

**Meeting of the Task Force on Financial Intermediation Services Indirectly Measured (FISIM)
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**Measurement of FISIM Volumes
by Deflating Loans and Deposits**

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Assuming we choose the Deflation Approach, How Should we Implement It?

- Two possible approaches to volume of FISIM:
 - (1) deflate values of outstanding loans and deposits by some broad price index; or
 - (2) directly calculate a volume index by applying weights to transaction counts.
- Approach (1) seems to be the leading contender.
- How to implement approach (1) is not entirely obvious, so a look at this question is in order.
- Focus on implementation of (1) is not intended to imply any sort of rejection of approach (2).

Deflators must account for Changes in Composition of FISIM

- User-cost margin of a loan =
loan rate – reference rate.
- User-cost margin of a deposit =
reference rate – deposit rate.
- Price of a loan or deposit =
user-cost margin \times an aggregate price index.
- Variation in rates on different types of loans and deposits, and relative variation in the reference rate affect loan and deposit prices.



Need for Indexes of User-cost Prices

- Price effects on FISIM come both from general inflation and from interest margins.
- Jointly changing prices and volumes (deflated balances) mean that index number methods must be used to isolate the roles of prices and volumes in changes in FISIM values.
- In a high inflation environment many interest margins will also be high.
- Measure of overall price of FISIM should include this effect.

Price p_{it} and Volume D_{it} of Deposit Type i

I_t/I_0 = GDFE price index from base period 0 to period t

D_{it} = stock of deposit type i deflated by GDFE price index

r_{it} = interest rate on deposit type i

$$p_{it} = (r_t^{\text{ref}} - r_{it})(I_t/I_0)$$

$\sum_i p_{it} D_{it}$ = nominal depositor FISIM in period t

Price and Volume Index Formulas



Paasche price	$\frac{\sum_j D_{it} p_{it}}{\sum_j D_{it} p_{i0}}$
Laspeyres volume	$\frac{\sum_j D_{it} p_{i0}}{\sum_j D_{i0} p_{i0}}$
Chained Fisher price	<p style="text-align: center;">Square root of:</p> $\frac{\sum_j D_{it} p_{it}}{\sum_j D_{it} p_{it-1}} \times \frac{\sum_j D_{it-1} p_{it}}{\sum_j D_{it-1} p_{it-1}}$



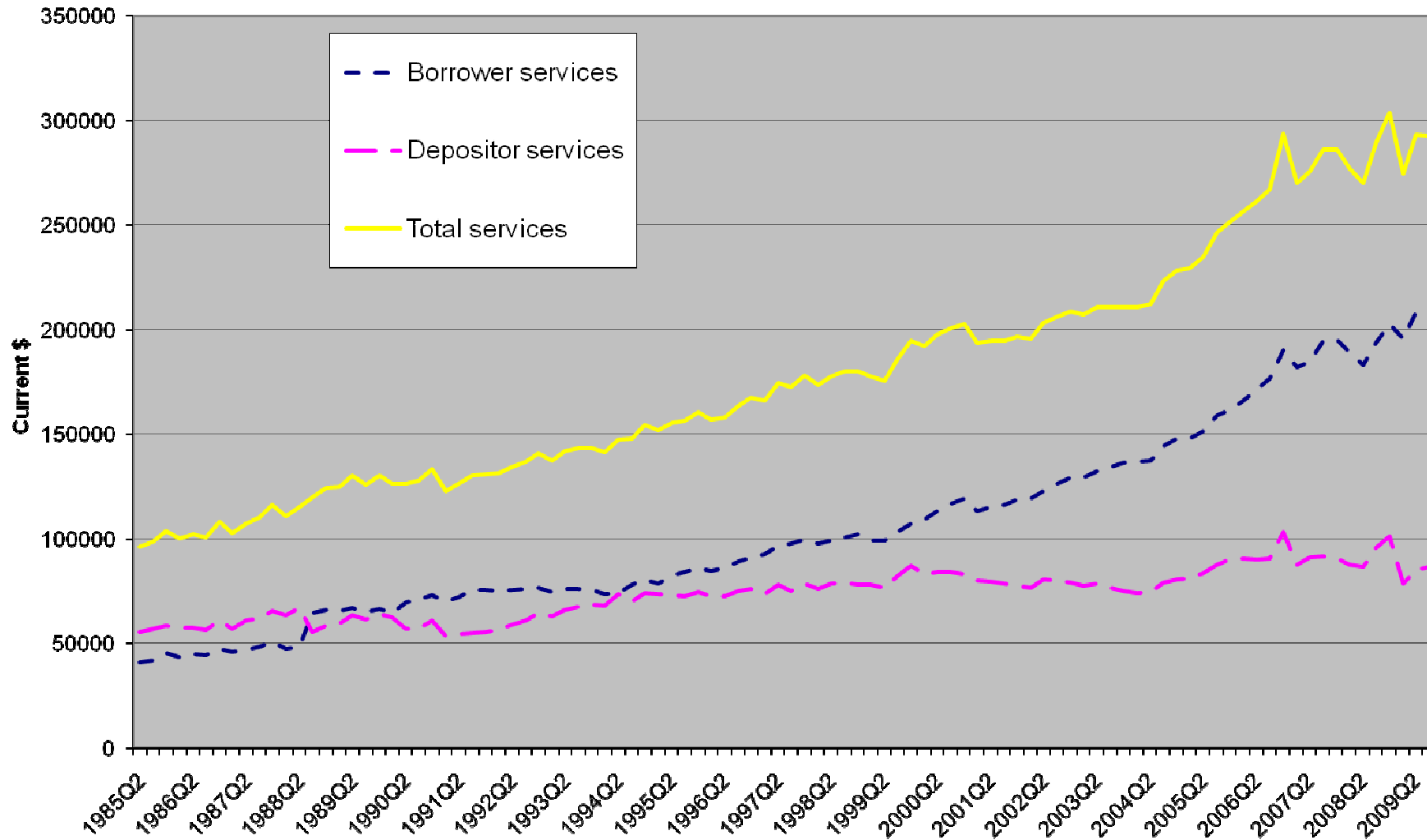


Constructing higher level aggregates

- To create higher level aggregates in a Fisher index framework, Laspeyres and Paasche price (or volume) component indexes have to be aggregated separately.
- Even though they cannot themselves be aggregated, detailed Fisher indexes are useful for analytical purposes.
- In the data used for this example, the difference between Laspeyres and Fisher volume measures is negligible.

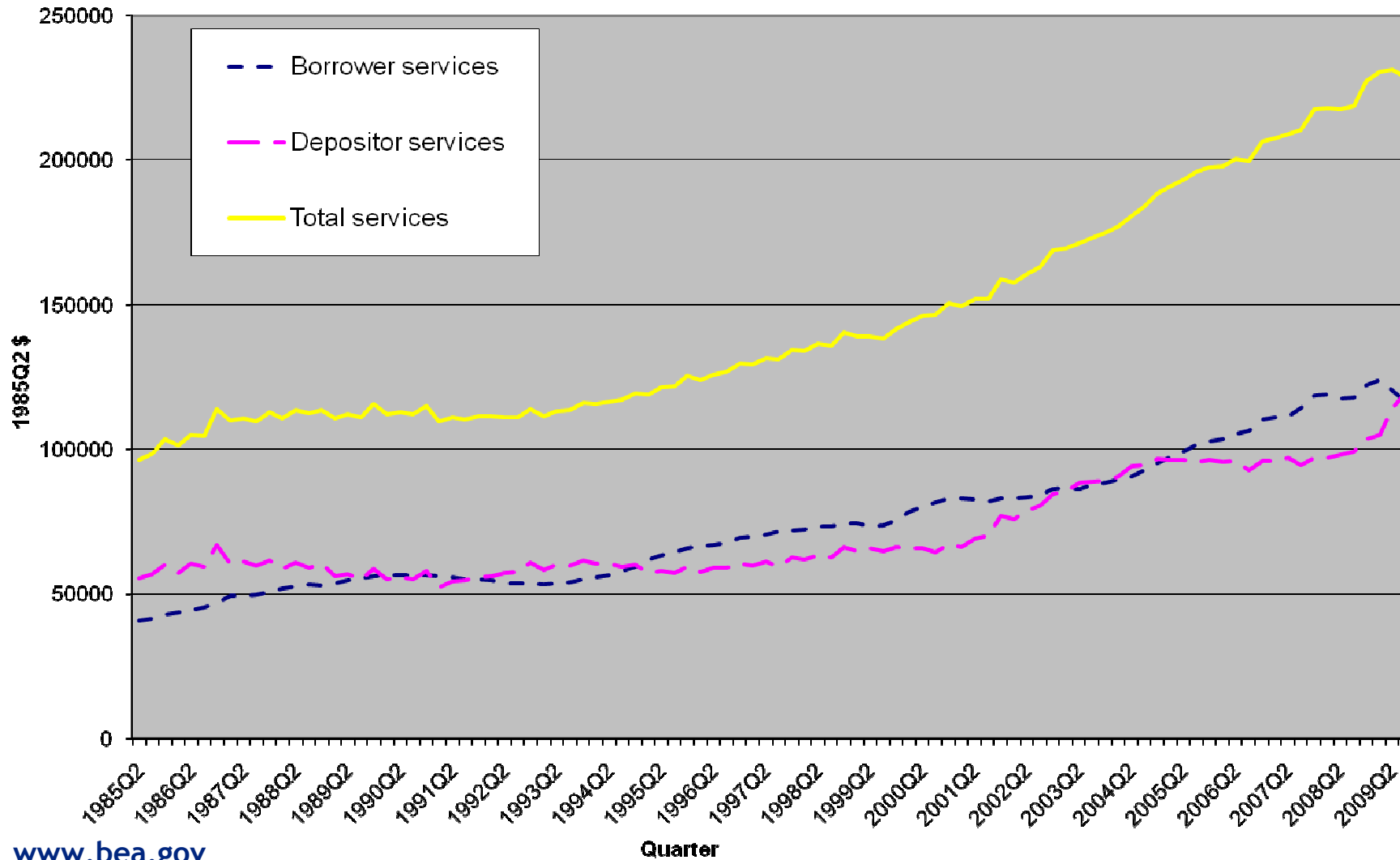
Nominal Depositor and Borrower FISIM Diverge

FISIM of Commercial Banks in Current Prices



But No Divergence in Volumes of FISIM

FISIM Volume (in Chained Dollars of 1985 Q2)



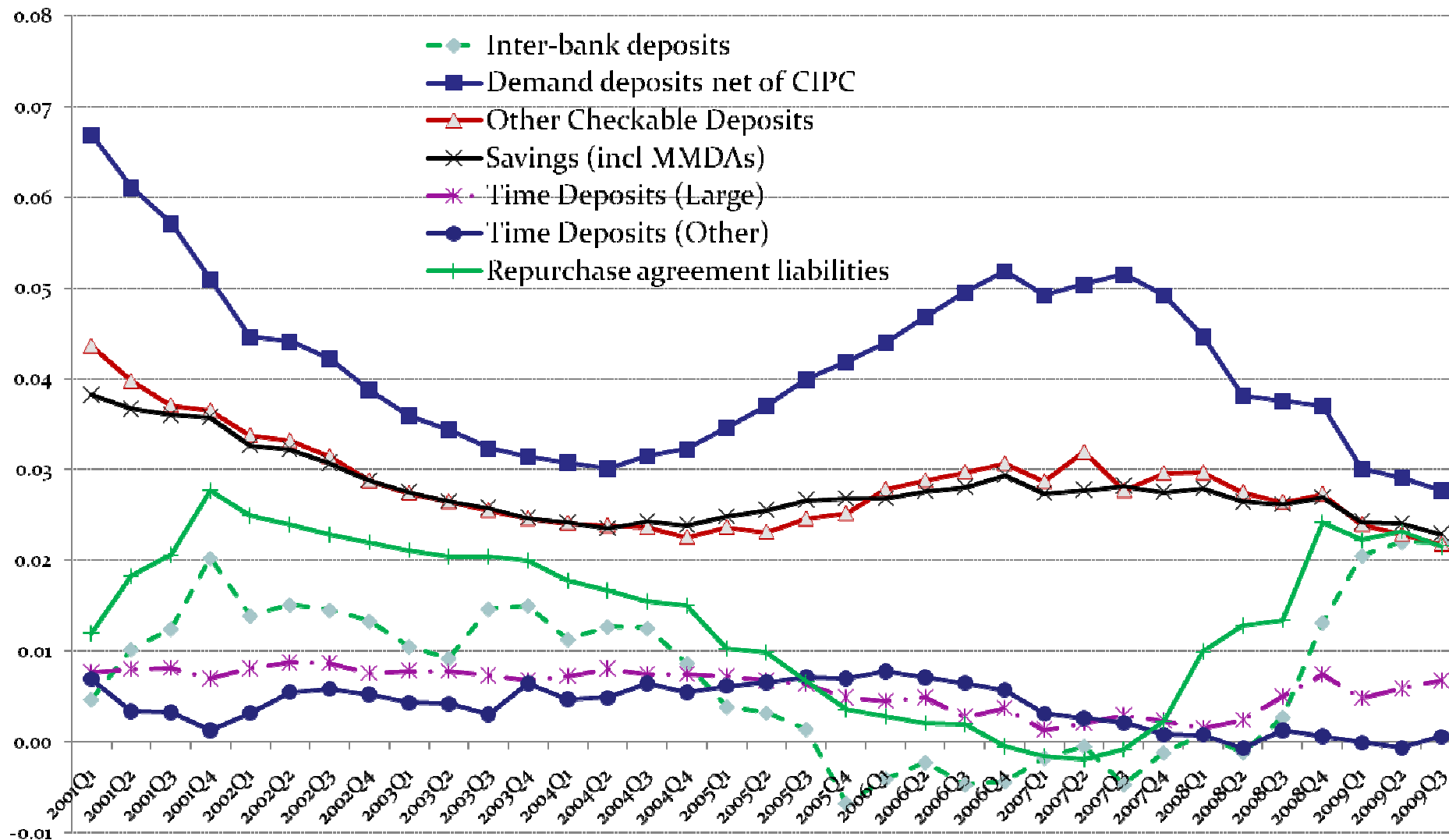
Unit Values as an Alternative to Indexes

- Alternative to detailed price indexes is to pool loans and/or deposits, then find unit value.
- Unit value = (total nominal FISIM)/(sum of deflated stocks).
- To illustrate, below we'll do this for deposits.
- *Changes in composition of loans or deposits will change their unit value price. So will changes in the structure of interest rates.*

Illustrative Example for Depositor FISIM

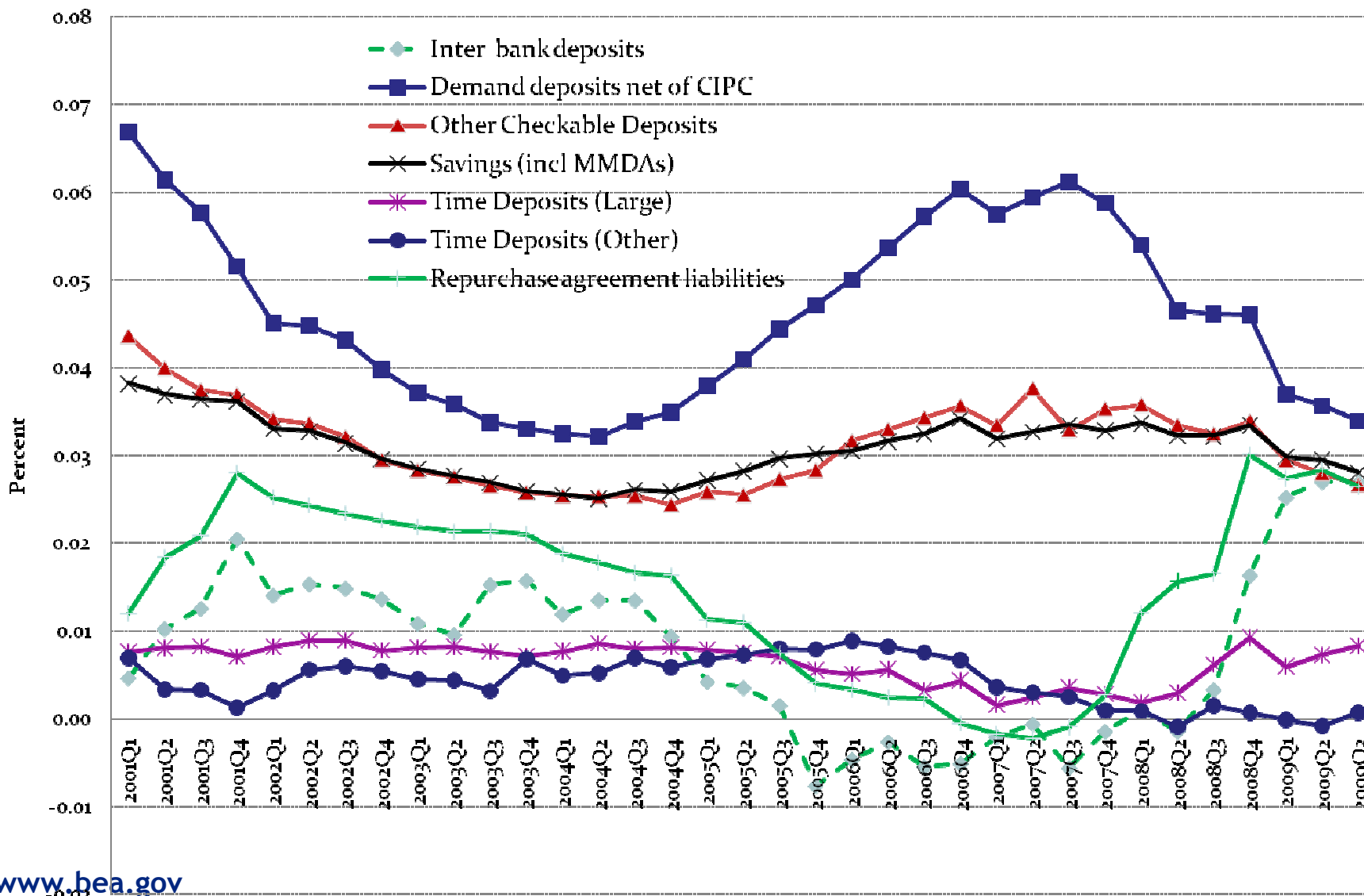
- Depositor FISIM is mostly consumed by households, while borrower FISIM goes mostly to intermediate uses.
- Depositor FISIM index plays a role in calculations of price and volume of household consumption and of GDP.
- *Example is intended as an illustration of methods only.*

User-Cost Margins for Deposits, by Type



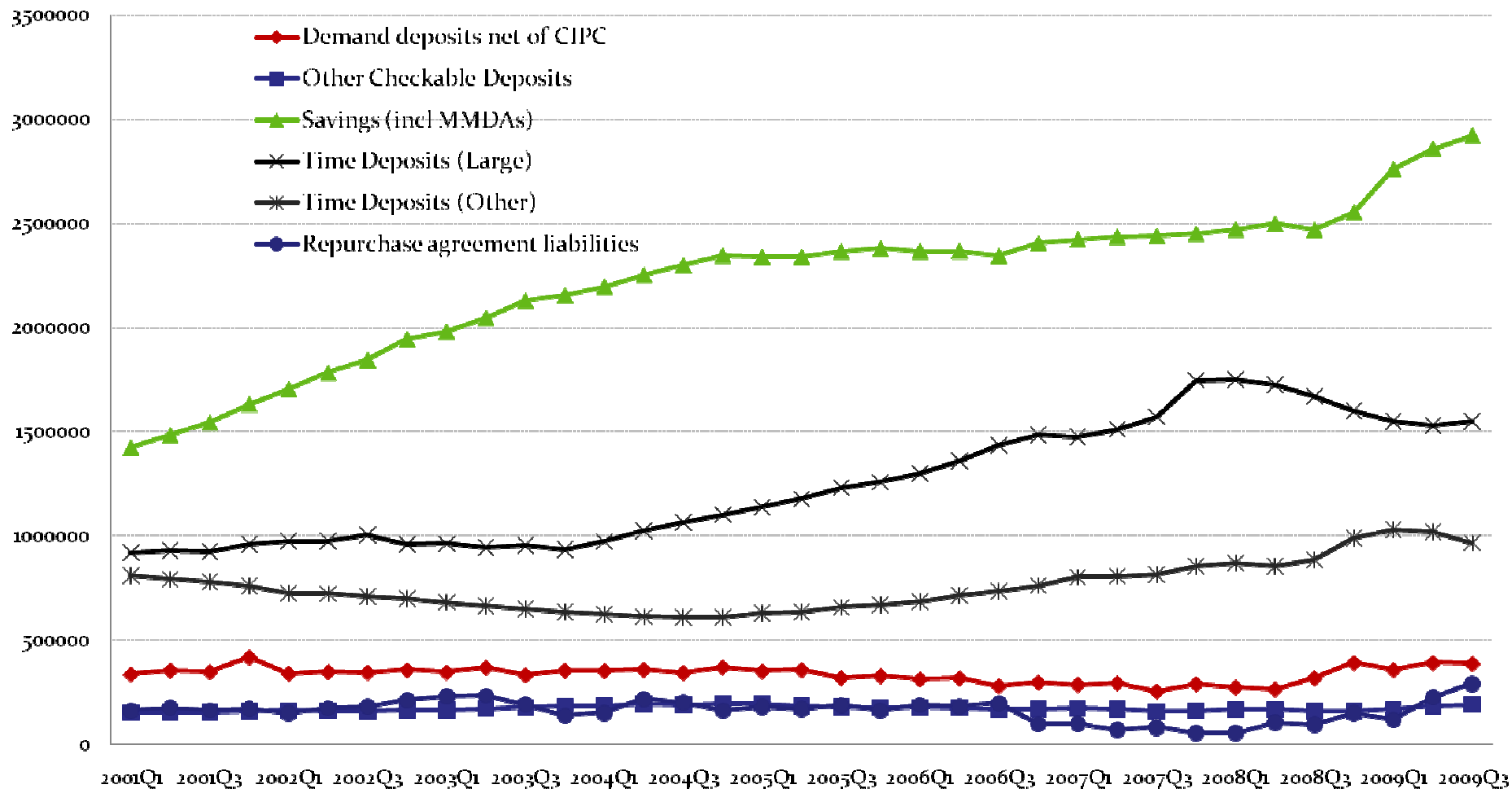
Prices including margins & general index

Margins × Price Index for GDFE



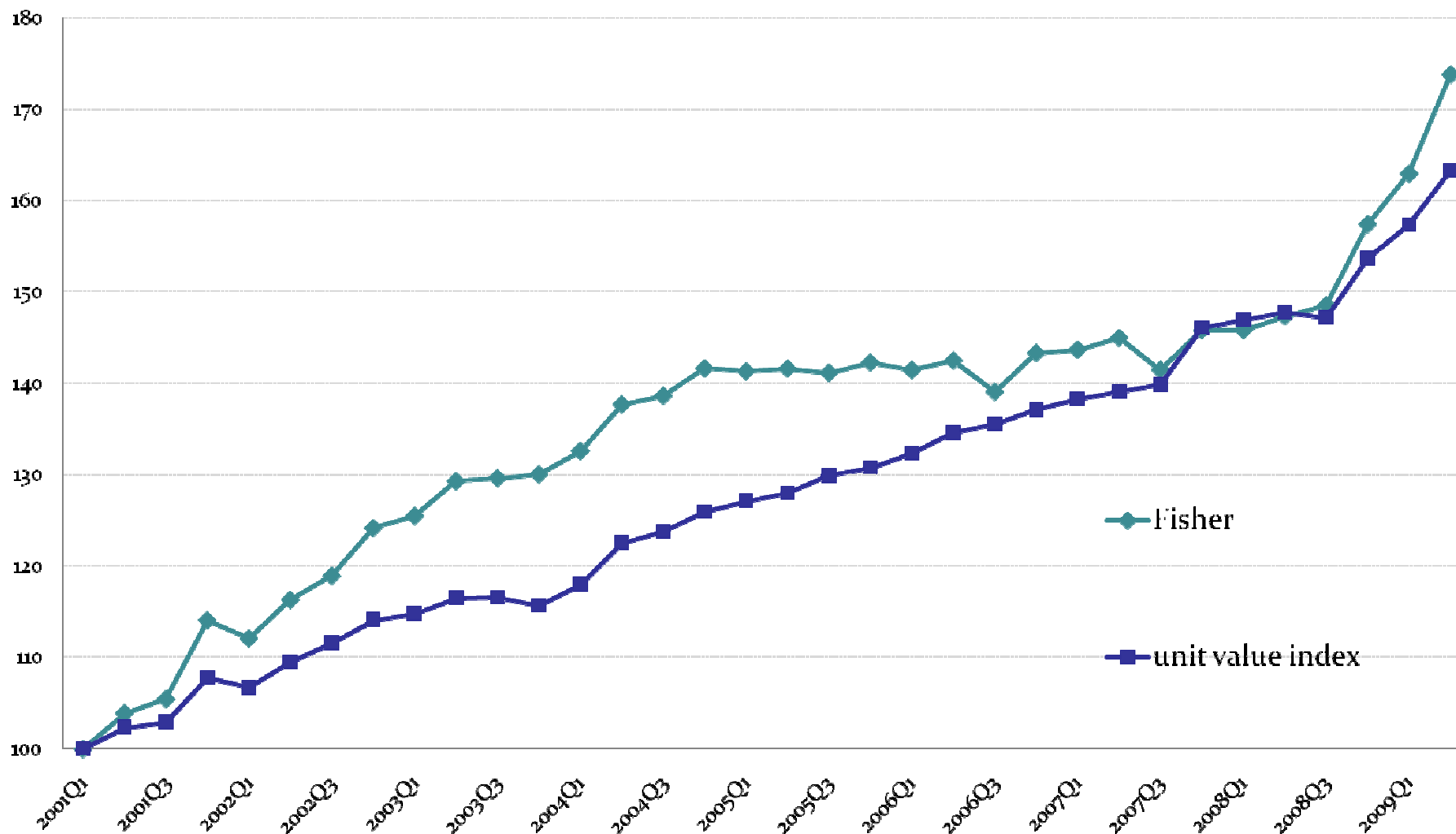
Volume of Deposit Stocks, by Type

Deflated Stocks of Deposits



Growth in Savings Accounts distorts Unit Value Index

Depositor FISIM Volume with Fisher and Unit Value Deflators



Effects of Risk Aversion

- Changing risk aversion (required compensation for bearing risk) can be a source of change in price of FISIM.

- But if changes in risk aversion coincide with changes in unobservable effort to manage risk, a quality-adjusted measure of output volume would be appropriate for some purposes.

Conclusion

- Correctly identifying price and volume for FISIM is important.
 - Sharp changes in prices, as measured by interest margins, can alter the relative values of borrower and depositor FISIM, affecting GDP.
- If we measure FISIM volumes by deflating loan and deposit balances, we must use an index formula that accounts for changes in the detailed structure of flows of FISIM.