Linkage not Interest - Wages not Prices

English text with Hebrew translation.
This article is a shortened and simplified version of the paper “Interest Free Wage Linkage of Personal Loans and Mortgages”. Here we have omitted calculations, discussions, tables and references. The full paper can be found on my internet page - see end of article. Sincere thanks to all who helped me with this work.
It is permitted to copy this article but only in its entirety.

I arrived in Israel in December 1978 - ספטמבר 1978, during a period of high inflation that continued for a number of years. There was economic turmoil.

During those years prices increased by 25% every month or two, and penalty interest rates reached about 1760% per annum. I clearly remember seeing a sign on a shop selling car accessories warning - "deferred payments bear interest of 4% a day".

During those years, three zeroes were removed from the currency - remember the lira and the shekel before the new shekel. Sadly, there was a state of economic collapse. Tragically, someone committed suicide because of escalating debts.

It is a pity that all this happened amongst a people required by the Torah not for exact interest from each other.

In spite of all this, there were glimmerings of hope during those years of high inflation. Also, I remember a radio program where people phoned in to make contributions, instead of money, some gave "a day", "a week" whilst a friend even contributed "a month". Contributing time, had become more meaningful than contributing money, which was collapsing. These events somehow gave me the idea of interest free linkage to the average wage. Since then, I have worked on this idea, from time to time over the years.

"Time is money" so the saying goes. Money can be lent and borrowed but is this true for time? If time is money, does it have a representative exchange rate (גרש ז"פ - שער הירד) ? If time is money, can it be used for defining prices, apartment rentals, fees, balances, monthly payments, rates and so on? By using the average wage for debt linkage, we can get quite close to lending and borrowing time. Yes, time is money and the average wage is its representative exchange rate. Yes, prices, apartment rentals, fees, balances, monthly payments, rates and so on can be defined in terms of time.

Lending with interest has generated hatred and persecution of the Jewish people and we must not forget the lesson of history. Here I have tried to propose an alternative, which is fair to borrower and lender, and takes into account moral and economic considerations. My prayer and my plea, is that we
remember the lesson of history, and make appropriate changes.

This concludes the opening remarks. Here are the contents of the article.

1 Index formulae and linkage
2 Accuracy and stability of index formulae
3 Wage and not price linkage
4 Linkage without interest
5 Halachic questions
6 Accounting in terms of the average wage, discouraging fraud, encouraging honesty
7 Linkage and economic stability
8 Others who have proposed linkage without interest
9 Conclusions and suggestions

1 Index formulae and linkage

Let us say a family wishes to measure the change in the price of fruit and records details of the "fruit baskets" it purchases.

Initial purchase: 3 kilos apples at 3 coins a kilo and 5 kilos bananas at 2 coins a kilo.

Most recent purchase: 4 kilos apples at 2 coins a kilo and 1 kilo bananas at 4 coin a kilo.

Here are five values of the "family index of fruit" at the most recent purchase relative to the initial purchase, according to five different index formulae. (Detailed explanations and calculations appear in section 1 of the full paper.)

<table>
<thead>
<tr>
<th>Index formula</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laspeyres</td>
<td>136.8</td>
</tr>
<tr>
<td>Paasche</td>
<td>85.7</td>
</tr>
<tr>
<td>Fisher</td>
<td>108.3</td>
</tr>
<tr>
<td>Unit</td>
<td>101.1</td>
</tr>
<tr>
<td>Normalized Unit</td>
<td>99.3</td>
</tr>
</tbody>
</table>

An index value of 100 is supposed to indicate that there is no price change. So it is not clear from the above, if there has been a price increase or a decrease!

Formulae used in Israel for prices and wages

Laspeyres' index formula is used for prices. That is, we calculate monthly, the change in price of a fixed (or initial) basket of commodities.

The Unit index formula is used for wages. The unit in this case is the employee post. The cost per employee post is the total wages paid divided by the number of employee posts filled, and this is calculated monthly.

Debt Linkage

Regarding full linkage, the debt and debt repayments would rise and fall in proportion to some index, e.g. prices, wages,
foreign currency, etc. This means that the new amount equals the original amount multiplied by the ratio of the new index value to the original index value.

If the linkage is partial, for example 99% linkage, then the values calculated using full linkage would be multiplied by 99/100.

2 Accuracy and stability of index formulae

An index formula should be both accurate and stable. "Stable" means that unrealistic prices should have little or no effect on the value of the formula. These matters are particularly important when debts are linked to an index formula.

Accuracy

We used a computer to simulate test situations where the true average index value is known. We observed that the Unit Index, the Normalized Unit index and Fisher's index were accurate in all our tests, whereas the indices of Laspeyres and Paasche were accurate only when there was no correlation between price and quantity.

Stability

We noted in the full paper that the Unit index and Normalized unit index have a property which gives them good stability characteristics, namely, unrealistic prices are typically down weighted by low quantities. Laspeyres', Paasche’s and Fisher's indices do not have this property and therefore can have poor stability characteristics. The following two examples illustrate this.

Example of a sudden price increase making a price unrealistic.

Initial purchase: 2 kilos apples at 2 coins a kilo and 2 kilos bananas at 2 coins a kilo.

Most recent purchase: 4 kilos apples at 2 coins a kilo and 0 kilo bananas at 4 coins a kilo.

Here are the values of the index formulae.

<table>
<thead>
<tr>
<th>Index formula</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laspeyres</td>
<td>150</td>
</tr>
<tr>
<td>Paasche</td>
<td>100</td>
</tr>
<tr>
<td>Fisher</td>
<td>122</td>
</tr>
<tr>
<td>Unit</td>
<td>100</td>
</tr>
<tr>
<td>Normalized Unit</td>
<td>100</td>
</tr>
</tbody>
</table>

Example of a sudden price decrease because of an unrealistic price.

Initial purchase: 4 kilos apples at 2 coins a kilo and 0 kilos bananas at 4 coins a kilo.

Most recent purchase: 2 kilos apples at 2 coins a kilo and 2 kilo bananas at 2 coin a kilo.
Here are the values of the index formulae.

<table>
<thead>
<tr>
<th>Index formula</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laspeyres</td>
<td>100</td>
</tr>
<tr>
<td>Paasche</td>
<td>75</td>
</tr>
<tr>
<td>Fisher</td>
<td>87</td>
</tr>
<tr>
<td>Unit</td>
<td>100</td>
</tr>
<tr>
<td>Normalized Unit</td>
<td>100</td>
</tr>
</tbody>
</table>

Note that only the Unit index and Normalized Unit index were not affected by the unrealistic price in both these examples and had value 100 which indicates no change from the buyer's viewpoint.

Section conclusion

From the previous discussions we see that only the Unit index and the Normalized Unit index were both accurate and stable.

The Unit index can only be used to measure price change of a single item or similar items sold in the same units, and is in our opinion, the best choice for this case. The Normalized Unit index can be used to measure price change of different items sold in different units and is in our opinion the best choice for the general case. (See the full paper for further details.)

3 Wage and not price linkage

There are many formulae for calculating the price index of a number of different items. Fisher for example, gives one hundred and thirty four such formulae. He also compared these formulae using data for the U.S.A. covering the years 1913-1918. Except for the Unit index formula, he found that there was close agreement between the other four formulae presented here. His findings are different from ours. As the situations in the U.S.A. and Israel are significantly different from each other, we do not think that his findings are valid for Israel. From the above, one thing is certain. There is great controversy regarding the formula for calculating the price index of a number of different items. In view of this, debts should not be linked to such a price index. There is no justification that people should be harassed or have their property confiscated because of debts linked to such a price index, when there is so much controversy regarding its formula.

In the single item case (e.g. wages or price of manpower) there has not been controversy and the Unit index is the accepted choice. In our opinion it is the correct formula in the single item case and we have seen that this index formula has good accuracy and stability characteristics. These and other reasons indicate that debts may be linked to an index of the average wage or income calculated by the Unit index formula.

4 Linkage without interest

For medium and large debts, the maximum long term linkage that the average wage earner can reasonably handle cannot be higher than the rate of his income. Any higher rate of interest is an injustice to the debtor and is not justified. It is therefore our opinion that debts should not be linked to the price index of a number of different items.
linkage, will cause a larger and larger portion of the borrower’s income to be used for debt repayment with the likelihood of inability to repay the debt. Similarly adding interest to this linkage will also increase the difficulty for the average wage earner to handle debt repayments and the inability of repaying the debt. Wide scale inability of borrowers to repay their debts, can cause the lender not to make a profit or in the worst case go bankrupt be cause of accumulating bad debts. We therefore see that this form of interest free linkage gives the maximum return which can be reasonably expected from personal loans and mortgages.

Furthermore, full linkage of debts to the average wage would cause hardship to about half the population - namely those whose rate of wage increase is below the average rate of wage increase. In view of this, it is proper to consider partial linkage to the average wage (e.g. 99%), in order that the majority of the population can handle the repayments.

Regarding the return to be expected from interest free loans linked to the published average gross wage, we have calculated from data for the years 1980 to 1986 as follows.

One year fully linked loans would give a return of about 1.5% above the price index to the lender. (I have heard that this return is typical for Israel and not just for these years.) With 99% linkage, the lender can expect a return of about 0.5% above the price index. However, as prices and wages are measured by different formulae, the true return is likely to be higher (see full paper).

In view of the previous discussion, we suggest that personal loans and mortgages should at most be fully linked to the average wage or income and should bear no interest.

Note

The linkage rate on bank deposits can be at a lower linkage rate than on bank loans. For example, loans can be fully linked to the average wage, while deposits can be 99% linked to the average wage. As at present, a bank can profit from the difference of these two linkage rates.

5 Halachic questions

The following questions summarize Halachic issues and are discussed in the full paper.

1) Does debt linkage to an inaccurate index formula contradict laws concerning just weights and measures, laws concerning price fraud, or the biblical requirement “...מדברים שקר הרות?”

2) Are price linked loans or wage linked loans in keeping with the spirit of the biblical command of “...אלא אל תחר ולא חמסה...”? Does price linkage cause hardship to the wage earner?
3) Is linkage to the average wage akin to a reciprocal work agreement in which the works of both parties are of equal difficulty and therefore permissible?

4) Is linkage to the average wage akin to a partnership?

5) May הרתיה for interest be used for lending between Jews?

6) Would the lender be getting a fair return on his money with wage linkage?

7) Are price linked loans near to profit and far from loss and what about wage linked loans?

8) From a Halachic standpoint, which methods of calculating the average wage or income are acceptable for debt linkage? Which methods are to be preferred?

9) From a Halachic standpoint, which formulae for calculating price indices are acceptable for debt linkage? Which formulae are to be preferred?

10) Does the prohibition of "האסב האס" have Halachic implications regarding the choice of index formula for debt linkage?

11) Which forms of debt linkage are Halachically acceptable when lending to the non-Jew?

Notes

1) Regarding linkage, we earlier defined that the debt and debt repayments would rise and fall in proportion to some index, e.g. prices, wages, foreign currency, etc. Linkage in equal measure to both rises and falls is important as this avoids the prohibition of לזרב ןאצ. See 'ט ה קפ אעיצמ אבב האר.

2) The use of a twelve month period is an important technique used for dealing with the Halachic difficulty discussed in question (3) - see the full paper. In addition this technique reduces the risk, avoids problems of seasonality, and contributes to stability of an average wage, (and similarly for a price index, a foreign currency rate etc.).

6 Expressing the value of money in terms of time, encouraging honesty, discouraging fraud

Any sum of money can be expressed in terms of time, by dividing the sum of money by an average wage. For example, if your bank balance on a certain date is 1800 shekel and the average wage on that date is 1200 shekel a month, then the balance can be expressed as 1800/1200=1.5 average monthly wage, that is the value of 1.5 months of average labour. We assert that balances and monies expressed in terms of an average wage gives a clear meaning of the value of these amounts in terms of what it means in time to an average man.
This is a central idea of our approach for the linkage of debts and it can also be used for encouraging honesty and discouraging fraud. As we have written another article on this topic, we shall not discuss this matter further here. See [http://homedir.jct.ac.il/~rafi/enc-dis.pdf](http://homedir.jct.ac.il/~rafi/enc-dis.pdf)

7 Linkage and economic stability

Debt linkage to wages is likely to behave as an automatic stabilizer (negative feedback), since when the standard of living improves, one effectively pays more, and when it decreases one effectively pays less. This stabilizes the spending power of borrowers. Timely repayment relief is given to the borrower at the expense of the lender when prices increase more than wages. The return to the lender is increased at the expense of the borrower when wages increase more than prices. So for example, a mortgage bank would receive a timely increase in its income when its wage bill increases.

(Linkage to prices can cause instability and this issue is discussed in the full paper.)

8 Others who have proposed linkage without interest or zero interest

John von Neumann developed a mathematical model to study economic equilibrium. This means that the proportional structure of the economy is not changing, but its size may change. He found that this can only occur when the interest rate equals the rate of expansion even if these rates are negative. In terms of linkage, this means that debts are linked to the size of the economy without interest. Perhaps John von Neumann is the first to consider interest free linkage even though he did not use this term.

Similarly in the economic model described by Milton Friedman, zero nominal interest rates are necessary for efficient resource allocation. Harold L. Cole and Narayana Kocherlakota further developed this approach.

However linkage without interest to the average wage is better suited for personal loans and mortgages, since it takes wages into account directly.

Combined linkages?

It is possible to combine different linkages. For example, the debt can be linked without interest to the size of the economy and be repaid in instalments linked to the average wage. (With such an arrangement, the exact number of instalments may not be known at the time of giving the loan, though it would be known approximately.) Is this combination also suitable for economic equilibrium? Further investigation is needed on this topic.
Conclusions and suggestions

We have seen there are several reasons for using linkage to wages and not to prices for loans and other transactions. We have also seen that interest free wage linkage can give a profit to the lender and is not oppressive to the borrower and so should be used for personal loans and mortgages. We have also explained how the loan should be given so as to meet Halachic requirements and reduce the risk. Furthermore, the linkage rate on bank deposits can be at a lower linkage rate than on bank loans. As at present, a bank can profit from the difference of these two linkage rates.

Detailed lists of conclusions and suggestions appear in the full paper.

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