Detailed Description of Reconciling NIPA Aggregate Household Sector Data to Micro Concepts

Online Appendix to accompany "Household Income, Demand, and Saving: Deriving Macro Data with Micro Data Concepts," *Review of Income and Wealth*, doi: 10.1111/roiw.12206

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This document describes the details of the adjustments we make to reconcile NIPA data on aggregate consumption, demand, income, and saving for the U.S. household sector with the cash flow concept described in our paper "Household Income, Demand, and Saving: Deriving Macro Data with Micro Data Concept*"* from the *Review of Income and Wealth,* which we refer to as "the paper" in what follows. Interested readers should refer first to the paper for the broad motivation of these adjustments before scrutinizing the details to follow.

I. Adjustments to Disposable Income, Consumption, and Saving

Table A1 summarizes in detail the adjustments we make to obtain cash flow measures for the key variables described in equation 1 of the paper, reproduced here:

$$\text{(1)} \qquad \begin{matrix}\text{Disposable}\\ \text{Income}\end{matrix} = \text{Consumption} + \begin{matrix}\text{Household}\\ \text{Investment}\end{matrix} + \begin{matrix}\text{Household}\\ \text{Transfers}\\ \text{and Interest}\end{matrix} + \begin{matrix}\text{Financial}\\ \text{Saving.}\end{matrix}$$

The NIPA data satisfy this equation, although there is no household investment category in the NIPA tables. We define the household investment category below. Individual adjustments are described in double-entry form row by row, showing how each adjustment affects the major household financial flows in equation 1. The double entries assure that the accounting identity from equation 1 holds before and after each individual adjustment. For each adjustment item, the table specifies the source of the data in the NIPA tables (table number, line number, and unique identifier) necessary to make the adjustment.

The table provides sample values for each adjustment from 2013 to provide an idea of the magnitude of each item.[1]

In a few cases, we propose moving items out of demand created by the household sector that nonetheless should be counted in aggregate demand. In these cases, the items are identified in table A1 with a dagger. The first row of table A1 shows the key NIPA aggregates for the household sector, disposable personal income (DPI), personal consumption expenditure (PCE), personal interest and transfers, and personal saving. As equation 1 indicates, NIPA personal saving is DPI less the sum of PCE and personal interest and transfers.[2] The term "outlays" refers to the sum of spending on goods and services, transfers and interest. Saving is therefore disposable income less outlays.

[Table A1 approximately here]

In the text to follow we describe the detailed logic of the adjustment for each major category of the rows in table A1.

A. Adjustments for Owner-Occupied Housing

The most important and economically significant adjustments we propose change the treatment of owner-occupied housing to reflect the actual demand for newly produced housing and eliminate imputed income that does not represent actual cash flows for the household sector, would not appear in conventional household budget measures, and would not be tracked in survey data that asks households to report measures of their finances.

The BEA treats the service flow of owner-occupied housing (i.e., the value that the owner receives from use of the house) as a source of implicit rental income for homeowners (owners' equivalent rent) and the consumption of housing as implicit rent paid by the home-owning household to

[1] The 2013 data described in this appendix were published by the BEA in 2014. A subsequent 2015 release included 2014 data and revised 2013 data. The figures in this appendix have not been updated to the 2013 numbers released in 2015.
[2] The aggregates in the first row of table A1 can be obtained from NIPA table 20100. The line numbers and unique BEA identifiers for the source data are: line 27 and A067RC1 for DPI, line 29 and DPCERC1 for PCE, line 30 and B069RC1 for personal interest, and line 31 and W211RC1 for personal transfers.

itself. Thus, the NIPA definitions raise measures of both household income and household consumption relative to what cash accounting familiar to the typical household would imply.[3] But implicit rental income cannot be used for spending on market-produced goods and services. And the imputed consumption arising from imputed homeowners' rent is not a demand for anything produced for sale on the market. We therefore adjust the NIPA data to remove non-cash rent of homeowners from consumption and their implicit rent from disposable income.

Section 1 of table A1 describes the adjustments that address these issues for owner-occupied housing. The seven lines in this section (rows 1a through 1g) can be interpreted together as the total effect of adjustment for owner-occupied housing but we describe each adjustment separately with the double-entry approach.

The largest component is the implicit rent that the NIPAs treat as paid from homeowners to themselves (row 1a). We subtract this item from PCE, reducing consumption demand. To maintain the identity from equation 1 we also reduce disposable income by the same amount. The income adjustment should be viewed as eliminating the revenues (but not the costs) of the implicit rental business that the BEA approach constructs for a homeowner. Of course, if an owner-occupied home were, in fact, rented instead of owned, the landlord would need to spend some of the rental revenue to pay costs to maintain and operate the home. These purchases would create demand for new production. The BEA treats such costs as intermediate inputs to the implicit rental business.[4] Because our approach eliminates the total implicit rental revenue in row 1a, we add the cost of maintenance and operation back to demand in row 1b. This adjustment to demand is intuitive: when we stop thinking of owning a home as creating an implicit rental business, we treat the purchase of goods and services for operating the home as normal

[3] The spending and income components do not exactly offset. The rental spending attributed to homeowners is the full amount of the estimated rent they could receive if they rented their homes in their local markets. The rental income is the difference between this rent and cash expenses for maintenance, interest, insurance, taxes, etc. and a non-cash deduction for depreciation.

[4] The intuition is that the full value of the home is reflected in the rent, which is the value of the final consumption. But it takes some intermediate inputs to produce that final output. The logic is analogous to any business producing a final good or service using inputs purchased from other businesses.

consumption demand. The necessary adjustment to DPI implied by row 1b, however, is less intuitive. In the NIPA accounts, the creation of an implicit rental business for homeowners leads the BEA to treat intermediate inputs like a business cost of production, so intermediate inputs by themselves reduce the profit of the imputed business. If one eliminates intermediate input expenses, in isolation, that raises income.

A numerical example illustrates this logic. Suppose that the implicit rent for an owner-occupied house is $2,000 per month and the household pays $300 per month in maintenance and operating costs (assume for the moment that there are no other costs associated with the home). The NIPA approach measures $2,000 of PCE for the implicit rental value of the home which becomes revenue to the implicit rental business. But the income to the rental business is reduced by the $300 expenditure on intermediate goods. The net effect on income of the combined revenues and costs is $1,700. The adjustments in table A1 eliminate this fictitious business. In our adjusted measure, the $2,000 of implicit rent is not demand but the operating and maintenance expenditures do create demand. In this example, rows 1a and 1b together would reduce personal consumption demand by $1,700. Furthermore, the $1,700 of DPI that the NIPAs impute to the household does not exist, which is removed by the sum of lines 1a and 1b in the disposable income column.

Row 1c of table A1 adjusts for mortgage interest. The logic of the positive sign in the disposable income column follows from the explanation of the intermediate inputs adjustment to disposable income explained above. The BEA treats mortgage interest as an expense to the imputed homeowner rental business. It is therefore deducted from the rental business income and, other things equal, reduces disposable income. Because our adjustments eliminate the imputed business, we eliminate this cost deduction by adding mortgage interest back to disposable income. But interest expense clearly is an important household cash flow for households who have mortgages. Unlike maintenance and operating costs, however, mortgage interest payments do not create demand for newly produced output; instead

they are transfers from borrowers to lenders. Therefore, to balance the elimination of the mortgage interest deduction from the NIPA definition of DPI we add mortgage interest to personal transfers and interest. This adjustment leads to a treatment of mortgage interest that aligns much better with the typical way households perceive their finances: mortgage interest is not a deduction from income but it is part of households' cash outlays.

It is interesting to note that the structure of the NIPA personal income and saving accounts implicitly recognizes the role of interest as a transfer because all household interest payments, *except* those on mortgages, are treated just like the "personal transfer" category in the NIPAs (see NIPA table 20100, especially lines 27 through 34). Interest payments on non-mortgage debt are considered a non-consumption part of personal outlays. The logic for treating mortgage interest differently is because of the objective in the NIPAs to attribute imputed income to homeowners from renting to themselves, an objective that our adjustments are designed to eliminate. In our adjusted measures, mortgage interest is treated like all other interest payments by households.

Row 1d of table A1 shows the adjustment for depreciation of owner-occupied housing. As is the case for GDP and national income in the aggregate, the output measure is "gross" with no deduction for depreciation while the income measure is net of depreciation. Again, depreciation is treated like an expense to the implicit rental business created for homeowners in the NIPAs, so eliminating it raises disposable income, holding everything else constant. To balance this adjustment requires an increase in one of the other terms from equation 1. Depreciation does not create cash outlays; it is neither consumption nor a transfer. By eliminating the non-cash deduction from income, this adjustment, by itself, is balanced by an increase in household financial saving.

Some reflection explains the intuition for the rise in saving from eliminating the depreciation of owner-occupied homes. According to the NIPA concepts, the value of the housing asset declines by the amount of estimated depreciation. If one thinks of saving as the change in a measure of household total

wealth that includes owner-occupied homes, then depreciation lowers saving holding other household cash flows equal. Our financial saving concept, however, is a cash flow measure, and it should not be affected by a non-cash expense like depreciation. Furthermore, these adjustments help clarify the difference between the BEA personal saving concept and the adjusted saving measures defined in the paper and how that difference relates to residential construction. Because residential construction is not considered an outlay of the household sector in the NIPA accounts it is not a deduction from disposable income in the calculation of personal saving. Therefore, residential construction in the NIPAs is, implicitly, included in personal saving and lumped in with financial saving. The definitions that we propose in the paper have the advantage of distinguishing the part of gross saving that is the accumulation of financial claims on other sectors (financial saving) from the accumulation of real assets (newly constructed homes) that are unlikely to be sold to other sectors.

Summing the adjustments in rows 1a through 1d of table A1 eliminates the imputed demand and income that the BEA creates with its treatment of owner-occupied housing as an implicit business.[5] Disposable income is somewhat lower because the imputed "profit" from homeownership has been removed. The effect is not negligible, reducing 2013 DPI by 4.2% (row 1a from table A1 less the sum of rows 1b, 1c, and 1d as a share of NIPA DPI). Removing imputed owner's rent less spending on intermediate inputs (row 1a less 1b) from consumption, however, has a more substantial effect, reducing personal consumption expenditures by 10.2% in 2013.

The adjustments discussed so far reduce demand that the NIPA attributes to the household sector. But owner-occupied housing certainly creates demand for current production over and above operating and maintenance costs. The demand effect comes when homes are built and sold or when they

[5] Property taxes are also treated as an expense in the computation of implicit rental income for owner-occupied housing. This adjustment would eliminate the rental business expense and increase personal taxes, leaving *disposable* personal income unchanged. Because we begin our adjustments with disposable income, we do not identify the tax adjustment separately. To measure pre-tax personal income in a way consistent with the adjustments proposed here, however, the tax adjustment would be necessary. We make just such an adjustment in section II of this appendix.

are renovated. These cash flows directly create demand, production, and jobs. Of course, these items add to demand in the NIPAs because they are treated as investment spending, lumped together with business equipment, structures, and inventories. For our purposes it is more appropriate to link the demand for new homes to the household sector than to the business sector.[6] It is the incomes of households that must pay for housing. Of course, much of this payment is often deferred as households borrow for such a major purchase. But that deferral is no different conceptually from households borrowing to pay for a car, for education, for a vacation, etc. The purchase is what creates demand. Our approach to residential construction treats housing consistently with all non-housing purchases in the economy.[7]

Row 1e of table A1 provides the detail for the owner-occupied residential construction adjustment.[8] This item is clearly an addition to demand emanating from the household sector. We define this component of demand as household investment to recognize the importance of housing as part of household wealth. (It is not an addition to GDP because the demand is simply transferred from the investment sector to the personal sector.) It may be more surprising to see the reduction in financial saving in row 1e. The key to understanding this entry is to recognize the importance of the word "financial" in this definition of saving. This saving concept represents claims accumulated by the household sector on other parts of the economy that are mediated through financial markets. An addition to the housing stock is not saving in this sense, although it clearly represents the accumulation of a valuable asset. Therefore, holding other things equal, particularly disposable income, greater residential construction reduces the financial saving of the household sector. Another way to look at this issue,

[6] In an extensive survey of related issues, Ruggles and Ruggles (1986) write that residential investment should be integrated with the household sector. More recently, Van Treeck and Sturn (2012, page 10) recognize the same point.
[7] One difference remains between our treatment of residential construction and other consumer durables. Consumption or demand for non-housing durables can differ from production of these items (in either direction) with the difference reflected in inventory changes. We do not have data for inventories of newly constructed houses. The residential construction measure used here is new homes produced rather than new homes sold.
[8] We take the data from NIPA table 71200 that breaks out owner-occupied construction. NIPA table 50405, however, provides more detail about what is included in total residential construction. In 2013, improvements were 34% of residential investment. This share was inflated by the housing bust, it peaked at 42% in 2011. But even in the boom years prior to 2008, improvements were almost always over 20% of residential investment

perhaps somewhat mechanically, is to think of spending on a new home as an "outlay." Saving is defined as the difference between disposable income and outlays. If the purchase of an additional home is an outlay, which must be the case, then the conventional definition of saving must fall holding disposable income constant.

The final set of adjustments for housing reflect the fact that residential construction includes broker commissions paid for the purchase and sale of homes (both existing and newly constructed houses). These items are demand and cash flows from the household sector, but they are not investment. We therefore remove acquisition costs and disposal costs from household investment and add them to consumption. These items are quite large, constituting over 20% of residential investment in recent years.

It is important to recognize that these adjustments for owner-occupied housing mean that our adjusted measures do not have what might be called an ownership invariance property of the NIPAs.[9] With the NIPA treatment of housing, a shift in the share of the ownership of the housing stock from landlords to occupants would, in the absence of measurement error, leave PCE unaffected. That is, the explicit rent paid to rent a house from a landlord should equal the implicit rent imputed in NIPA PCE to live in the same home occupied by the owner. If the objective is to measure the services created by the housing stock, this invariance property would be desirable. But, for the reasons discussed above, including imputed rent on owner-occupied housing in both household income and household demand violates the objectives we set out for adjusted measures. This point highlights the fact that our adjusted measures are not "better" than the NIPA accounts. Rather, they are different because they meet different objectives.

[9] We are grateful to an anonymous referee for emphasizing this point.

B. Adjustments to Imputed Value of Free Financial Services

The BEA imputes interest income to the household sector that families never see as a cash flow. The imputations include interest on property/casualty and life insurance reserves as well as interest imputed from banking institutions (see Katz, 2012, page 21). The adjustments are described in section 2 of table A1. As shown in rows 2a through 2c, we remove all imputed interest to households from disposable income. In addition, the BEA estimates the value of "free" banking services received on deposit accounts (row 2d) and household loans (row 2e) and includes these estimates as income to households. Because these items are considered an implicit purchase of financial services, they are included in NIPA PCE. A close look reveals that the items in rows 2a and 2d are one and the same, so we intentionally omit any adjustment for row 2a.[10] The adjustments for imputed interest in rows 2b and 2c reduce income and household saving, while the adjustments for imputed financial services in rows 2d and 2e reduce income and consumption.

The net effect of the adjustments in section 2 of table A1 is to reduce disposable income, consumption and financial saving. The effect is not trivial. In 2013 these adjustments reduce financial saving by about 2.0% of NIPA DPI and 2013 disposable income itself declines by 3.9%.

C. Pension and Retirement Saving Adjustments

The treatment of pension and retirement saving plans presents both conceptual and data challenges. Among the most important reasons for personal financial saving is to provide funds for retirement. To the extent that saving in retirement plans meets this need, it could be viewed as a perfect substitute for personal saving outside of a designated retirement plan. But even defined contribution plans have various requirements for participation, restrictions on the use of funds, and differences in

[10] Unfortunately, we did not catch the fact that the same imputation was described in two different ways in two different NIPA tables before publication of the paper. Data on this site have been corrected in light of this discovery. The correction increases 2013 adjusted disposable income by 5.5% and increases 2013 financial saving by about 3.7% of NIPA DPI. The interpretations of the data presented in the paper are unaffected by this correction.

vesting that make them different from voluntary cash saving by households out of their disposable income. Defined benefit plans are even more removed from household saving.

We treat defined contribution and defined benefit plans differently. Conceptually, funds flowing into defined contribution plans, and the capital income received on balances in these plans, seem like saving to the household. And when funds are withdrawn from such plans to pay for consumption in retirement (or at other times) this seems like dissaving. In contrast, funding of defined benefit plans is the responsibility of employers and is largely external to the household. As discussed by Gale and Sabelhaus (1999) the pension benefit for the employee's household occurs when the benefit is granted (and vested), even though the saving to fund it occurs as the employer allocates funds to its pension reserves. The effect on household income from a defined benefit plan occurs most obviously when benefits are paid, much like Social Security.

We adjust income and financial saving for contributions, capital income, and benefits from defined benefit pensions. We treat all defined benefit pensions—federal government, state and local government, and private—on a cash flow transfer basis similar to Social Security. Contributions to plans from either employer or employee are not counted as disposable income (employee contributions are relatively small). With our adjustments, defined-benefit pension benefits add to disposable income when they are paid to the household sector, again like the case of Social Security.

The adjustments are described in section 3 of table A1. Removing contributions to defined benefit plans and capital income on defined benefit plan balances from the NIPA DPI reduces both disposable income and financial saving. We adjust for both employer and employee contributions since both will be used to pay benefits and the benefits themselves cannot be divided according to the source of the contribution. Again, this treatment is entirely symmetric to Social Security. While the NIPA provide employee contribution data for publicly administered government employee plans throughout our sample period, no information is available for private defined-benefit pension plans prior to 1984.

We estimate employer contributions to private defined-benefit plans (3c) by assuming that the ratio of employee to employer contributions in the private plans is the same as this ratio for the government plans. For 1948 through 1983, we estimate employee contributions to private defined benefit plans (3i) by assuming that the share of employer defined benefit contributions is a constant share of total employer contributions to private pension and profit-sharing plans, for which data are available back to 1948 from NIPA table 61100B. The assumed share is the average of the actual share for the first five years separate private defined benefit employer contribution data are available (1984-1988). Similarly, we estimate capital income earned by private defined benefit plans (3l) prior to 1984 by assuming that the ratio of capital income for private defined benefit plans is the same as the 1984-1988 average ratio of private to government defined benefit plan capital income. We estimate benefits paid by private defined-benefit plans for 1948 to 1983 (3o) with the average 1984-1988 ratio of benefits paid by private defined benefit plans to total pension benefits paid. We make no adjustment for imputed employer contributions to private defined benefit plans (3f) prior to 1984.

Finally, we add the benefits paid by defined benefit pension plans to their beneficiaries. As rows 3m – 3o show in table A1, this adjustment raises disposable income and financial saving. It therefore offsets, in large part, the deductions made by removing plan contributions and capital income from disposable income and saving. But the net effect of the pension-retirement adjustments is a reduction of adjusted disposable income by 1.3% in 2013.

Section 4 of table A1 presents conceptually identical adjustments for workers' compensation. As is the case of pensions, we eliminate the payments by employers (premiums in this case) from income and saving but add in benefits received to income and saving. These adjustments are included for consistency, but their net effect is negligible.

D. Adjustments for Medical Insurance and Medical Payments

Medical spending is a significant and rising part of the national economy. In the NIPAs, health care production lands almost exclusively in the household sector despite the fact that much of it is paid for by private and government insurance programs. Expenditures for medical care are considered household spending in PCE, regardless of who pays for these services, and insurance premiums are added to DPI even if they never become part of household cash flows.

First consider the effect of private insurance. The BEA treats premiums paid by employers as "supplements to wages and salaries" that are part of DPI and any medical services paid for by this insurance are part of PCE in the household sector. Of course, this is not the way employer-subsidized health insurance affects the cash flows of households. While some employers may provide information to employees about the cost of insurance purchased on their behalf, employer payments for insurance do not affect cash flow coming into the household. Similarly, when the household has medical costs, the deductible, co-payments, or any uncovered expense create a negative household cash flow. But the part of the medical bill paid by insurance never enters the household's cash budget.

Our adjustments summarized in row 5a of table A1 adjust household disposable income and expenditure to put medical expenditure on a household cash flow basis. The group health insurance premiums paid by employers are removed from disposable income. The transaction on the other side of equation A1 that balances the DPI adjustment is somewhat subtle and involves consideration of what insurance premiums actually pay for. In a direct sense, premiums purchase insurance.[11] The funds received by insurance companies pay for the administrative costs and profits of the insurance company plus the medical services that the insurance company pays for on behalf of its policyholders. In either case, these items are part of PCE.[12] Because we are interested in measuring demand that comes from

[11] Many large firms and organizations are self-insured. But that really does not change the analysis that follows. In fact, self-insurance programs are usually intermediated by an insurance company.

[12] Some qualification to this statement is in order because insurance companies, or self-insured employers, may accumulate or draw from claim reserves in a given year which could make total premiums received somewhat larger or smaller than the

households, not business making purchases on behalf of their employees, we remove the expenditure for health insurance paid for by employers from consumption so that our adjusted household demand concept contains only what households actually purchase. Note that this adjustment leaves the household's out-of-pocket spending on medical care as part of consumption and it does not affect the BEA treatment of insurance premiums actually paid by households.

The adjustments for group insurance payments in line 5a are similar to those for imputed homeowners' rent in line 1a; both adjustments have the same sign entries in the disposable income and household demand columns. But there is an important difference between *implicit* rent and the *explicit* payments for group insurance. Implicit rent is not a cash flow transaction in any sense; as discussed above it creates no demand for newly produced goods and services. Payments to an insurance company to cover the costs of insurance and the benefits paid are clearly cash flow transactions that create demand for final services produced either by the insurance or the health care industries, even though this demand is not part of our definition of household demand. While we remove the demand created by employer group insurance payments from our definition of household demand, it remains part of *aggregate* demand. Adjustments that have this characteristic are designated with a dagger sign in table A1.

Adjustments for government health insurance follow a similar logic. In the NIPAs, government payments for medical care through Medicare, Medicaid, and a very small amount for military beneficiaries are treated as income to the household sector. But the households whose medical costs are covered in these programs do not see the payments by the government to their health providers as a cash inflow in any sense. Furthermore, households do not see the expenditure from these government programs as their discretionary consumption. For these reasons we remove these items from both

demand for final services produced. Our approach assumes that premiums are equal to the cost of insurance plus claims paid in the aggregate, which we think is reasonable for the economy as a whole, especially over time. Any deviations from this assumption on a year-to-year basis are not likely important for the measurement purposes described in this paper.

disposable income and household demand (rows 5b, 5c, and 5d of table A1). As in the case of private group insurance, however, the spending financed by government health care remains part of aggregate demand (which, again, is the reason that the dagger designations appear for these rows in table A1).

E. Adjustments to Remove Non-Profit Economic Activity from the Household Sector

The BEA includes the relatively small, but non-trivial, economic activities of the non-profit institutions that serve households (NPISH) in the household sector. To focus on household demand, income, and saving, we remove the items associated with non-profits, as described in section 6 of table A1. Since the BEA started reporting NPISH data separately in table 20900 in 1992, we extrapolate the available data backward to the beginning of our sample by assuming that the ratio to NIPA personal income of each series we adjust was constant throughout that time period and equal to the average actual ratio between 1992 and 1994. Rows 6a, 6b, and 6c remove explicit non-profit incomes from household disposable income. Other things equal, these adjustments also reduce household financial saving. Rental income and expenditure is also imputed for non-profits in the NIPAs, and these items are removed from our adjusted measures as described in row 6d. Note that this adjustment leads to a net reduction in demand for the same reasons discussed previously for owner-occupied housing.

The NPISH sector receives transfers from both business and government that are counted as part of NIPA DPI. Eliminating these relatively small items (rows 6e and 6f) reduces disposable income and financial saving. Households also make transfers (most likely in the form of voluntary contributions) to the NPISH sector. Because the BEA consolidates NPISH and household units in the NIPAs, these transfers do not affect NIPA measures of DPI or personal transfers; they are intra-sector in the NIPAs. To meet our objectives, however, we pull NPISH activities out of the household sector which causes household-NPISH transfers to cross a sectoral boundary. For that reason, we add transfers from households to the NPISH units as a personal transfer and balance this adjustment by reducing household

financial saving (row 6g). But of course, transfers come the other way, from non-profits to households, which increases disposable income and financial saving (row 6h).

Finally, the NPISH sector engages in productive activity. Some of this production is sold on the market to the household sector and represents demand created by the household sector for newly produced output. This activity is included in PCE and should remain there. But some part of NPISH production is not sold to households (consider the administration costs of grants from non-profits, for example). This output is treated as consumption of non-profits and is included in NIPA PCE. Because it is not household demand, we remove it from adjusted demand, which other things equal increases household financial saving. As in the case of medical services paid by insurance, however, even though we remove NPISH consumption from household demand, it remains part of aggregate demand, as indicated by the dagger symbol in row 6i in table A1.

Isolation of the NPISH sector from households has a non-trivial effect on adjusted consumption (3.7% in 2013). But it has little effect on household saving because the expenditures of the NPISH sector largely offset the cash flows the sector receives.

F. Miscellaneous Adjustments

Section 7 of table A1 describes a large number of miscellaneous adjustment. With the exception of the capital consumption adjustment, these items have trivial magnitudes but are included for conceptual completeness.

Items consumed in kind provided by employers and farms are treated as PCE, and their value is included in DPI in the NIPAs. The income imputed for in-kind items is clearly not household cash flow, nor is the demand for them based on financial choices made by the household sector. We therefore remove them from adjusted disposable income, and both consumption and household demand (rows 7a through 7d).

Because the household sector includes proprietors' income, some non-cash NIPA items primarily associated with the business sector appear in the household accounts as well. None of the items in rows 7f through 7i represent cash flows for the household sector. The inventory valuation adjustment is designed to eliminate cash profits or losses due to the effect of inflation on the nominal value of inventories. The capital consumption adjustment arises because the BEA uses different depreciation rules from the accounting principles that generate business income. These are non-cash adjustments made to the NIPAs, so we effectively return the NIPAs to a cash basis by removing them. The trivial "margin on owner-built" housing likely represents non-cash profits imputed to home improvements made by owners.

Small subsidies and fringe benefits are removed from the accounts as described in rows 7j through 7m. Employer payments for property/casualty insurance are treated like employer payments for medical insurance discussed above. We treat energy subsidies symmetrically. Rental subsidies in this category are removed as well. All these items are negligible.

[Figure A1 Approximately here]

Figure A1 shows standard and adjusted measures of key household sector variables on a real, per capita basis. These simple comparisons suggest the potential importance of the adjustments that we propose, but they reflect different definitional concepts and so they can be somewhat misleading. Section IV of the article describes the economic significance of the adjustments.

II. Adjusted Pre-tax Income

To undertake the comparisons between the micro data sources and our adjusted aggregate data we require an adjusted measure of pre-tax income. Starting from our adjusted disposable income measure, we derive an "adjusted" counterpart to personal income by adding back employee contributions for government social insurance, personal current taxes, and property taxes. Equation A2,

the counterpart to equation 1 from the paper, provides an accounting identity decomposing adjusted pre-tax income:

(A2) Adjusted Pre-tax Income = Taxes + Household Consumption + Household Investment + Transfers and Interest + Financial Saving.

Taxes in equation (A1) represents the gap between adjusted pre-tax income and adjusted disposable income. That gap differs from the gap between NIPA personal income and NIPA disposable personal income, because the adjusted taxes include property tax paid on owner-occupied housing.

[Table A2 approximately here]

Figure A1. Per Capita, Real (2009$) NIPA Personal Income and Expenditure and Adjusted Household Income and Expenditure

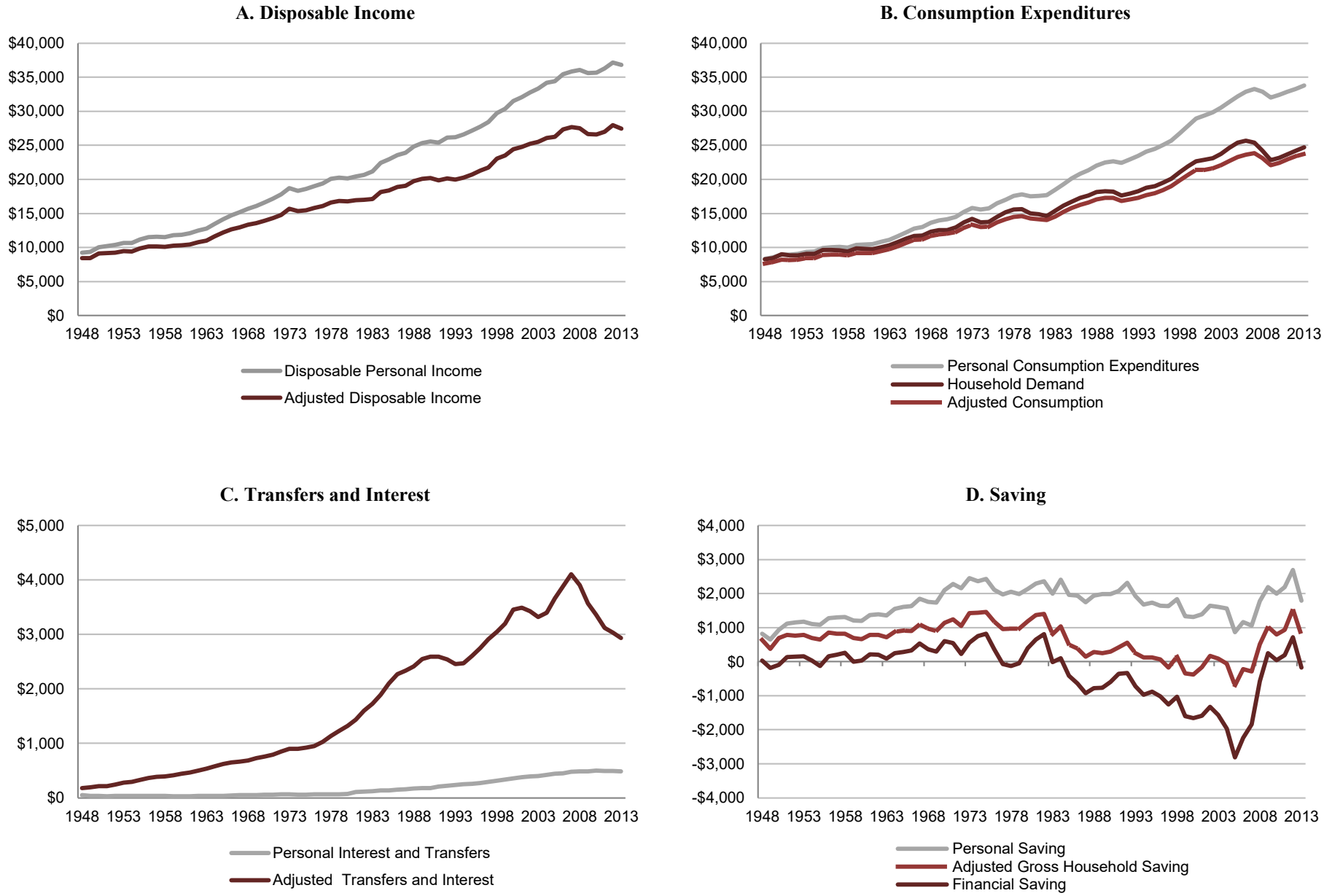

Table A1. Adjustments to NIPA Data

	(2014) NIPA Source		BEA Unique ID	Disp. Personal Income	Personal Cons. Expenditures	Household Investment	Personal Transfers and Interest	Personal Saving	2013 Amount ($ Billion)
	Table	Line							
Original NIPA Data				**12505.1**	**11484.3**	**0**	**412.7**	**608.1**	
1. Adjustments for Owner-Occupied Homes									
1a. Implicit rent (1)	71200	153	A2013C1	−	−				1325.5
1b. Intermediate inputs	71200	154	A2014C1	+	+				152.1
1c. Mortgage Interest	71200	225	W498RC1	+			+		333.8
1d. Depreciation	71200	164	B2607C1	+				+	311.7
1e. Construction of Owner-Occupied Structures (2)	71200	209	B1166C1			+		−	426.2
1f. Owner Occupied Acquisition Costs	FA2004	8	i3r53105acoo		+	−			15.7
1g. Owner Occupied Disposal Costs	FA2004	9	i3r53105dcoo		+	−			89.8
2. Imputed Value of Free Financial Services									
2a. Imputed interest received by households from banks, credit agencies, and investment companies	71100	67	B1611C1	*intentionally omitted, same as row 2d (see text on the top of page 9 and footnote 10)*					205.9
2b. Imputed interest received by households from life insurance carriers	71100	68	B1612C1	−				−	248.8
2c. Imputed interest received by households from property and casualty insurance companies	71100	69	W356RC1	−				−	7.4
2d. Depositors	71200	170	B1611C1	−	−				205.9
2e. Borrowers	71200	175	W542RC1	−	−				23

3. Pension Plan and Retirement Saving Adjustments									
3a. Actual Employer Contributions (Federal Gov. DB Pensions)	72300	5	Y270RC1	–				–	159.9
3b. Actual Employer Contributions (State and Local Gov. DB Pensions)	72400	5	S251101	–				–	101.1
3c. Actual Employer Contributions (Private DB Pensions)	72200*	5	W350RC1	–				–	118.2
3d. Imputed Employer Contributions (Federal Gov. DB Pensions)	72300	8	Y273RC1	–				–	-99.8
3e. Imputed Employer Contributions (State and Local Gov. DB Pensions)	72400	6	Y310RC1	–				–	88.6
3f. Imputed Employer Contributions (Private DB Pensions)	72200*	6	Y240RC1	–				–	-39.4
3g. Employee Contributions (Federal Gov. DB Pensions)	72300	11	Y276RC1	–				–	3.5
3h. Employee Contributions (State and Local Gov. DB Pensions)	72400	7	S251201	–				–	45.1
3i. Employee Contributions (Private DB Pensions)	72200*	7	Y241RC1	–				–	0.8
3j. Pension fund capital income (Federal Gov. DB Pensions)	72300	16	Y279RC1	–				–	163.4

3k. Pension fund capital income (State and Local Gov. DB Pensions)	72400	10	Y312RC1	−				−	143
3l. Pension fund capital income (Private DB Pensions)	72200*	10	Y242RC1	−				−	77.3
3m. Benefits paid (Federal Gov. DB Pensions)	72300	26	Y293RC1	+				+	135.5
3n. Benefits paid (State and Local Gov. DB Pensions)	72400	20	S121001	+				+	257.7
3o. Benefits paid (Private DB Pensions)	72200*	20	Y256RC1	+				+	205.4
4. Workers' Compensation									
4a. Premiums paid by employers	61100D*	34	B4925C0	−				−	65.9
4b. Benefits received by workers	61100D*	43	B4932C0	+				+	43.9
5. Adjustments for Medical Insurance									
5a. Group health insurance purchased by employers (†)	61100D*	32	B4923C0	−	−				623.4
5b. Medicare (†)	31200	6	W824RC1	−	−				572.4
5c. Medical care (Medicaid and Other) (†)	31200	32	B1597C1	−	−				454.4
5d. Military medical (†)	31200	16	B1606C1	−	−				5.1

6. Remove Activities of Non-Profit Institutions									
6a.Rental income	20900*	48	W159RC1	–				–	10.4
6b. Interest income	20900*	50	W403RC1	–				–	18.5
6c. Dividend income	20900*	51	W404RC1	–				–	24
6d. Implicit rental value of non-profit fixed assets	71200	165	A2050C1	–	–				122.3
6e. Transfers from governments to non-profits	20900*	53	W406RC1	–				–	22.6
6f. Transfers from business to non-profits	20900*	54	W407RC1	–				–	16.3
6g. Transfers from households to non-profits	20900*	55	W397RC1				+	–	250.8
6h. Transfers from non-profits to households	20900*	32	W386RC1	+				+	88.4
6i. Consumption of non-profits in PCE (†)	20900*	57	DNPIRC1		–			+	305.6
7. Miscellaneous Adjustments									
Eliminate consumption in kind									
7a. Farm products consumed on farms	71200	199	A2051C1	–	–				0.2
7b. Food furnished to employees	71200	203	DFOORC1	–	–				17.4
7c. Military clothing	71200	204	DMICRC1	–	–				0.4
7d. Employee lodging	71200	205	A2641C1	–	–				0.7
Technical Adjustments to Proprietors' Income									
7f. Inventory valuation adjustment	11200	36	B179RC1	–				–	0.4
7g. Capital consumption allowance	11200	37	B047RC1	–				–	165.6
7h. Capital consumption allowance for farms	11200	33	B044RC1	–				–	-5.8
7i. Margins on owner-built housing	71200	211	B1173C1	–				–	1.1

Subsidies and Related Items									
7j. Employer supplements for property / casualty insurance (†)	71200	181	W549RC1	—	—				8.4
7k. Rental subsidies	71200	158	B1154C1	—				—	1.3
7l. Energy assistance (†)	31200	38	B1601C1	—	—				3.8
7m. Other non-cash assistance (†)	31200	42	B1605C1	—	—				1.9
Adjusted Data (3)				**Adjusted Disp. Inc.**	**Adjusted Cons.**	**HH Invest-ment**	**Adjusted Transfers and Interest**	**Financial Saving**	
				9,330.60	**8,071.50**	**320.7**	**997.3**	**-58.9**	

Notes to Accompany Table A1

(*) We extrapolated all series marked with an asterisk backward in time. Series from table 20900 are reported starting in 1992. Series from table 72200 are reported starting in 1984. Data are extrapolated back in time based on a constant ratio to a reference series that goes back to the beginning of the sample period, as discussed in the appendix text.

(†) Certain items that we propose removing from the household sector, because they reflect transactions that are not in the direct control of households, are nonetheless cash transactions that generate demand in the economy are marked with a dagger. Those items had a total value of $1,975 billion in 2013.

(1) The adjustments to remove imputed items for owner-occupied housing are taken from NIPA table 71200 (“Imputations in the National Income and Product Accounts”) because all items in this table are broken out for owner-occupied housing. The concepts, however, are easier to understand from the structure of NIPA table 70405 (“Housing Sector Output, Gross Value Added, and Net Value Added”) although some items in this table do not split owner-occupied homes out from the total housing sector.

(2) Includes value of improvements to owner-occupied homes and broker commission for the sale of owner-occupied homes. The broker commissions are removed from household investment and added into personal consumption expenditures by the adjustments that follow in lines 1f and 1g.

(3) Household demand equals adjusted consumption plus household investment, or $8,392.2 billion in 2013. Adjusted outlays equals household demand plus adjusted transfers, or $9,389.5 billion in 2013. Adjusted gross household saving equals financial saving plus household investment, or $261.8 billion in 2013.

Table A2. Adjustments to Create Adjusted Pre-tax Income (2013 Annual Values)

		source	units	value
a	Adjusted Disposable Income		$ bil	9330.6
b	Contributions for government social insurance, domestic	A061RC1	$ bil	1,104.5
c	Employer contributions for government social insurance	B039RC1	$ bil	526.1
d	Personal current taxes	W055RC1	$ bil	1,661.8
e	Property taxes	A2016C1	$ bil	148.4
f	Adjusted Pre-tax Income	= a+(b-c)+d+e	$ bil	11,719.2
g	Population (midperiod)	B230RC0	# 000s	316,465
h	Per Capita Adjusted Pre-tax Income	= f/g*1,000,000	$	37,032

Appendix References

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