse by separate years. If instead of aggregating three years, we take price changes and tax changes for 1959/60, 1960/61 and 1963/64 separately, even then the results would be the same. The responses of prices to tax changes of recent years are not different from that of previous years, despite "liberalisation" of import restriction and greater availability of imported goods.

Conclusion

Import "liberalisation" in recent years has generally taken the form of increased supplies of foreign exchange for imports. This may have had the general effect of shifting the vertical portion of supply curve to the right and hence moving markets for goods with high import component of input relatively closer to "true" equilibrium, *i.e.*, tending to reduce the gap ST in Figure 1. But the time-trend of demand has also surely been rightward as well, thus tending to maintain that gap. The problem for fiscal policy is to assess the situation in such a way as to make the presence or absence, and, hopefully, the appropriate size of the gap between marginal cost and marginal revenue less a matter of conjecture. Our analysis suggests that such a gap exists generally among the industries observed, though it tells us nothing whatever about the size of that gap. In the absence of such evidence, indirect tax policy should probably be changed with caution.

On the basis of these limited results we cannot conclude that taxes are not shifted forward, for, we have not found any positive evidence of either shifting or non-shifting. However, these results somewhat support the hypothesis that supply fixity has placed the indirect tax burden on the seller in recent years.

In view of the lack of evidence of forward shifting there seems to be the possibility of raising additional revenue from indirect taxes without having adverse effects on price from the consumers' point of view. Whenever the government intends to impose a tax on a commodity it would be appropriate to look at the specific demand and supply conditions of that commodity and not presume that taxes are shifted forward and are paid by consumers. If indirect taxes are not shifted forward, therefore, revenue from indirect taxes comes mainly out of profits of sellers and producers, and is not paid by consumers. If we assume that profits are generally saved then the taxes fall mainly on saving rather than on consumption.

As a more general matter, our study suggests that it should not be assumed *a priori* (as is frequently the case in studies of tax incidence) that indirect taxes are shifted forward. Estimates of tax burdens based on such assumptions are questionable in the absence of positive evidence of forward shifting. /

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Appendix A

SOURCES AND DESCRIPTION OF DATA

The Central Statistical Office publishes a monthly bulletin (*CSO Bulletin*) in which annual wholesale price index numbers for some selected commodities are given. Some of these commodities are not taxable, and are of little use for the purpose of this study. For a few taxable commodities "all Pakistan" indices are given but for others (mostly manufactured goods) separate indices for East and West Pakistan are given. We combined these separate indices in order to get all Pakistan index numbers. The formula used for combining the two separate indices is, $I = \frac{E(W) + W(W)}{\Sigma(W)}$, where (W) indicates total production *plus* imports, *minus* inter-wing imports. The figures for weights are available in a CSO publication entitled, *Wholesale Price Index for Pakistan*.

We wanted to use a deflated price index in order to get rid of changes in the general price level, but due to unavailability of a suitable deflator we had to use an undeflated price index. The general price index, as given in *CSO Bulletins*, is highly biased to food prices because the percentage weight of food in the general index is 71 for East Pakistan and 59 for West Pakistan. If we use the general price index as a deflator, it means essentially that we deflate the separate commodity indices by food prices. Similarly, if the "manufactures price index" is used as a deflator it means essentially that cotton and jute textile prices are used as a deflator, for the weights of cotton and jute in the "manufactures price index" are very high. Since neither of these deflators appear to be appropriate, we have used undeflated figures.

The source of data for sales and excise taxes is *The law of Sales Tax* [1] and an unpublished document (cyclostyled) provided by the Central Board of Revenue (CBR).

Appendix B

PERCENTAGE POINT CHANGES IN TAX RATES AND PRICES
1959/60, 1960/61, 1963/64

Sl. No.	Commodities	Name of the tax	Year	Changes in tax rates	Changes in prices
1.	Tea	Excise	1959/60	+ 6.45	+ 18.79
2.	Tea	Excise	1960/61	+ 5.63	- 1.54
3.	Matches	Excise	1959/60	+ 11.96	+ 2.01
4.	Vegetable ghee	Sales	1960/61	+ 2.5	- 0.74
5.	Vegetable ghee	Sales	1963/64	+ 2.5	- 0.33
6.	Vegetable ghee	Excise	1959/60	+ 0.98	-11.78
7.	Hides	Sales	1960/61	+ 2.5	- 0.46
8.	Hides	Sales	1963/64	+ 2.5	-10.27
9.	Skins	Sales	1960/61	+ 2.5	-25.55
10.	Skins	Sales	1963/64	+ 2.5	- 0.65
11.	General chemicals	Sales	1960/61	+ 2.5	- 9.46
12.	General chemicals	Sales	1963/64	+ 2.5	+ 1.33
13.	Footwear	Sales	1959/60	+ 6.0	+ 11.98
14.	Footwear	Sales	1960/61	+ 2.5	- 1.62
15.	Paper	Sales	1960/61	+ 6.25	+ 0.55
16.	Paper	Sales	1963/64	+ 2.5	+ 2.41
17.	Cement	Excise + Sales	1960/61	+ 18.89	+ 4.81
18.	Cement	Sales	1963/64	+ 2.5	+ 2.57
19.	Jute manufactures	Sales	1960/61	+ 2.5	+ 29.07
20.	Jute manufactures	Sales	1963/64	+ 2.5	- 7.29
21.	Paints	Sales	1960/61	+ 2.5	0
22.	Paints	Sales	1963/64	+ 2.5	0
23.	Paints	Excise	1959/60	- 1.0	-14.66
24.	Coal and coke	Sales	1960/61	+ 2.5	- 6.56
25.	Coal and coke	Sales	1963/64	+ 2.5	+ 6.47
26.	Cotton coarse	Excise	1960/61	+ 3.06	+ 16.33
27.	Cotton coarse	Excise	1963/64	+ 9.12	- 4.08
28.	Cotton medium	Sales	1960/61	+ 2.5	- 1.04
29.	Cotton medium	Excise + Sales	1963/64	+ 8.64	- 4.33
30.	Cotton yarn	Sales	1959/60	+ 3.75	+ 3.04
31.	Cotton yarn	Sales	1960/61	+ 2.5	+ 10.84
32.	Cotton yarn	Sales	1963/64	+ 2.5	+ 5.19
33.	Diesel oil	Excise	1963/64	+ 35.85	+ 40.66

Sources: i) Figures for tax rates are from [1] and an unpublished document provided by CBR.
ii) Figures for price index are from [5].