Sectoral Balance Sheets for Nonfinancial Assets

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The integrated macroeconomic accounts (IMA), produced jointly by the Bureau of Economic Analysis (BEA) and the Federal Reserve Board (FRB), present a sequence of accounts that relate production, income and saving, capital formation, financial transactions, and asset revaluations to changes in net worth between balance sheets for major sectors of the U.S. economy. These integrated accounts are useful for analyzing sectoral developments in the U.S. economy, for both financial and nonfinancial assets. In this paper I will first provide some background information on the IMAs. Next, I'll focus on the private sectors' nonfinancial assets, describing how the balance sheets positions (i.e. net stock), capital account flows, other changes in volume, and revaluation account estimates are prepared. I will also examine recent trends in some of the sectors and then conclude with a discussion on recent improvements and future plans for the IMAs.

1. Integrated Macroeconomic Accounts

The integrated macroeconomic accounts were developed in 2006 as part of an interagency effort to further harmonize BEA's national income and product accounts (NIPA) and FRB's flow of funds accounts (FFA).[1] The *System of National Accounts, 1993* (SNA) was used as the organizing framework in an effort to bring these accounts into closer accordance with international guidelines. While the resultant set of IMAs are largely in accordance with the SNA, there remain differences, particularly with respect to the way sectors are defined. The IMAs use a consistent set of sectors throughout the entire sequence of accounts, and these sectors are primarily based on definitions used in either the NIPAs or FFAs. In the SNA, a nation's institutions are grouped into five mutually exclusive sectors: 1) nonfinancial corporations, 2) financial corporations, 3)

[1] For more information, see Bond, Martin, McIntosh, and Mead (2007).

general government, 4) nonprofit institutions serving households (NPISH), and 5) households.[2] In the IMAs, estimates are calculated and presented for the following sectors: 1) households and NPISH, 2) nonfinancial noncorporate business, 3) nonfinancial corporate business, 4) financial business, 5) federal government, 6) state and local government, and 7) rest of world. The primary difference is in the treatment of noncorporate business (sole proprietorships, partnerships, and government enterprises).[3] In the SNA, limited liability companies, limited partnerships and government enterprises are classified as "quasi-corporations" in the financial or nonfinancial corporate sectors and general partnerships and sole proprietorships are classified in the household sector.

Most of the IMA series are derived from published NIPA and FFA data. Current account and capital account statistics are based on NIPA data, while the financial account statistics are based on FFA data. The other changes in volume, revaluation, and balance sheet accounts reflect a combination of both BEA and FFA data. BEA provides FRB with unpublished data, where necessary, and the FRB is responsible for compiling the full set of integrated accounts. The IMAs are updated quarterly about 75 days after the end of the quarter and are published by both BEA and FRB.[4] The BEA-supplied statistics for the most recent quarter typically reflect revisions to the previous quarter, with more substantial historical revisions stemming from the NIPA annual revision introduced with the September IMA release. The FRB-supplied statistics are not

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[2] Nonprofit institutions serving business are included in the corporate sector.
[3] Government enterprises include agencies such as the U.S. Postal Service and local transit authorities.
[4] IMAs are available on the BEA website (http://www.bea.gov/national/nipaweb/Ni_FedBeaSna/Index.asp) and on the FRB website (http://federalreserve.gov/releases/z1/).

constrained by a set revision cycle and thus are open to historical revisions with each quarterly update.

2. Balance Sheets for Nonfinancial Assets

In the NIPAs, a balance sheet for fixed assets and inventories (excluding land and nonproduced nonfinancial assets) is presented in Table 5.9. Fixed assets are disaggregated into private and government; however, no sector detail is provided within "private." Purchases of consumer durable goods are treated as final consumption and are excluded from the balance sheets of the household sector.

In the FFAs, balance sheets are only produced for sectors with reliable information on the market value of real estate (including land): households and NPISH, nonfinancial noncorporate business, and nonfinancial corporate business. For other types of institutions, balance sheet information is limited to financial assets and liabilities mainly because of a lack of information on the market value of real estate.[5] Purchases of consumer durable goods are treated as investment because they represent important assets of households and are an important part of their net worth. Because the FFAs do not measure current production, this practice does not create any inconsistency within these accounts.

In the IMAs, balance sheets for nonfinancial assets are presented for each of the six domestic sectors; however, the net stock of structures (excluding land) is used in lieu of

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[5] The U.S. Office of Management and Budget provides supplemental information on the real estate owned by the Federal Government, but these data are provided for illustrative purposes and have not been fully vetted for use in the accounts.

real estate for the sectors with insufficient data on market value of real estate. There are

three sets of accounts that explain the changes in the balance sheet account for

nonfinancial assets: 1) capital account, 2) other changes in volume account, and 3) the

revaluation account. An example of the balance sheet account for financial business is

presented in Table 1, attached. A more in-depth discussion of these accounts is provided

in the sub-sections that follow.

2.1 Opening/closing balance (nonfinancial assets). Each sector begins with an opening

balance sheet, which records the value of nonfinancial assets. For those sectors for which

there are not reliable estimates for the market value of real estate (financial business,

federal and state and local governments), the opening balance for the nonfinancial assets

is the current-cost net stock of equipment, software, and structures taken from BEA's

fixed assets accounts (FAA)[6]. In the FAAs, quantities of net stock for nearly all asset

types are estimated indirectly using the perpetual inventory method:

$$(1) \ \ K_{jt} = K_{j(t-1)}*(1-r_j) + \ I_{jt}*(1-r_j/2) - O_{jt}$$

Where:
      K_{jt} = net stock for year t for type of asset j
      r_j = depreciation rate for type of asset j
      I_{jt} = investment for year t for type of asset j
      O_{jt} = other changes in volume for year t for type of asset j

Current-cost estimates of the net stock of asset j are obtained by multiplying the quantity

of net stock at the end of year t for asset j by the end-of-year price index that was used to

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[6] For information on BEA's fixed assets accounts, please see
http://www.bea.gov/national/FA2004/index.asp.

deflate nominal investment in asset j. The current-cost net stock of assets at the end of

the year t is estimated as the sum across all asset-types. A discussion on how fixed

investment (aka gross fixed capital formation, or GFCF) and depreciation (aka

consumption of fixed capital, or CFC) estimates are prepared is presented in section 2.2,

"Capital Account Transactions." Section 2.3 discusses the estimates for "other changes

in volume."[7]

For those sectors where reliable estimates for the market value of real estate do exist

(households and NPISH, nonfinancial noncorporate business, and nonfinancial corporate

business), the opening balance for the nonfinancial assets is the current-cost net stock of

equipment, software, and real estate. Net stock of real estate is estimated by FRB using a

variety of data and methods, including Census Bureau's American Housing Survey, BEA

net investment, and various trade data. While it may be tempting to impute a value for

land owned by a given sector as the difference between the value of real estate and

current-cost net stock, it is not recommended. The two measures are estimated

independently from one another and rely on different source data. For example, for the

nonfinancial corporate business sector, the difference between real estate and net stock

turns negative in 2009. Assigning this difference solely to the value of land owned by the

sector suggests, implausibly, that the value of land is less than zero. Nevertheless, it is

useful to analyze and question the relationship between real estate and structures in order

to better understand the underlying source data and methods used to construct these

statistics.

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[7] For information on the depreciation rates, please see
http://www.bea.gov/national/pdf/Fixed_Assets_1925_97.pdf.

2.2 Capital account transactions. The capital account derives net lending or net borrowing by subtracting GFCF from saving that has been carried forward from the current account. Net capital formation consists of GFCF less CFC plus acquisition of nonproduced nonfinancial assets (net) plus change in private inventories. All of these estimates are *consistent* with estimates published in the NIPAs as part of GDP. Although we don't currently present many statistics by sector in the NIPAs, BEA recently expanded its presentation of saving, investment, capital account transactions and net lending or net borrowing to show broad sector splits (domestic business vs. households and institutions) beginning with 1960.[8]

With the perpetual inventory method (PIM) being used to indirectly measure BEA's net stock and depreciation estimates, GFCF is essentially the foundation of the nonfinancial assets balance sheets. For most asset-types, detailed estimates of GFCF are taken from the published NIPA private fixed investment estimates, and then allocated to purchasing industries and to legal forms of organization (LFO). There are some relatively small conceptual differences between the NIPAs and FAAs which are separately identified in a set of reconciliation tables found here: http://www.bea.gov/national/FA2004/index.asp.[9] LFO ratios are developed at (approximately) the 3-digit NAICS industry level using quinquennial Economic Census data on payroll and revenue for the following LFO types: corporate business, sole proprietorships, partnerships, NPISH, households, and tax-exempt cooperatives. These LFO allocations are critical, naturally, to the accuracy of the

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[8] For more information, see Seskin and Smith (2010).
[9] For more information on NIPA PFI estimates, see NIPA Handbook: Concepts and Methods of the U.S. National Income and Product Accounts (2010).

sectoral balance sheets. While the link between payroll/receipts and capital expenditures by industry is tenuous, it is currently the best available source data for calculating these LFO ratios. We are, however, currently working with the Census Bureau to obtain LFO detail from their Annual Capital Expenditures Survey (ACES). Using LFO ratios computed from ACES would, potentially, result in significantly improved GFCF, net stock and depreciation estimates at the sector level.

As with net stock, quantities of depreciation are estimated indirectly using the PIM. The PIM from equation (1) above can be rewritten as follows:

$$(2)\ K_{jt} = K_{j(t-1)} + I_{jt} - O_{jt} - M_{jt}$$

Where:
$\quad M_{jt}$ = depreciation for year t for type of asset j

From equation (2), we can see that depreciation can be estimated as a residual as follows:

$$(2a)\ M_{jt} = I_{jt} - O_{jt} - (K_{jt} - K_{j(t-1)})$$

Similar to net stock, the current-cost depreciation is estimated by multiplying the quantity of depreciation for year t for asset j by the price index that was used to deflate nominal investment in asset j. The current-cost depreciation of assets for year t is estimated as the sum across all asset-types.

NIPA estimates are used for the acquisition of nonproduced nonfinancial assets (net) and change in private inventories. Nonproduced nonfinancial assets transactions include

purchases of land, payments for drilling rights, electromagnetic spectrum proceeds and miscellaneous international transactions.[10]

Net capital formation turned negative in 2009 for all private business sectors, which marks the first time since these statistics began (1960) that either nonfinancial corporate business or financial business showed negative net investment. Net capital formation for nonfinancial noncorporate business, while relatively small compared to nonfinancial corporate business, last turned negative in 1991. Chart 1, attached, illustrates the magnitude of the recent declines in net capital formation in the private sector -- particularly households and NPISH, and nonfinancial corporate business. Chart 2 focuses on the nonfinancial corporate business sector, presenting quarterly estimates for net capital formation, undistributed profits, and net cash flow (scaled to the right axis). The chart illustrates the [expected] coincidental relationship between net capital formation and undistributed profits, both beginning to rebound in the third quarter of 2009. Net cash flow, calculated as undistributed profits plus CFC less capital transfers paid (net), is interesting to analyze here as well, as it is a measure of cash available to the sector for capital (and other) expenditures. Capital transfers, lumpy by nature, reflect disaster-related insurance benefits and government subsidies stemming from legislative acts such as the American Recovery and Reinvestment Act of 2009.

2.3 Other changes in volume account. Other changes in volume consists primarily of the acquisition of nonproduced nonfinancial assets (net) and losses of fixed assets that are

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[10] For more information on change in private inventories, see NIPA Handbook: Concepts and Methods of the U.S. National Income and Product Accounts (2010).

significantly damaged or destroyed in major disasters such as hurricanes and earthquakes.[11] Acquisition of nonproduced assets includes purchases of land, payments for drilling rights, electromagnetic spectrum proceeds and miscellaneous international transactions. Disasters are generally defined as catastrophic events with property losses exceeding 0.1 percent of GDP (or about $15 billion). Disaster losses are estimated from a variety of sources, including insurance-related trade data, risk management firms, and official government reports. Chart 3 illustrates the magnitude and sporadic nature of these disaster adjustments, as well as the composition among the private sectors.

2.4 Revaluation account. The revaluation account reflects nominal holding gains (or losses) in the value of the assets stemming from changes in price. The revaluation estimates are derived residually as the closing balance less net capital formation, other changes in volume, and the opening balance. The revaluation can be sizable and typically accounts for most of the change in net worth on the balance sheet. Chart 4 presents the change in net worth (EOY – BOY), revaluation, and GFCF for real estate/structures (scaled to the right axis) for the households and NPISH sector. The chart illustrates that the revaluation accounts for nearly all of the change in net worth; gross fixed capital formation accounts for little of the change. As can be seen, the revaluation (and net worth) falls dramatically beginning with 2006 and then rebounds in 2009, although still negative. These changes can be primarily attributed to changes in prices for new and existing residential real estate. Chart 5 presents the change in net

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[11] Net investment for consumer durable goods is also included here for the household and NPISH sector. As a result, such goods can be recorded on the balance sheet for the household sector while consistency with the SNA's (and NIPA's) exclusion of the purchases of such goods from measures of fixed investment can still be maintained.

worth, revaluation, and GFCF for real estate/structures (scaled to the right axis) for the nonfinancial corporate business sector. For this sector as well, changes in net worth are driven by the revaluation account, which in turn is driven primarily by prices of new and existing commercial real estate. Of note, GFCF for new structures by the households and NPISH sector falls in step with the revaluation, suggesting the drop in housing prices negatively influenced new home purchases (GFCF volume measures are consistent with the current-dollar movement). However, GFCF for new structures by nonfinancial corporate business continues to increase in 2006, 2007, and 2008 while the revaluation for real estate declines.

3. Recent Improvements and Plans for the Future. In June 2010, BEA and FRB released, for the first time, quarterly IMA statistics beginning with the first quarter of 1992. Slightly less detail is available quarterly in the current account, primarily reflecting insufficient source data on gross flows of property income paid and received. Response to the new quarterly detail has been very favorable. Also, with the release of the 2010 annual revision of the NIPAs this past July, BEA expanded the NIPA presentation of saving, investment, capital account transactions and net lending or net borrowing to show broad sector splits (domestic business vs. households and institutions) beginning with 1960, better aligning these estimates with the quarterly IMA statistics.

Looking forward, BEA and FRB plan to research the feasibility of producing (and publishing) more detail for the financial business sector. One of the challenges that we will face is the fact that the BEA subsector detail is industry driven, whereas the FRB

data is more "institutional" based. Nevertheless, we believe there is substantial demand

for this subsector detail and are hopeful that we will be able to offer additional detail.

We're also planning on carrying the quarterly IMA statistics back to 1960; presently they

begin with 1992. We're also working with the Census Bureau to obtain LFO statistics

from their annual capital expenditures survey. This would, potentially, mark a significant

improvement in the FAA estimates, and corresponding IMA sectoral balance sheets.

Lastly, we plan to publish a set of reconciliation tables, by sector, that show the precise

relationship between BEA FAA net stocks of fixed assets and corresponding FRB values

published in the FFAs. Additional research is planned to learn more about what, in

addition to land, explains differences between real estate and structures.

REFERENCES

Bond, Charlotte Ann, Teran Martin, Susan Hume McInstosh, and Charles Ian Mead. 2007. "Integrated Macroeconomic Accounts for the United States." <u>Survey of Current Business</u>, 87 February 2007: 14-31.

Seskin, Eugene P. and Shelly Smith. 2010. "Annual Revision of the National Income and Product Accounts. Annual Estimates for 2007-2009. Quarterly Estimates for 2007:I-2010:I." <u>Survey of Current Business</u>, 90 August 2010: 21-22.

NIPA Handbook: Concepts and Methods of the U.S. National Income and Product Accounts. November 2010. Chapters 6-7.

Table 1. Balance Sheet for Financial Business
[Billions of dollars]

	Line	2007	2008	2009
Opening balance				
Nonfinancial assets	**1**	**1,491.9**	**1,579.7**	**1,686.9**
Structures (nonresidential)	2	957.2	1,019.2	1,105.3
Equipment and software	3	534.7	560.5	581.6
Capital account				
Capital formation, net				
Gross fixed capital formation (nonresidential)	4	187.5	183.3	146.7
Equipment and software	5	139.8	133.2	110.7
Structures	6	47.7	50.0	36.0
Less: Consumption of fixed capital	7	140.6	147.4	148.5
Equipment and software	8	114.9	120.0	120.3
Structures	9	25.7	27.3	28.3
Other changes in volume account				
Damage amounts	10	0.0	-0.6	0.0
Structures (nonresidential)	11	0.0	-0.3	0.0
Equipment and software	12	0.0	-0.3	0.0
Revaluation account				
Nonfinancial assets	13	41.0	72.1	-50.4
Structures (nonresidential)	14	40.0	64.0	-45.8
Equipment and software	15	1.0	8.1	-4.6
Closing balance				
Nonfinancial assets	**16**	**1,579.7**	**1,686.9**	**1,634.7**
Structures (nonresidential)	17	1,019.2	1,105.3	1,067.2
Equipment and software	18	560.5	581.6	567.5

Chart 1. Capital Formation, Net
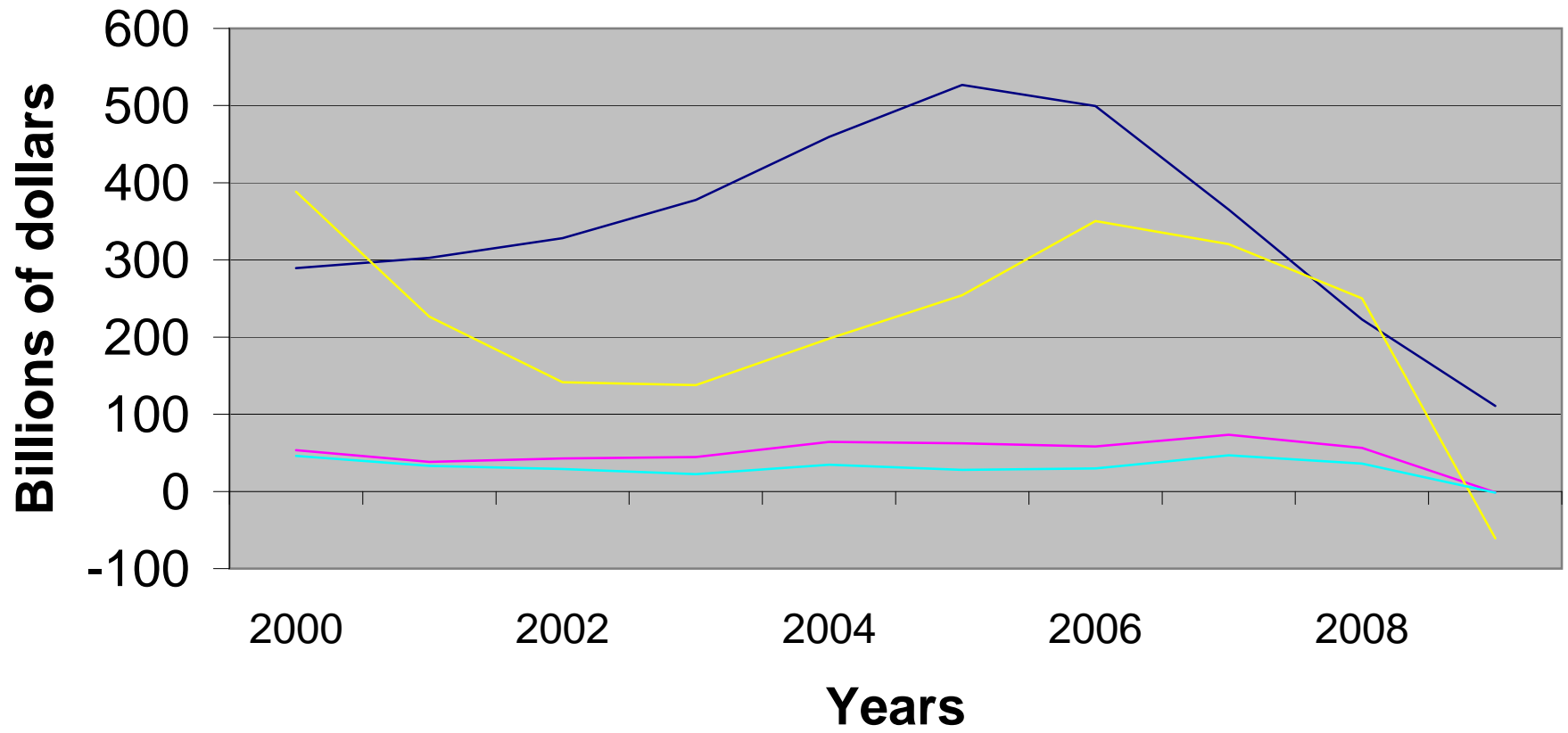
Legend:
— Households and NPISH
— Nonfinancial corporate
— Nonfinancial noncorporate
— Financial business

Y-axis: Billions of dollars
X-axis: Years

Chart 2. Nonfinancial Corporate Business

Net capital formation — Undistributed profits — Net cash flow

Chart 3. Disaster Losses
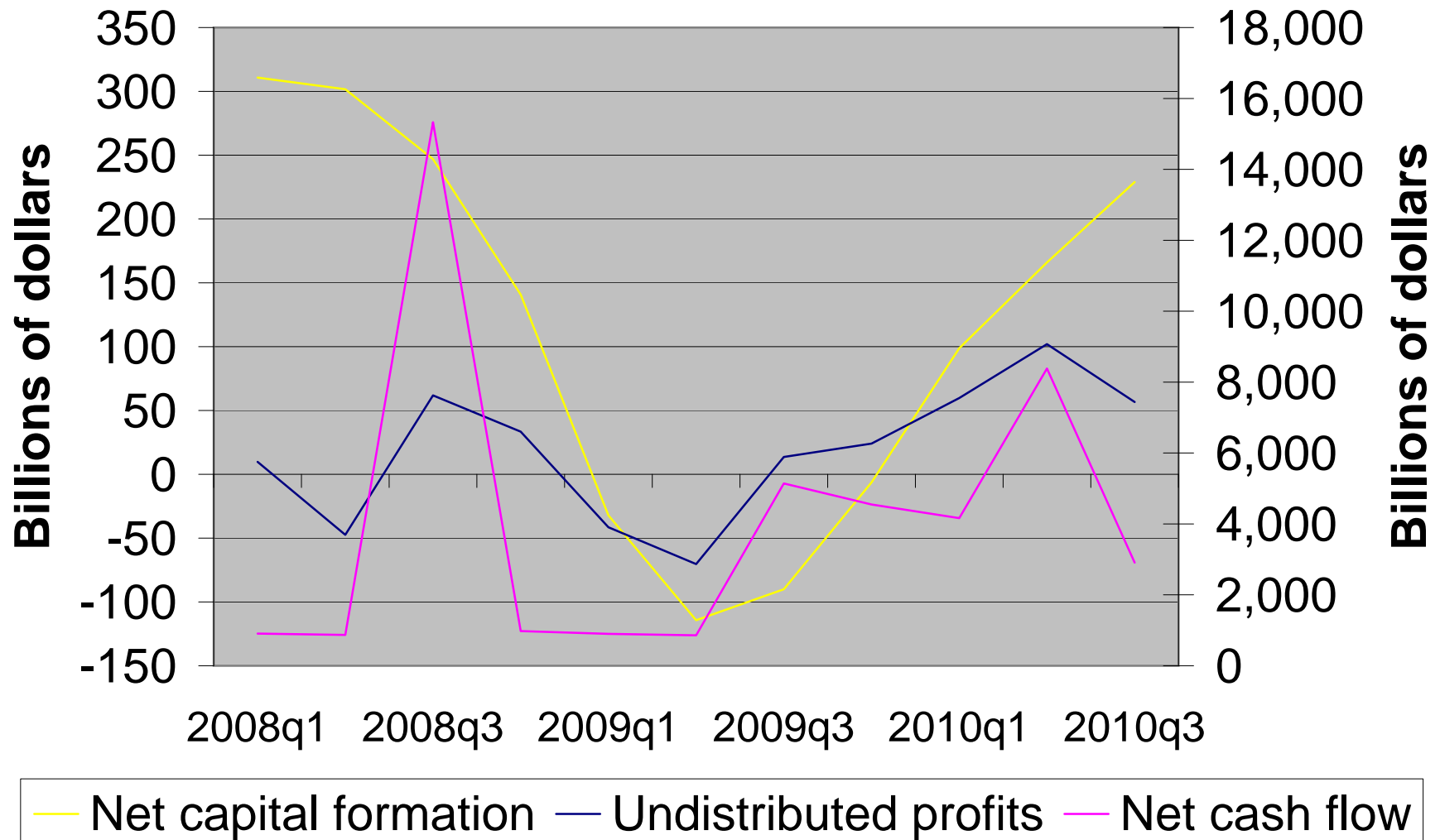
Legend:
- Households and institutions
- Nonfinancial noncorporate business
- Nonfinancial corporate business
- Financial business
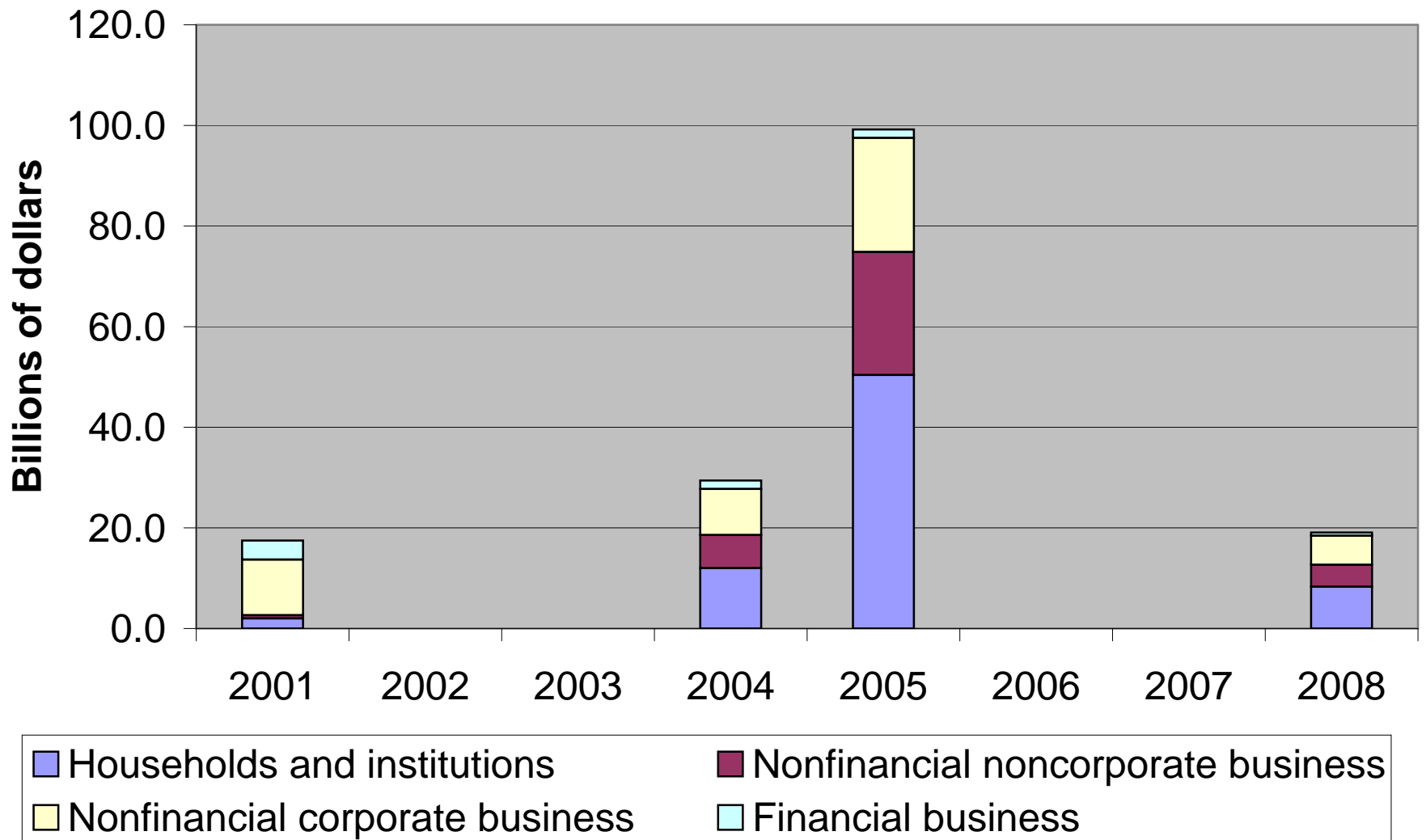
Chart 4. Households and NPISH: Real Estate
[Billions of dollars]

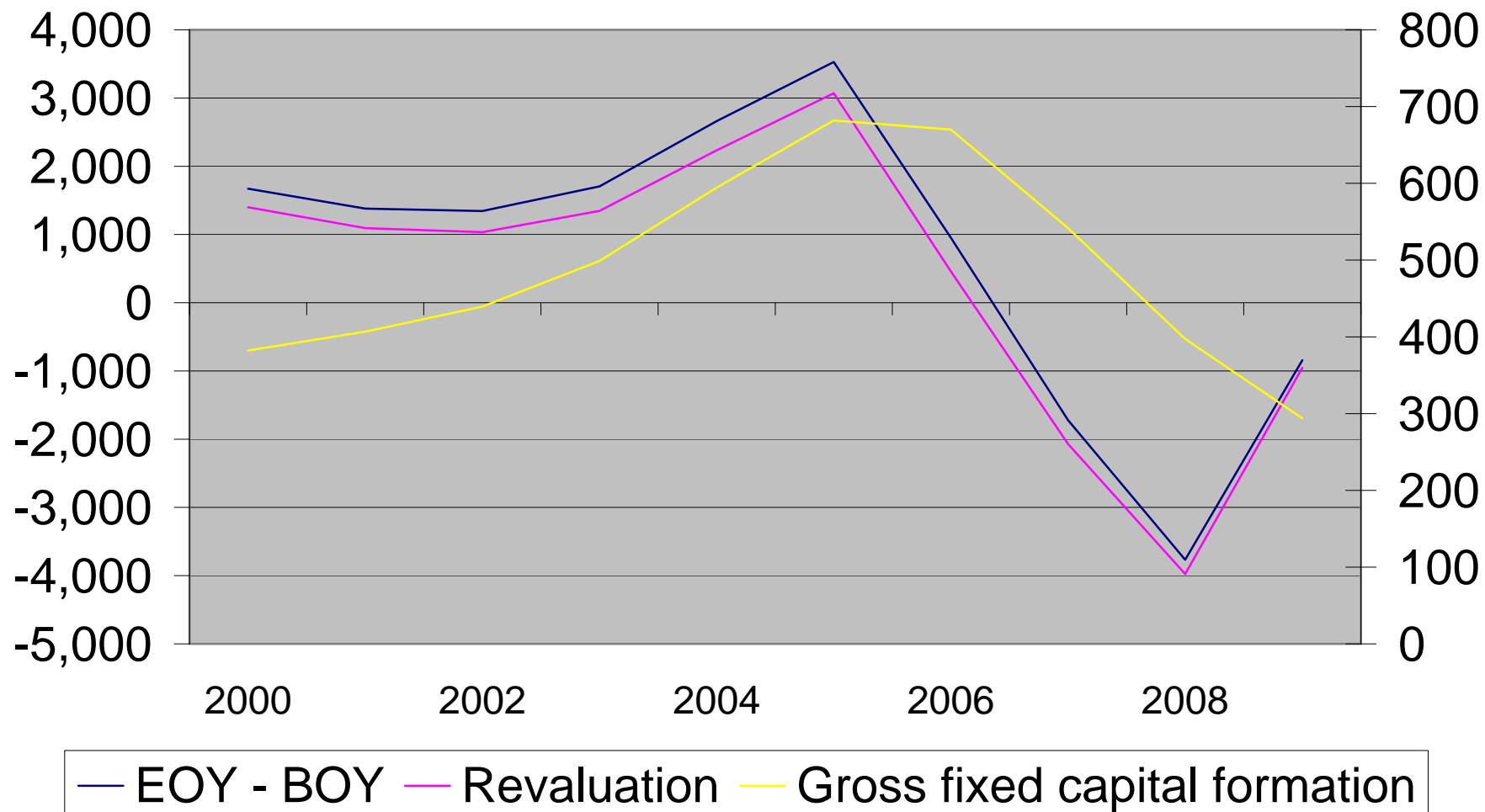EOY - BOY   Revaluation   Gross fixed capital formation

Chart 5. Nonfinancial Corp. Bus.: Real Estate
[Billions of dollars]

Legend: — EOY - BOY — Revaluation — Gross fixed capital formation