Notes on the Welfare Costs of Real and Money Transfers*

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The standard problem of the theory of international trade is the transfer problem—the effects of a continuing transfer from one country to another—on the welfare of the country making the transfer (the "transferor"). This problem has traditionally, following the work of Samuelson, been dealt with in terms of the question of whether or not there is a presumption that the terms of trade will turn against or in favor of the country making the transfer, thus imposing a "secondary burden," or mitigating the effects of the transfer by a "secondary benefit," by comparison with the effects of the transfer at unchanged terms of trade. Moreover, in this analysis the transfer is customarily assumed fixed in terms of one or the other commodity, i.e., it is a "real" transfer. Rather than approach the transfer via the presumptive movement of the terms of trade, however, it seems more useful to approach the question of welfare effect directly. Moreover, it seems more natural to assume a transfer fixed in terms of money, rather than in terms of a commodity; this approach, incidentally, introduces an additional concept of secondary burden or benefit, associated with the question of whether the transfer, and the associated transfer of purchasing power and demand for money from transferor to transferee, increases the demand for money and reduces the general price level or vice versa. The purpose of these notes is to present some approximating formulae for the welfare effect of a transfer, on the simplifying assumption that money demand is proportional to money expenditure.

We begin with a transfer specified in terms of the transferor's export good, abstracting from money and assuming a barter economy. (The transfer could easily be assumed to be fixed in terms of the transferor's import good, by expressing it as a value magnitude in terms of the export good.) Country 1 is the transferor and country 2 the transferee, quantities being measured in terms of country 1's export good and p being the price of the other good in terms of it, assumed to be equal to unity in the absence of the transfer. The equilibrium

*This paper is one of a related series of occasional studies in the theory of the transfer problem. In a monetary economy, carried on under the auspices of the International Monetary Research Programme at the London School of Economics, funded by the (British) Social Science Research Council. For a description of the importance of the transfer problem and a citation of the major contributions to the (monetary) treatment of it, see Harry G. Johnson, "The Welfare Effects of Tariffed International Transfers," in Trade, Stability and Macroeconomics: Essays in Honor of Lloyd A. Metzler, ed. by George Horwich and Paul A. Samuelson (New York and London: New Academic Press, 1976), pp. 79–110. See also Harry G. Johnson, "The Transfer Problem: A New Approach" (forthcoming), for a fuller statement of the alternative approach being pursued in these studies and an application of utility Cobb–Douglas utility function to the evaluation of welfare effects.

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overall balance of payments of country 1 is
\[ B_X = X_1 - pX_2 - T = 0 \]
where \( X \) represents exports of the subscribed country and \( X_1 = \frac{X}{X_1} = X \) in the absence of the transfer.

Differentiating from a zero transfer,
\[ \frac{\partial p}{\partial t} = -\frac{1 - m_1 - m_2}{X(\eta_1 + \eta_2 - 1)} \]
where the \( m \)'s are marginal propensities to import and the \( \eta \)'s elasticities of demand for imports. Note that \( \eta_1 + \eta_2 = 1 \) is the stability condition, assumed satisfied, and that the terms of trade turn against or in favour of the transferor according as \( m_1 + m_2 \leq 1 \), the usual criterion.

The equilibrium value of country 1's imports is approximately
\[ X_1 = m_1T + \frac{\partial p}{\partial t}T \quad \text{or} \quad X_1 = m_1T + \frac{1}{\eta_1 + \eta_2 - 1} \left( \frac{1 - m_1 - m_2}{\eta_1 + \eta_2 - 1} \right) \]
(substituting \( T \) for \( \partial p/\partial t \) is the amount of the transfer).

The primary welfare loss from the transfer is \( T \) and the secondary loss (or benefit if \( \partial p/\partial t < 0 \)) approximately
\[ (X - m_1T) \frac{\partial p}{\partial t} = \frac{1}{X(\eta_1 + \eta_2 - 1)} \left( \frac{1 - m_1 - m_2}{\eta_1 + \eta_2 - 1} \right) \]
where
\[ A = \frac{1 - m_1 - m_2}{\eta_1 + \eta_2 - 1} \]

We now turn to a monetary economy with the transfer fixed in terms of money, for simplicity assuming that each country is completely specialized, outputs being \( Y_1 \) and \( Y_2 \). Let \( e \) be the world price of country 1's good, and \( k_1 \) and \( k_2 \) the (assumed constant) money to expenditure ratios in the two countries, expenditure being output plus minus the transfer. Let \( M \) be the fixed total of world money, equal to \( k_1Y_1 + k_2Y_2 \) so that \( p = 1 \) and \( e = 1 \) when \( T = 0 \), \( e \) being the money price of Year, and \( T = T \) the money transfer. The demand for real balances (measured in country 1's good) is
\[ \frac{M}{T} = k_1Y_1 + k_2Y_2 + (k_1 - k_1T + k_2 + k_2T) \frac{\partial p}{\partial t}T \]
\[ = \frac{1}{T} \frac{T}{X(\eta_1 + \eta_2 - 1)} \left( \frac{1 - m_1 - m_2}{\eta_1 + \eta_2 - 1} \right) \]
Letting \( T = T/X \), the total welfare loss as a proportion of initial trade volume is
\[ \left[ 1 + \frac{1 - m_1 - m_2}{\eta_1 + \eta_2 - 1} \left( \frac{1 - m_1 - m_2}{\eta_1 + \eta_2 - 1} \right) \times 2m_1(\eta_1 + \eta_2 - 1) \right] + \eta_1(1 - m_1 - m_2) \]
Note that the first two terms reduce to \( \eta_1 + \eta_2 - 1 \), where \( \eta \) is an income-compensated elasticity, while the third term must be positive for \( m_1 + m_2 > 1 \) (favourable terms of trade movement) so that (to this approximation) there must be a welfare loss even if the terms of trade turn in favour of the transferor. Note also that, for a transfer fixed in terms of the import good, \( T \) we may merely substitute \( r \) in the foregoing formula:
\[ \frac{T}{X} = \frac{1}{e} \frac{X}{k_1 + k_2} \left( k_1 + k_2 \frac{1 - m_1 - m_2}{\eta_1 + \eta_2 - 1} \right) \]
where \( r = T/X \) is the ratio of the money transfer to the value of exports at initial pre-transfer money prices. (Note that differences between the marginal and the initial average money-to-expenditure ratios could be allowed for by printing \( k_1 \) and \( k_2 \) in the parenthesis expression in the denominator).

Letting \( 1 - m_1 - m_2 \) be represented by \( A \),
\[ \frac{Y_1}{X} \]
and \( k_1Y_1 + k_2Y_2 \left( k_1 - k_1 + k_2 \frac{1 - m_1 - m_2}{\eta_1 + \eta_2 - 1} \right) \] by \( B \),
the welfare loss as a proportion of the initial value of trade is
\[ \frac{r}{1 - erf} \left[ 1 + A - rB + AB + mA + A \eta_1 \frac{1}{\frac{A}{1 - erf}} \right] \]
or
\[ \frac{1 + A - r}{1 - erf} \left[ B + rA \right] \]
\[ - B + AB + mA + A \eta_1 \etk \]
where
\[ B = \eta_1 \etk \]
and those symbols represent respectively the velocities of circulation of money in country 1 relative to country 2 (the money-to-expenditure ratio in country 2 relative to country 1), the importance of trade to country 1, and the size of the rest of the world relative to country 1.

The main purpose of approaching the effects of transfers in terms of (approximative) welfare cost rather than presumptive movement of the terms of trade is to gain some quantitative idea of the influence of the various parameters suggested as relevant by economic analysis but ignored by calculations based on the assumed constant of prices in face of the transfer. Table I is a preliminary calculation which ignores the presence of money and compares the welfare costs of transfers fixed in terms of the export and the import good when the conditions for the "classical preemptive" that the terms of trade turn against the transfer are fulfilled. It should be noted that in the case of a "real" transfer, the sizes of the two countries relative to each other and to the initial volume of trade between them is irrelevant, unless it systematically influences the parameters themselves, since trade volume is the same for both countries. The attempt to derive presumptions from calculations of relative sizes was, as Samuelson's classical articles on the transfer problem showed, a blind alley, into
### TABLE I

<table>
<thead>
<tr>
<th>( n )</th>
<th>( x = 10% )</th>
<th>( x = 25% )</th>
<th>( x = 50% )</th>
<th>( x = 75% )</th>
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<td>7.25</td>
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<tr>
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<td>10.72</td>
<td>7.67</td>
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</tr>
<tr>
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<tr>
<td>3.00</td>
<td>10.77</td>
<td>10.72</td>
<td>7.67</td>
<td>5.73</td>
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</table>

The figures in the table can be used to study the four questions that have appeared in the literature concerning the influence on the size of the "secondary burden" of the transfer of variations in the elasticities of international demand, differences in marginal preferences, for goods, the size of the transfer (as a proportion of initial trade) and the choice between devaluation of the dollar in importable and in import-substituting goods. In connection with the first two variables, it should be noted that, since the elasticity of demand for imports can be decomposed into an elastic component and a compensated elasticity of demand, use of the uncompensated elasticity and the marginal propensity to import as parameters implies an equal and opposite change in the compensated elasticity when the marginal propensity to import changes (a reduction in the propensity representing an increase in the marginal rate of transfer). The use of the uncompensated rather than the compensated elasticity is chosen for simplicity of the model and the alternative approach can easily be developed by the interested reader; its main effect is to understate the effect of increasing difference in marginal preferences in increasing the "secondary burden." The main results shown by the table are two. First, the "secondary burden" becomes significant relatively to the "primary burden" only when taste differences are large and demand elasticities are low, and significant in absolute terms only when the transfer is large as well. Note in particular the figures associated with the maximum import demand elasticity of two shown in the table: recent empirical studies tend to suggest that a value of two is rather low. Second, and rather more surprising in view of the importance that theory has attached to the difference between transfers fixed in terms of exportable and importable goods, the difference between the welfare costs of the two specifications are negligible unless the transfer is very large (in relation to initial trade), the elasticities of import demand very low, and the marginal taste differences very large. Consider the figures for a transfer of 25 per cent of initial trade, elasticities of 1.5, and marginal propensities to import of .35. The results would indeed suggest that concentration on the question of whether the transfer is denominated in exportables or in importables is justified only in near-pathological cases.

Table II presents calculation of the approximate welfare costs of transfers fixed in money and expressed as a proportion of the initial trade volume (\( x \)) for values of .35, and .50, on the assumptions that the rest of the world is alternatively one, two, and four times the size of the transfer (y being the ratio of foreign to domestic income), and the money-to-income ratio there is respectively one, one-and-one-half, and two times the transfer's ratio. (Being the ratio of the foreign to the domestic money-to-income ratio, for the values of the marginal propensities to import \( m \) and elasticities of demand for imports \( q \) previously imposed. It is assumed that before the transfer exports (and imports) are one quarter of the transferor's national income. This last assumption seemed the most reasonable one to make about the parameter; it was most convenient to fix in order to reduce the possibilities of parametric variation to a single, easy-to-read table.

The chief interest of Table II, as compared with Table I, concerns the effects of variations in monetary conditions on the (approximate) welfare costs of the secondary burden and therefore the total welfare cost of the transfer. This involves two dimensions, differences in the money-income ratios and differences in relative sizes of countries. As the table shows, the approximate welfare burdens increase as the money-income ratio in the transferer rises relative to that of the transferor, and the size of the transfers increases relative to that of the transferor. (The numbers shown in the last line of Table II(a), for \( x = 2 \), however, may indicate that with small enough transfers, high enough elasticities and a large enough difference in marginal propensities to import in money-to-income ratios, an increase in the relative size of the transfer reduces the welfare cost of the transfer; this possibility is not explored here.) However, the increase in welfare burdens as the money-to-income ratios and relative national income differences increase are very small relative to the size of the burden (the welfare cost) for equal incomes and money-to-income ratios, set by the magnitudes of the elasticities and the marginal taste differences. This in turn suggests that analysis may fairly concentrate on the real parameters to the neglect of the monetary ones, subject to the necessity of recognizing that in cases requiring large changes in relative prices atten-
tion must be paid to the division of the relative price change between a fall in the money price of importables and a rise in the money price of importables, and this division will depend on relative money-to-income ratios and national income sizes. For given elasticities and marginal propensities to import, and equal money-to-income ratios, the welfare cost of a transfer fixed in terms of money must (and in the figures of Table II does) fall between the welfare costs of transfers fixed in terms of exportables and importables, and can be approximated by either as a limit, though with low elasticities and large differences in marginal preferences an average of the two limits would be a significantly closer approximation. This last consideration suggests a somewhat different type of problem, whose solution must await another occasion or possibly another author. Suppose that, contrary to the assumptions of the classical transfer analysis but in line with the spirit of Samuelson's classic investigations, we know only the "structure" of the countries involved in the transfer, that is, their sizes, average propensities to spend on, imports and domestic goods, and money-to-income ratios, the marginal propensities being unknown; and suppose that the transferring country has a choice among the alternatives of denominating the transfer in terms of exportables, importables, goods, and money. What numerical should it choose, and how important would the choice be for its likely level of welfare after the transfer?

Working Women's Contributions to Family Income

CAROLYN SHAW BELL†

References to the increasing number of women in the labor force abroad, these days, and more and more attention focuses on the growing number of married women and married mothers who work in paid jobs. Yet little attention has been given to the impact of these women's employment on their families' income. Most of the discussion has dealt with family structure: whether or not children are being neglected, whether women have two obligations (one to the job and the other to the home), whether the nuclear family is breaking up or the role of the husband/father is changing. What economic analysis exists has been directed to the occupational distribution of the new group of working women, and to various measures of occupational and income differences which might indicate economic discrimination. Very few calculations of the income earned by these women, or of its distribution, exist.

This is a matter of some surprise, actually, for normally when a significant group of people become earners their purchasing power is avidly sought by producers and sellers looking for new markets. Some engaged in market research may have calculated the rise in total family income without realizing the extent to which that rise stems from the earnings of married women. Other market researchers, depending on the family as the unit of analysis, may have ignored the nature of individual contributions to total family income in favor of inquiries as to the disposition of that income.

To the question "How much do married women earn?" one answer recurs about one-quarter of total family income. Nor has this fraction changed very much over time. Occasionally one finds some amplification as in the following (Bureau of Labor Statistics [3][5]) statement:

The overall relative contribution a working wife made to family income did not change and was about the same as it has been for at least a decade. In 1970, the median proportion of income contributed by the wife's earnings was 27%, ranging from 35% for wives who had worked full time all year to 16% for those who had worked less than a full year

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