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Income Tax Offsets versus Real Changes in Government Spending

I. Introduction.

According to revenue estimating convention, imposing an excise tax has two effects on total tax receipts. First is the increase in receipts from revenue collected from the new excise tax. Second is the reduction in receipts from the decline in the base of the income tax. This second effect, called the income tax offset, derives from the idea that, if a dollar is paid in excise taxes, it is unavailable for payment as income. Most who have examined the issue would agree that, in calculations that hold constant the size of the economy, measured as money GNP at market prices, there is an income tax offset, in the sense that, relative to its money size without the excise tax, or as a share of GNP, the income tax base declines by (at least) the full amount of excise tax collected.[1]

Identifying and accounting for the offset, however, tells only part of the story. While tax receipts might fall in reflection of the income tax offset, real government spending, measured in, e.g., tanks, boats, or miles of road-bed, might not fall at all. This seemingly paradoxical result would occur if the prices the government pays for its purchases fall by just enough to counteract the income tax offset. But, such a counteracting effect is likely, as suggested by recalling the reason for the income tax offset; the income tax base declines because factor earnings (income) decline. But a reduction in factor earnings means that, all else constant, prices also decline. Moreover, as a first approximation, the proportional reduction in factor earnings should just about equal the proportional reduction in prices, so that real government spending financed with the income tax is left unaffected by the offset. Total real government spending rises by the full amount of revenue collected from the excise tax. This is our interpretation and elaboration of a point raised by Eric Toder[2], and it highlights the importance of looking past the arbitrary

accounting convention that separates the revenue from the spending side of the budget.

In the body of the memo we first develop the point that there is no real income tax offset and relate it to the analysis suggesting that there is a money offset, through the aid of simple examples based on a one sector, one factor model. We next discuss numerical results from calculations using a richer, 2 good, 2 factor, 2 consumer model. These numerical results confirm the notion that a countervailing price reduction (at least approximately) negates the real economic effects of the money income tax offset. In the final section of the memo, we briefly consider the implication of this analysis for OTA's decision to include or exclude offsets from revenue estimates.

This short note is meant only to help frame future debate on the issue of excise tax offsets. A number of potentially important issues, especially those associated with rigidities in government spending programs that limit its ability to benefit from price reductions, are not addressed. A final resolution of the excise tax offset question will have to deal this these and other issues, some of which are mentioned in the paper's concluding comments.

II. Why an Income Tax Offset Does Not Reduce Real Government Spending.

A. Simple One Good, One Factor Model.

1. The Model.

We first explore the issue using a very simple one good, one factor model. Output, X, is produced according to the production function $X = a*L$, where a is a parameter and L is the amount of labor used in production. We assume that consumers supply a fixed amount of labor, regardless of the real wage rate. Competitive behavior means that the wage rate equals the value of the marginal product of labor, $w = a*P$, where P is the price of the produced good. We implement the revenue estimating convention of holding money GNP constant by setting $P = 1$ throughout the discussion below.

2. Equilibrium with an Income Tax Used to Finance Government Purchases of the Produced Good X.[3]

Let's assume initially that the government imposes an income tax at rate m, and uses the proceeds to buy some quantity of good X. The base of the income tax is labor earnings, w*L, which equals a*L, since the price of the produced goods is unity. Note that the income tax base equals 100 percent of GNP. Income tax receipts equal the product of the tax rate times the tax base, m*a*L, and real government spending (in units of output), G, is m*a*L. The income tax at rate m allows the government command over m percent (=G/GNP = m*a*L/a*L) of GNP.

3. Equilibrium With an Excise Tax Imposed on Top of the Income Tax.

a. The Distinction Between Income Tax Offsets and Real Changes In Government Spending.

Now, let's assume that the government imposes an excise tax at the rate of t on all purchases of X, while leaving the income tax in place. The government collects t*X in excise tax revenue. As a result of the excise tax, the wage rate falls to a*(1-t), so the income tax base falls by the amount of excise tax revenue to a*(1-t)*L. Relative to GNP the income tax base also has declined, from 100 percent to (1-t)*100 percent, or by an amount consistent with revenue collected from the excise tax. As a consequence, income tax receipts have fallen from m percent of GNP to m*(1-t) percent of GNP. There appears to be an income tax offset of m*t*a*L.

Let's look now at the effect of the excise tax on real government spending, measured in units of X. Total tax revenue, R, is the sum of revenue from the income tax, m*a*(1-t)*L, plus revenue from the excise tax, t*a*L: R = a*L*[m*(1-t) + t]. Budget balance requires that (in money terms) government spending equals revenue. Compared to when there is only an income tax, government spending (measured in money or units, as P = 1) rises by t*(1-m)*a*L, which is less than excise tax revenue by an amount equal to the income tax offset. This might suggest that real government spending falls by the offset, but that suggestion is wrong. To see the error, note

first that excise tax revenue calculated as t*X is overstated because it includes phantom revenue that the government collects from itself, and so cannot really spend.[4] Net excise tax revenue, excise tax revenue collected from private spending only, is t*(X-G) = t*(1-m)*a*L, which is exactly the amount that government spending (measured in money or units, as P = 1) rises. The conclusion is that government consumption of X rises by an amount consistent with the full amount of (net) excise tax receipts collected from the private sector, so the money income tax offset is not reflected in a reduction in real government spending.

b. The Reason for the Distinction Between the (Money) Offset and Real Spending Changes.

The income tax offset does not reduce real government spending because the (net) price the government pays for X falls proportionately with the income tax base. To see this, recall that in no real sense can the government collect excise tax revenue from itself. Consequently, the government's true price for a unit of X is the net of excise tax price, which the imposition of the excise tax reduces from 1 to (1-t)[5]. Thus, the government still can purchase m*a*L units of X with its income tax receipts of m*a*L*(1-t); the excise tax has left unchanged the real purchasing power of revenue from the income tax. This occurs because the excise tax's reduction in the wage rate lowers the true price the government must pay on its purchases in exactly the same proportion that it lowers money income tax receipts.

B. Analysis in a More General Model.

The one good model used above does not allow for complications owing to tax induced changes in prices and shifts in resources across activities. Some of these effects have been alleged to affect the offset issue. For example, some have argued that whether these is an offset depends on whether the government buys the taxed or the untaxed goods, or whether the government exempts itself from the excise tax.

To address these concerns, we analyze excise taxes using a more general competitive, fixed factor model in the Harberger tradition.

The Cobb-Douglas model we construct to examine this issue has 2 goods, 2 factors of production (labor and capital), 2 private consumers and a government. Government spending is devoted to its own consumption of one or a combination of the goods produced by the economy. [6]

In simulations using the 2 sector Cobb-Douglas model we find a price reduction that acts to countervail the offset.[7] So the general intuition from the simple model holds over in the more complex model. In determining the real effects of the excise tax, it makes little difference which, or how many, goods are subject to the excise tax, whether the government buys the taxed good or the untaxed good, or whether the government charges itself the excise tax.

1. Illustrative Tax Regimes

As examples of the flavor of these results, Table 1 presents calculations for three cases in which the government taxes only one of the two goods.[8] The simulations compare an initial equilibrium in which the government finances its purchases with a 10 percent income tax, with a new equilibrium in which the government finances an increase in its consumption with a 20 percent excise tax. To conform to revenue estimating conventions, prices are scaled proportionately so that money GNP (measured using excise tax inclusive final goods prices) is held constant in the face of tax changes.[9]

In the first two excise tax calculations presented in Table 1 (columns B and C), the government purchases only the taxed good, which is taken to be good 1. These two calculations differ superficially, however, in that in the first (column B) the government exempts itself from paying the excise tax, while in the second (column C) the government pays the excise tax. Thus, in addition to demonstrating the result that there is no real income tax offset, they also highlight why the issue of whether the government charges itself the excise tax does not matter.

In the third excise tax calculation (column D), the government places a 20% excise tax on good 2, but buys only good 1. This

calculation shows that whether the government buys the taxed or the untaxed good is largely irrelevant. It also illustrates a complication that can make the countervailing price reduction differ very slightly from that required to exactly cancel out the income tax offset.

2. Initial Equilibrium

The initial equilibrium, where the government uses a 10% income tax to raise its revenue, is shown in column A of Table I. GNP is $59.756, and income tax revenue, and hence total government revenue, is $5.976. The government spends all of its revenue by purchasing 2.746 units of good 1 at a price of $2.176 per unit.

3. Government Buys Only the Taxed Good.

a. Government is Exempt from the Excise Tax.

Now consider the case in which the government buys only the taxed good, but exempts itself from the excise tax, shown in column B. The excise tax raises gross revenue of $4.323, but, compared to column A, income tax revenue falls by $0.432. There is an full income tax offset associated with the imposition of the excise tax. But does this money offset correspond to a reduction in the units of good 1 that the government can purchase from its income tax revenue? Is the offset real is that fundamental sense? From a trivial perspective it is, since, all else equal, if the government had more revenue it could buy more units of good 1.

In a more basic sense, however, the offset is not associated with a reduction in real government purchases. The income tax offset arises because of reduced factor earnings. But the reduction in factor earnings also lowers the prices of goods, including the good that the government buys, so there is a countervailing effect on the price of good 1 that negates the offset. While these two effects show up on opposites sides of the government's budget, it is misleading to focus exclusively on the money offset on the revenue side of the budget, while neglecting the price reduction's increase in purchasing power on the spending side of the budget.

In the calculations presented in column B, the countervailing price reduction is exact; both the income tax[10] and the net of tax price of good 1, which is the price the government pays, decline by 7.23% percent. Consequently imposing the excise tax has no effect on the real purchasing power of income tax revenue; the government can buy 2.746 units of good 1 with income tax revenue both before and after the imposition of the excise tax. Since the excise tax does not change the real value of income tax revenue, the excise tax raises the government's real purchasing power (measured in units of good 1) by the full amount of excise tax receipts. That is, the 2.142 unit actual increase in government purchases of good 1 exactly equals the number of units that can be purchased from excise tax revenue, ignoring the offset: the 2.142 = Gross Excise Tax Revenue/P1(factor cost) = $4.323/$2.019.

b. Government Pays the Excise Tax.

Lets turn now to the case in column C where the government charges itself the excise tax on its purchases of good 1. In these calculations, the excise tax raises $6.521 in gross revenue, and reduces income tax revenue by 10 percent of this: there is a full money income tax offset. But, again we ask whether there is any real reduction in government purchases of good 1 that corresponds to the offset? Is there instead a countervailing price reduction that "offsets" the income tax offset?

We find that there is such a countervailing price reduction. One way to see this begins by noting that the increase in the (gross of tax) price of good 1, from $2.176 without the excise tax to $2.423 with the tax, is due solely to the excise tax. But the tax component of good 1's price is irrelevant from the government's perspective. What the government gives up with one hand when it pay the excise tax to itself, it gets back with the other hand when it collects the excise tax from itself. It is, rather, the net of tax price that is relevant for determining the government's real cost of good 1. The excise tax reduces the net of tax price (the factor cost) of good 1 (and good 2 as well) by 10.91 percent, which precisely equals the proportional reduction in income tax receipts. The price reduction therefore exactly counteracts the decline in the money amount of income tax revenue: income tax revenue will

fund 2.746 units of good 1 both before and after the imposition of the excise tax. There is no real reduction in purchasing power associated with the lower level of money income tax receipts -- no real offset.

If there is no real offset, then the excise tax's increase in the government's real purchasing power should correspond to the amount of excise tax revenue collected, unadjusted for the offset. Is this true? Going down this road requires first netting out phantom revenue of $2.369 that the government collects from itself when it pays the tax. This leaves $4.152 as net excise tax revenue collected from private purchases of good 1. The government can buy 2.142 units of good 1 with this amount of revenue, once account is taken of the feedback effect from the government charging itself the tax.[11] But 2.142 is exactly equal to the actual unit increase in the government's consumption of good 1. So real government spending (consumption) rises by the full amount of (net) excise tax revenue -- there is no effect on real spending that corresponds to the offset.

A final approach towards understanding that there is no real offset when the government pay itself the excise tax stems from noting that whether the government pays the excise tax has no real effect on the economy. While the price level after the imposition of the excise tax is slightly higher in column B than in column C[12], relative prices are identical, as is the allocation of real resources: private and government consumption of the two goods, for example, is identical in columns B and C. [13]

Since the economic effects of imposing an excise tax are identical in columns B and C, the real offset issue also must be identical.[14] If there is no real offset -- no reduction in the income tax revenue's control over real resources (units of good 1) -- when government does not charge itself the excise tax, then there can be no real offset when the government charges itself the tax.

4. Government Buys Only the Untaxed Good.

Column D presents results for a case in which the government places a 20% excise tax on good 2, but purchases only good 1. In this

case, the excise tax reduces money income tax receipts from $5.976 to $5.423, or by 9.25%. But at the same time, the excise tax reduces factor earnings and so reduces the price of good 1 from $2.176 to $1.990, or by 8.56%. In contrast to the results in columns B and C, here the percentage reduction in the price of good 1 is slightly smaller than the percentage reduction in the income tax revenue. Consequently, the price reduction is insufficient to fully counteract the reduction in the money value of revenue from the income tax, leaving intact a very small real reduction in the purchasing power of the income tax. So there is a small real income tax offset, equivalent to 0.021 units of good 1, or 0.8% of initial government purchases.

The proportional price reduction differs from the proportional income tax reduction because we assume that the production functions in the two sectors differ. Differing production conditions do not matter in the simple Cobb-Douglas model as long as the government buys only the taxed good.[15] But differing production conditions matter in these calculations where the government buys only the untaxed good because now resource shifts change relative prices.[16]

The excise tax on good 2 acts to reduce the demand for good 2, which pushes resources out of industry 2 and into industry 1. We assume that industry 1 is relatively capital intensive, while industry 2 is relatively labor intensive. Consequently, the relative factor price (the ratio of the wage to the interest rate) must fall in order to insure employment of the labor released by industry 2. This fall in the relative factor price means the excise tax reduces the price of good 1 by a smaller proportional amount that it reduces the (net of tax) price of good 2, and that the income tax consequently falls by a (weighted) average of these two (net of tax) price reductions. Since the government buys only good 1, the countervailing effect of a fall in the cost of the goods it purchases is not quite sufficient to fully compensate for the fall in the money value of its income tax receipts.[17] So a small real income tax offset remains.

In the calculations reported in column D, we assume that industry 1 is 50% more capital intensive than is industry 2, and that both

industries are (about) equally important in the initial (income tax only) equilibrium. Nonetheless, the countervailing reduction in the price of good 1 comes very near to fully compensating for the money income tax offset. This is illustrative of a general tendency. In sensitivity tests, we found that as a general matter, the difference between the price reduction on the spending side of the budget and the income tax reduction on the revenue side of the budget tends to be small. Consequently, the size of the real offset, when it exists at all, tends to be rather small.

III. Should the Money Income Tax Offset Be Ignored or Included in Revenue Estimates?

A. When the Analysis is Based on Fixed Money GNP.

We have argued above that in calculations which hold constant money GNP, an excise tax causes an observed income tax offset in money terms, but also causes a countervailing price reduction. These two reductions cancel each other out (almost exactly), so that real government spending rises by the full amount of excise tax receipts. Does this mean that OTA should ignore the offset in its revenue estimates?

Our analysis does not necessarily support an argument for neglecting the money offset in revenue estimates. It is possible to interpret revenue estimates as reflecting dollar or money amounts available for the government to spend. Following this line of reasoning, it is up to those on the spending side to account (perhaps in consultation with OTA) for the excise tax's increase in the purchasing power of a dollar of government revenue. Were OTA to report a revenue estimate that neglected the money income tax offset, it might be telling those on the spending side that they have more money to spend than they really do, and so lead to spending in excess of revenue.

For example, in going from column A to column B of Table 1, the excise tax increases total government revenue from $5.976 to $9.867, or by $3.891. This increase can be decomposed into direct excise tax revenue of $4.323, less an income tax offset of $0.432. If the offset were ignored, and the revenue estimate for the excise

tax reported as $4.323, then total estimated tax revenue might incorrectly be taken to rise to $10.299 under the combined excise tax - income tax system, where in reality total tax revenue would be only $9.867. So, if the purpose of the revenue estimate is to provide, ultimately, total revenue under the new tax system, then an offset might be appropriate.

Unfortunately, this is not the only possible interpretation of the meaning of a revenue estimate. A revenue estimate might alternatively be taken to provide a stand alone summary of the increase in real purchasing power allowed by the excise tax. Under this interpretation, it might be appropriate to ignore the offset. Direct excise tax revenue of $4.323 would allow the government to purchase 2.142 additional units of good 1, which is exactly the total net increase in units of good 1 actually observed.[18] In contrast, the net revenue increase of $3.891 suggests incorrectly that the government could increase its consumption of good 1 by only 1.927 units.

The ambiguity arises because of the excise tax's reduction in goods prices. Dollar changes in total revenue do not fully reflect changes in real purchasing power when prices are simultaneously changing. In the example, the lower (net of tax) price for good 1 means that initial income tax receipts can buy more units of good 1 than they could under the income tax, but this effect is not captured by measuring the dollar change in total tax receipts. To some extent, then, including or excluding the offset might depend on how OTA thinks revenue estimates will be (should be?) interpreted.

B. When the Analysis is Based on Fixed Factor Earnings.

Whether there is a measured money offset can depend on what is held constant in the calculations (i.e., on what is chosen as numeraire). One alternative to holding GNP at market prices constant would instead hold constant GNP at factor cost, which is the same thing as aggregate factor earnings[19], or income. If factor earnings were held constant, then by assumption an excise tax on output would not change the income tax base (in money terms compared to its level without the excise tax). Instead, the excise

tax would raise money GNP -- it would raise the price of produced goods relative to income. While there would be no offset in the sense that the excise tax would not reduce the money size of the income tax base, there would be an observed offset in the sense that the excise tax would reduce the income tax base as a fraction of GNP. Nonetheless, real government spending possibilities would rise by the full amount of excise tax revenue[20], so there would be no real offset in the sense of a reduction in purchasing power of the income tax.

Ultimately, however, what is important is not whether OTA reports an offset, but whether decisions on the spending and revenue sides of the budget are based on the real purchasing power available to the government. The offset is neither more nor less real when money GNP (at market prices) is held constant than when factor earnings are held constant, and the economic answer in both cases is that real government spending rises by an amount (approximately) equal to excise tax collections unadjusted for the offset. To prevent spending that is accidentally above or below tax receipts requires that government decision makers on both the tax and spending sides of the budget know exactly what it means to say that an excise tax generates a certain amount of tax revenue. Whether we report an offset might then depend on what we think those on the spending side of the budget understand (or should understand?) to be represented by a "dollar" of tax revenue, and so a final decision might not be easy.

IV. Conclusion.

We have argued that, at least in simple models, excise tax induced reductions in money income tax receipts are counteracted by price reductions, so that an excise tax increases real government spending possibilities by (approximately) the amount of revenue directly collected from the tax. There is no real income tax offset. Recognizing the countervailing price effect, however, does not necessarily mean the OTA should exclude money offsets from its revenue estimates. Rather, it means that in making any such decisions, OTA must consider how its revenue estimates will be interpreted.

This short note has not settled the offset issue. Account must be taken of types of government tax and spending programs that are indexed for inflation or are fixed in nominal terms. Deficits also might matter, as might taxes on intermediate goods, and the distinction between consumption goods and investment goods. In addition, rigidities and adjustment costs might affect how quickly prices and quantities respond to tax changes in a way completely ignored in this analysis. These topics are subjects for future work.

Endnotes

1. Here and throughout this memo, we assume that the government will use excise tax revenue to fund its own consumption of goods.

2. Eric Toder has not endorsed our analysis. Any errors are entirely our own.

3. The analysis is not affected if instead the government purchases labor directly.

4. We assume in the text that the government charges itself the excise tax, but this assumption does not affect the analysis. If the government instead exempts itself from the excise tax, then $P = 1/[1-t*\{m*(1-t)+t\}]$ and $G = a*L*[m*(1-t)+t]$. Excise tax revenue is $t*P*X = t*a*L*[1-\{m*(1-t)+t\}]/[1-t*\{m*(1-t)+t\}]$, which finances $t*a*L*(1-m)$ units of the produced good, at a price of $P*(1-t)$ per unit. But the overall real increase in government consumption allowed by the excise tax (measured as the change in G relative to the income tax) is $a*L*[m*(1-t)+t] - a*L*m = t*a*L*(1-m)$, identical to the real purchasing power of excise tax receipts, unadjusted for any offset. Consequently, there is no real offset. See the discussion in section II.B.3 below.

5. See note 13 below.

6. Complications from transfer payments, whether fixed in real or nominal terms, are not consider in the analysis.

7. The countervailing price reduction, however, exactly eliminates the income tax offset only under certain circumstances. In our model an exactly countervailing price reduction relies on the excise tax leaving unchanged the relative factor price (i.e., the ratio of the wage rate to the interest rate). This requirement is satisfied, for example, in our Cobb-Douglas economy when the government buys only the good subject to the excise tax. In this case, the excise tax does not reduce the total demand for the taxed good and so does not change the allocation of resources across sectors, so there is no pressure on the relative factor price. As long as the relative factor price remains constant, the proportional reduction in factor earnings, which is definitionaly equal to the proportional reduction in the income tax base, also equals the proportional reduction in all goods prices, including the price of the good the government buys. The countervailing price adjustment therefore is exact.

The requirement of a constant relative factor price is not satisfied in our model when the government buys the untaxed good only, and production functions in the two industries differ. See the discussion below. Exactly countervailing price effects also might not obtain in other models, such as those based a more general CES functional form.

8. Results of other cases are left out due to space considerations, but are available from us.

9. But we discuss below some implications of an alternative interpretation of "fixed GNP".

10. The price of good 2 also falls by 7.23 percent, reflecting the same proportional fall in factor earnings that also lowers the price of good 1, as well as income tax receipts.

11. This is equivalent to simply dividing net revenue by the net of tax price. Alternatively, for the excessively thorough, note that given net revenue of NR, a gross of tax price of P and an excise tax rate of t, total purchases is the infinite sum $[NR/P]*\Sigma(t^i) = [NR/P]*[1/(1-t)] = NR/[P*(1-t)]$, assuming t is less than 1.

12. This is due to the implementation of the fixed GNP assumption. The overall level of market prices must be slightly higher in column B to account for the fact that government does not pay the excise tax, since GNP is measured is as the sum of actual government spending plus actual private spending, and so nominally depends on whether the government pays the excise tax.

13. Whether the government pays itself the excise tax is irrelevant to resource allocation precisely because the government can only collect net revenue from the private sector. When it pays itself the excise tax, it simultaneously gets a rebate (in the form of tax revenue) equal to the tax it pays. Consequently, the true price that the government pays is the net of tax price (or the factor cost) of the goods its purchases.

14. Clearly some items vary in the two panels, even after adjusting for price level differences. For example, gross excise tax revenue is larger when the government pays the excise tax. But the excess is just phantom revenue since it is associated with an equal increase in the cost of goods purchased; the higher revenue does not correspond to greater control over real resources.

15. See note 7 above.

16. If production functions were identical in the two industries, resource shifts would no change relative prices so the countervailing price reduction would exactly offset the fall in the money value of the income tax, even when the government buys only the untaxed good.

17. In contrast, if the government bought the same mix of goods 1 and 2 as does the private sector, then it would benefit from the price reduction in exactly the same proportion as it is hurt by the decline in money receipts from the income tax, so the countervailing price reduction would be complete. There would be

no real income tax offset.

18. If the government pays the excise tax, phantom revenue must be removed from excise tax receipts, and the net of tax price of good 1 used to convert dollars into units. Removing phantom revenue in order to correctly measure the real increase in government spending is not, however, what people typically mean by an offset.

19. When there are input subsidies, like the investment tax credit, there might be a distinction between factor earnings and factor cost as seen by employing firms. This distinction is not key here, since the main point is simply that something other than output can be used as numeraire. Holding factor earnings constant is like using labor as numeraire in a one factor model.

20. Of course, with government tax revenue collected from itself, if any, netted out, and neglecting effects do to small changes in relative net of tax prices.

Table 1 a/

Income Tax Offsets and the Allocation of Resources

	Income Tax	Excise Tax on Good 1						Excise Tax on Good 2		
		Government Exempt			Government Pays					
	(A)	Level	(B) Change	% Change	Level	(C) Change	% Change	Level	(D) Change	% Change
Factor Endowment (in Units)										
Labor	30	30	0		30	0		30	0	
Capital	25	25	0		25	0		25	0	
GNP	$59.760	$59.760	$0.000		$59.760	$0.000		$59.760	$0.000	
Prices of Factors										
Wage	$1.000	$0.928	($0.072)		$0.891	($0.109)		$0.870	($0.130)	
User cost	$1.190	$1.104	($0.086)		$1.060	($0.130)		$1.125	($0.065)	
								0.7733		
Prices of Goods										
P1 (gross of excise tax)	$2.176	$2.523	$0.347		$2.423	$0.247		$1.990	($0.186)	
P1 (at factor cost, net of excise tax)	$2.176	$2.019	($0.157)	-7.23%	$1.939	($0.237)	-10.91%	$1.990	($0.186)	-8.56%
P2 (gross of excise tax)	$2.102	$1.950	($0.152)		$1.872	($0.229)		$2.363	$0.261	
P2 (at factor cost)	$2.102	$1.950	($0.152)		$1.872	($0.229)		$1.890	($0.212)	
Government Revenue										
Income tax revenue (@ 10%)	$5.976	$5.544	($0.432)	-7.23%	$5.324	($0.652)	-10.91%	$5.423	($0.553)	-9.25%
Gross excise tax revenue (@ 20%)	$0.000	$4.323	$4.323		$6.521	$6.521		$5.526	$5.526	
Total revenue	$5.976	$9.867	$3.891		$11.845	$5.869		$10.949	$4.973	
Allocation of Resources (Output, in Units)										
Government purchases of good 1	2.746	4.888	2.142		4.888	2.142		5.502	2.756	
Private purchases of good 1	10.708	8.566	-2.142		8.566	-2.142		10.644	-0.064	
Private purchases of good 2	14.503	14.503	0		14.503	0		11.692	-2.811	

Note: a/ Author's calculations as described in the text.