National Transfer Accounts
Private Age Reallocation Guidelines

Andrew Mason, Sang-Hyop Lee, Gretchen Donehower,
Amonthep Chawla, Tim Miller, and An-Chi Tung

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The purpose of this document is to describe concepts and methods used to estimate private age reallocations in the National Transfer Flow Account. It is a companion document to the *Public Age Reallocation Guidelines*. The material presented here presumes that the reader has estimated the complete economic lifecycle and is familiar with the public reallocation guidelines. Important additional preparation for the reader would be to read Lee, Lee, and Mason (2008) Mason, Lee, et al. (forthcoming) and to review the private sector lectures available on the NTA website. Several spreadsheets, also available on the NTA website, can be used to assist in the construction of private sector accounts.

The Structure of Private Flows

The Structure of Private Flow Account (Table 1) provides a quantitative overview of the private sector and two broad economic mechanisms by which resources can be shifted across age groups in this sector. The first mechanism is private transfers that are mediated by families (or households) and non-profit institutions. Beneficiaries receive *Private Transfer Inflows* which consist of *Inter-household Transfers* and *Intra-household Transfers*. The flow account does not include *Capital Transfers*, e.g., bequests, dowry, and other large transfers. The flow account is limited to the disposition of current income. Capital transfers are accounted for separately following the approach in National Income Accounts.

Table 1. Structure of Private Flow Account, Japan 2004, billions of yen.

Private Transfers		
Net Private Transfers		0
Private Transfer Inflows		138,004
Intra-household Transfer Inflows	137,476	
Inter-household Transfer Inflows	528	
Private Transfer Outflows		-138,044
Intra-household Transfer Outflows	-137,476	
Inter-household Transfer Outflows	-568	
Net Private Transfers to ROW		41
Private Asset-based Flows		
Private Asset-based Reallocations		46,555
Private Asset Income		98,228
Less: Private Saving		51,673

Private Transfer Outflows are the counterpart of private transfer inflows and also consist of inter-household and intra-household transfers. Intra-household transfers must always balance. In a closed economy, inter-household transfer inflows and outflows would also balance. If residents are net recipients of transfers from the rest of the world (ROW), their inter-household transfer inflows will exceed their inter-household transfer outflows. If residents are net givers of transfers to ROW their inter-household transfer outflows will exceed their inflows. Net private transfers including transfers to and from the rest of the world (ROW) must always balance, i.e., sum to zero.

The second mechanism by which the private sector reallocates resources is through private asset-based reallocations. Private asset income is an inflow. Private saving is an outflow. Private asset-based reallocations equal private asset income less private saving. Private asset income includes only asset income of residents, while private saving is net saving by residents. It is equal to net private saving in the system of national accounts (SNA).

The Structure of Public Flow Account can be constructed using values available from NIPA or from GFS. This is not the case for the Structure of Private Flow Account, because there are no available aggregate controls for private transfers with the exception of net private transfers to ROW. Private asset-based flows are available from NIPA. The Structure of Private Flow Account is constructed after estimates of private transfers have been constructed and is used to summarize private flows in a manner similar to public flows.

Private Transfers

Private transfers are estimated after the researcher has estimated the economic lifecycle, public transfers, and public asset-based reallocations. The NT Flow Account includes current transfers, e.g., the transfer of current income across households or from households to non-profit institutions and the transfer of current income within households. Capital transfers such as bequests, dowry, and similar large transfers are not current transfers and are not included in the Flow Account.

Table 2 illustrates the private transfer accounts using estimates for Japan 2004 (Ogawa et. al) with broad age groups. The total private transfer inflow was 138 trillion yen. The total private transfer outflow was slightly more, leaving 41 billion yen of net outflow, which must match total net transfer to ROW. While all age groups recorded substantial inflows, the outflows were concentrated on certain age groups. The transfer outflow was largest for the 30-44 and 45-59 groups. The outflow of these groups is 170% of their transfer inflow. In contrast, the outflow for 0-19 group is less than 1% of their inflow. The 75+ age group's private transfer outflow is 63% of its private transfer inflow. Net private flows were from those in the 30-74 groups to those in the 0-29 and the 75+ age group.

Another important feature of the private transfers is that the inter-household transfers are much smaller than the intra-household transfers.

Table 2. Private Transfers, Aggregate Values, Japan 2004, Billions of yen.

	Total	0-19	20-29	30-44	45-59	60-74	75+
Net Private Transfers	-41	28,498	10,847	-14,531	-23,933	-5,036	4,113
Private Transfer Inflows	138,004	28,757	20,344	23,906	30,204	23,742	11,050
Intra-household Transfer Inflows	137,476	28,755	20,332	23,769	29,908	23,687	11,025
Inter-household Transfer Inflows	528	2	12	137	297	55	25
Private Transfer Outflows	-138,044	-259	-9,497	-38,437	-54,137	-28,777	-6,937
Intra-household Transfer Outflows	-137,476	-259	-9,486	-38,382	-53,837	-28,627	-6,886
Inter-household Transfer Outflows	-568	0	-11	-55	-300	-151	-51

The following sections provide a more detailed explanation of private transfers.

Inter-household Transfers

Inter-household transfers consist of direct transfers between households, transfers mediated by NPISHs, and transfers to and from ROW. Inflows are current economic transfers received by resident households and ROW. Outflows are donations and gifts given to households, to NPISHs and to the ROW. Inter-household transfers are assigned to the household head.

Aggregate Controls

Interhousehold Transfers

In principle UNSNA reports transfers between households and between households and other private institutions, but in practice NIPA estimates of inter-household transfers are not reliable. As a consequence, NTA values are based on survey estimates of private transfers received and given. More information about estimating transfer inflows and outflows from survey data is provided below. In general, inflow estimates will be inconsistent with outflows estimates. In a closed economy they would sum to zero, but in an open economy private inter-household transfer inflows plus net private transfers to ROW will equal inter-household private transfer outflows. Inflows and/or outflows must be adjusted to insure that consistency with estimates of net flows to ROW.

Remittances are classified as either compensation, i.e., labor income, or as current transfers from ROW using the information from Balance of Payments (BOP). In the Philippines, for example, many workers abroad are guest workers, considered to be residents of the Philippines, and their remittances are classified as labor income. In contrast, Mexicans working in the United States are typically not guest workers and their remittances are classified as current transfers.

Three methods for adjusting inflows and/or outflows are discussed in detail in Appendix A. Country teams will have to decide which method is most appropriate for their case based on the team's knowledge of data quality and whether the inflow or outflow side is suspected to be over- or under-estimated. In some countries specialized surveys which emphasize inter-generational transfers may provide more accurate estimates of aggregate inter-household transfers.

Intra-household Transfers

No aggregate controls are available for intra-household transfers. Intra-household transfers to and from ROW are by definition zero. Domestic net transfers must sum to zero. Total inflows and outflows are constructed from household survey data using methods described below.

Age Profile of Private Transfers

The age profiles of private transfer inflows and outflows are estimated using a nationally representative income and expenditure survey. The age profile of transfer outflows is estimated using reported cash and in-kind gifts and donations. Examples include, but are not limited to,

- Congratulatory gifts
- Obituary money
- Farewell presents
- Regular/irregular donations
- Remittances

The age profile of transfer inflows is estimated using similar variables that capture cash and in-kind gifts received by the household. The exact variables will differ from country to country.

Inter-household transfers are classified by the age of the household head in the receiving or the giving household. Each household must have only one person designated as the household head. Stata programming code for the case of Taiwan is available at http://www.ntaccounts.org/doc/repository/Other%20Code.txt.

Estimating Intra-household Transfers by Age

While inter-household transfers are estimated directly by survey data, intra-household transfers are estimated indirectly as the balancing item between private consumption and disposable income (labor income plus net private transfers plus public cash transfer inflows less taxes paid). Household members with a deficit (disposable income less than current private consumption) receive transfers from household members with a surplus (disposable income greater than current private consumption). If disposable income is insufficient to fund household consumption, the household head makes additional intra-household transfers out of asset income and if necessary by dis-saving. If disposable

income is more than sufficient to fund household consumption, the residual is transferred to the household head and saved.

The consumption of durables, including the services from owner-occupied housing, are treated in a distinct fashion because, by assumption, the household head owns all household assets and all income generated by those assets flows to the head. The consumption of durables by any non-head household member is *funded* by an intra-household transfer from the head to the member equal to the value of member's durable consumption.

Net intra-household transfer estimates are only as accurate as the estimates from which they are constructed – private consumption and the components of disposable income. Moreover, assigning assets and asset income to the household head has important implications for the calculation of net transfers. Non-heads members with a deficit draw on the assets of the head, not their own assets, to support current needs. Non-head members with a surplus cannot save, but rather transfer their surplus to the head to be saved. The methods described here allow us to construct separate estimates of these flows which are useful for judging their potential importance.

The methods described here make additional assumptions to allow more detailed estimates than required for the construction of net inter-household transfers. First, intra-household transfer inflows and outflows are constructed by assuming that no individual within the household has both inflows and outflows with one exception: a household member may have current transfer outflows and a transfer inflow associated with the consumption of durable services. To the extent that household members actually have both current transfer inflows and outflows, the estimates produced by these methods will understate inflows and outflows, but not net inflows.

Second, we construct estimates of intra-household transfers by purpose or sector, e.g. education, health, etc. To do so, we assume that the size of the sector-specific intra-household transfer inflow is proportional to sector-specific consumption by the individual receiving the transfer. Hence, in these calculations we do not incorporate the possibility that intra-household transfers are targeted at particular sectors.

Third, we construct estimates of joint age distribution of inter-household flows by assuming that the proportion of flows received from any age group depends only on the contribution of that age group to the total flow. In other words, there is no age targeting within the household. The estimates do not allow for a possibility that might occur within a three generation household: children depending more on siblings while co-resident elderly are receiving more of their support from their adult children.

The methods for allocating intra-household transfers rely on the following procedures, which are explained in turn. For mathematical presentation, see Appendix B.

- Data preparation
- Transfers for current consumption
- Transfers of remaining surplus to household head
- Transfers for housing and other durable consumption
- Aggregate control for intra-household transfers

There are three data preparation considerations that come up in the intra-household transfer methodology. First, each household must have one and only one person designated as the household head. Second, consumption values must be non-negative. Negative consumption values can arise when model-based estimation is used. Third, all *unsmoothed* input variables, adjusted to match aggregate controls, should be available. The necessary input variables are age profiles of labor income, sector-specific current and durable consumption, public cash transfer inflows, and taxes paid including indirect taxes on consumption (or equivalently public transfer outflows and public asset income and saving).

The best case is that all these variables come from one survey, which is not always possible. However, if more than one survey is used to estimate input variables, two additional steps are needed before the methodology can be applied. First, select one survey to provide the household composition information (and other estimated inputs based on that survey). It must identify the household head and provide the age of all members of the household. Second, assign control total-adjusted profile values to each individual based on age. These profiles can come from whichever survey the country team thinks provides the most accurate data. Then apply the following intra-household transfer methodology using the assigned profile values instead of adjusted survey responses.

It should be noted, however, that the multi-survey method cannot be used to calculate profiles for any sub-types of households where the original profiles might be different by the sub-types. For example, if we wanted intra-household transfer profiles by education of household head, we could not just apply the overall average profiles to different households. There is probably an interaction between education and the shape of the original profiles that we would be missing, giving inaccurate results. A second limitation of this approach is that the inflow and outflow estimates, although not the net flows, will be substantially biased towards zero.

Computing transfer for current consumption proceeds in four steps. First, compute the current surplus or deficit for each household member, including the household head, and for the household. A household member has a current surplus if his or her disposable income is higher than current private consumption; otherwise a deficit. Disposable income is defined as labor income plus net private inter-household transfers plus public cash transfer inflows less taxes paid including taxes on products and production (indirect taxes). Current private consumption is private consumption less the services from owner-

occupied housing and other consumer durables.[1] The household surplus is equal to the sum of the individual surpluses; the household deficit is the sum of the individual deficits. A shortfall exists for household j if the total deficit exceeds the total surplus. If there is a shortfall, the household must fund the consumption of some members relying on asset-based reallocations.

Second, calculate a household specific "tax rate". By assumption the tax rate on each individual's surplus varies across households but is independent of the age of the individual within the household. A flat-rate tax for household j is calculated as $\min(1, \text{household deficit/household surplus})$. This flat-rate tax is imposed on each member's surplus income and the taxed surplus is transferred to support current consumption of members with a deficit.

Third, calculate intra-household outflows for current consumption. The current intra-household transfer outflow for non-heads is equal to the tax rate times the surplus. For heads the outflow is the tax rate times the surplus plus any shortfall that the head must fund using asset-based reallocations.

Fourth, calculate the intra-household inflows and outflows for current consumption by sector. The current intra-household transfer inflows to non-heads in each current consumption sector are proportional to that individual's current consumption in that sector. For heads, the calculation is similar except that the head may have to finance his or her own deficit through dis-saving or asset sales, which would not be recorded as a transfer. For example, education transfer inflows for head is calculated by a formula, (education consumption / total current consumption) times max (0, deficit of head – shortfall of household). Current transfer outflows from individual i in each current consumption sector are proportional to the total household inflows to each sector.

Any surplus held by non-heads that is not taxed for current consumption transfers is transferred to the head to be saved. The head receives all surplus that is not transferred to other household members.

Transfers of the services from owner occupied housing and other durable goods are calculated separately. Both transfers are outflows from the head and inflow to non-heads. The inflows to non-heads are equal to the consumption by each non-head of services from durables; for non-heads no outflows arise from durables. The durable service outflow for the head is equal to the total consumption of durable services by non-head members, and the head receives no inflow.

Once the transfer variables have been constructed, a check on the calculations is that total intra-household transfer inflows must equal total outflows for each sector for each household and in aggregate. After all checks have been completed, tabulate by age to construct the age profiles. Smoothing should be accomplished in the same way that we

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[1] If consumption of consumer durables is measured by expenditure rather than by the flow of services from durable assets, then these expenditures are included with other current consumption.

smooth all other profiles.
www.ntaccounts.org/web/nta/show/Documents/Private%20Transfers shows a
spreadsheet example of the transfer methodology described above for one household with
current consumption sectors, education, health and other current consumption, housing,
and other durable consumption. Stata programming code for the case of Taiwan is
available at www.ntaccounts.org/doc/repository/IntraHHCode.do. The intra-household
methodology results in net aggregate intra-household transfers of zero, both overall and
by each type of transfer. Everything balances in the survey population – total inflows
equal total outflows for each type of flow and for all flows combined. However, the total
population will often have a slightly different age distribution than the survey population.
If this is the case, in applying the total population to transfer profiles, the aggregate
inflow/outflow balance is lost. The difference should not be large if the survey is
nationally representative. We need inflows and outflows to balance for each individual
and to balance for the entire population. While there are several ways to solve this
problem, the best answer is to *adjust only the outflows* to match the inflows. That is, the
multiplicative adjustment factor on outflows is the ratio of aggregate inflow to the
aggregate outflow, times negative one. This way our accounting identities are preserved
and all flows balance. The downside is that the adjustment comes out of private saving
because that is estimated as a residual. As mentioned previously, though, this adjustment
should be very small. Note that we must adjust the lowest-level profiles first, and then
sum those adjusted profiles to higher-level profiles.

If the difference does turn out to be very large, there may be a problem with the
implementation of the methodology or the survey. If the adjustment factors are larger
than 1-2%, check whether you are implementing the methodology correctly and whether
your survey population is a good representation of the national population.

Private Asset-based Reallocations

The final component of the NT Flow Account to be estimated is private asset-based
reallocations. These estimates cannot be completed if transfers and public asset-based
reallocations have not been estimated. The methods described here conform to the asset
reallocation spreadsheet (RA.xls) that can be used to estimate both public and private
asset-based reallocations.

The existence of assets provides an important mechanism for shifting economic resources
across age. Young adults may generate resources by acquiring debt. In some countries
this is a common means by which college students pay for part of their education.
Working-age adults may save to buy a house, to pay for the education of their children,
and to fund their retirement. Older adults may depend on pension funds and personal
saving to fund their retirement needs. Each of these is an example of using asset-based
reallocations to deal with a basic feature of the lifecycle, namely, that the path of
individual labor income does not conform with the preferred path of individual
consumption.

Individuals may accumulate, acquire, and hold assets for other reasons. Some may accumulate wealth to protect themselves from unforeseen events, to leave a bequest to their children, to support charitable activities, or for other reasons. Some individuals may receive inheritances by pure chance. Although the motives that lead to the accumulation of assets are an important research issue, the methods for measuring the flows in NTA are entirely independent of motive.

Asset-based reallocations are the composite of two flows: asset income and saving. In NTA two kinds of asset income are distinguished: capital income and property income. Capital income is the return to capital held by corporations and households. All capital income accrues to domestic sectors and with minor exceptions to private domestic sectors (corporations and households). Public enterprise is considered to be part of the private (or enterprise) sector as in National Income Accounts.

Property income arises because of the existence of financial assets, e.g., debt instruments and corporate shares. Important forms of property income are interest, dividend and rent (payments to owners of land, fossil fuels, and other subsoil minerals). For any form of property income inflows and outflows must always balance. Interest paid by debtors must equal interest received by creditors, dividends paid by corporations must equal dividends received by shareholders, and so forth.

Financial assets and property income play several important roles in age reallocations and in NTA. First, consumers may rely on private credit to fund their lifecycle deficits generating private interest income and expense. Second, individuals and governments may engage in credit transactions leading to private interest flows with public counterpart interest flows. Government debt, for example, generates private interest inflows and public interest outflows. Third, private institutions and foreign institutions may engage in financial transactions. ROW may extend credit to domestic parties or may own shares in domestic corporations generating interest flows or dividends.

Many financial assets and the associated flows do not lead to age reallocations in NTA. A transactions between domestic firms is an example. If a bank extends credit to a corporation, for example, no net age reallocations are generated. The associated age-specific inflows and outflows balance.

The second major component of asset-based reallocations is saving. Individuals can accumulate debt or dispose of existing assets to generate inflows. Or individuals can dispose of debt or acquire assets generating outflows.

Asset-based reallocations are illustrated in Table 3 using estimates for Japan 2004 (Ogawa et al. 2008). Total private asset income amounted to 98.2 trillion yen and total net private saving was 51.7 trillion yen. The difference, 46.6 trillion yen, is equal to total asset-based reallocations. The values are reported for broad age groups here, based on estimates for single years of age with 90+ the upper age category. Because all asset income and saving are classified by age of the household head, the values for children are zero and for late teens are very small. In Japan asset-based reallocations are largest for

the 60-74 and 75+ age groups. Private asset income for the 45-59 age group is substantial, but saving is 80% of asset income. In contrast, for the 60-74 age group saving is 37% of asset income and for the 75+ age group saving is 47% of asset income. There are many additional interesting features of the private asset-based reallocations in Japan not explored here.

Table 3. Private Asset-based Reallocations, Aggregate Values, Japan 2004, billions of yen.

| Variables | Total | Domestic by age | | | | | | | Foreign |
		Total	0-19	20-29	30-44	45-59	60-74	75+	
Private asset-based reallocations	55,889	46,555	84	1,462	3,392	5,816	26,827	8,975	9,333
Private asset income	88,943	98,228	5	332	9,015	29,479	42,459	16,937	-9,285
Capital income	83,263	83,263	8	745	9,616	26,705	33,313	12,876	0
Private Interest, net	5,795	12,914	-3	-423	-717	2,201	8,197	3,659	-7,118
Other property income, net	-115	2,052	0	10	117	574	949	402	-2,167
Less: Private saving <a>	33,054	51,673	-79	-1,130	5,624	23,664	15,632	7,962	-18,619

<a> Value for ROW (Foreign) is current external balance rather than saving.

Private Asset Income

Private asset income consists of capital income plus net property income for households, corporations, and non-profit institutions serving households (NPISHs), all sectors distinguished in national income accounts (financial and non-financial corporations are also often distinguished). Capital income is the return to private sector capital and includes the operating surplus of corporations, public enterprise, and NPISHs, the operating surplus of the household sector, and the portion of mixed income of the household sector that is estimated to be a return to capital. NTA estimates are based on the assumption that 1/3 of mixed income is a return to capital and 2/3 is a return to labor. The operating surplus of the corporate sectors is measured as the difference between revenues and operating costs.   The operating surplus of the household sector is the capital income that arises from owner-occupied housing. Capital income is computed inclusive of taxes on production less subsidies.

Only a portion of the capital income that flows to institutions within the economy are retained by those institutions. Capital income is distributed to institutions and individuals that have provided the capital. Corporations, for example, distribute earnings to its share holders by paying dividends, to its creditors by paying interest, and to owners of land, fossil fuels, and sub-soil minerals by paying rent. These distributions are components of property income.

Property income consists of dividends, interest, and rent or variations on these economic forms. Property income does not consist only of capital income distributions. Households also accumulate consumer debt, and interest inflows and outflows that arise as a consequence are property income. Private property income also includes interest

income on public debt, a public asset income outflow, paid to the private sector, a private asset income inflow. And private property income includes flows from the ROW that will be positive if residents are net owners of foreign assets or negative if foreigners are net owners of domestic assets.

The flows of asset income are illustrated in Table 4 using values based on the Allocation of Primary Income Account in UNSNA (1993). Values for the "Other Private" sector are computed by combining the flows for financial and non-financial corporations and NPISHs. About two-thirds of capital income accrued directly to households and about one-third accrued directly to "Other private", predominantly corporations. The capital income of government is relatively minor and not of concern here. By definition, capital income for ROW is zero.

Asset income of the household sector is substantially greater than its capital income primarily because corporations are paying dividends, interest, and rent to the household sector and because the government is paying interest either directly to the household sector or indirectly to the household sector through corporations. A significant portion of asset income may not be distributed to the household sector, because it is retained by corporations.

Table 4. Asset income extracted from the UNSNA Allocation of primary income account.

	Total	Households	Other Private	Government	ROW
Capital Income	629.00	409.14	201.04	18.81	0.00
Property income	0.00	109.00	-74.00	-10.00	-25.00
Asset Income	629.00	518.14	127.04	8.81	-25.00

Source: UNSNA (1993) Table 7.2 (p 159).

Additional detail about asset income, again extracted from the UNSNA Allocation of Primary Income Account, is shown in Table 5. The components of capital income – operating surplus net of depreciation, capital's share of mixed income net of depreciation, and taxes on production net of subsidies – are reported. Capital income in NTA is the pre-tax value. The method for estimating the share of taxes on production net of subsidies born by capital is discussed elsewhere.

Property income is reported separately as interest and other property income in Table 5. In UNSNA property income consists of interest; distributed income of corporations; reinvested earnings on direct foreign investment; property income attributed to insurance policy holders; and rent. The components of property income can be treated separately, but the same methods are used to allocate each of these components except interest income. Here, we distinguish only interest income and other property income.

Table 5. Asset income extracted from the UNSNA Allocation of primary income account.

	Total	Households	Other Private	Government	ROW
Capital Income	629.00	409.14	201.04	18.81	
Operating surplus, net	279.85	60.00	201.04	18.81	
Mixed income, net (capital's share)	349.14	349.14			

Property income	0.00	109.00	-74.00	-10.00	-25.00
Interest, net	0.00	35.00	-22.00	-21.00	8.00
Inflows	230.00	49.00	146.00	14.00	21.00
Outflows	-230.00	-14.00	-168.00	-35.00	-13.00
Other Property Income	0.00	57.00	-56.00	18.00	-19.00
Inflows	224.00	101.00	88.00	18.00	17.00
Outflows	-224.00	-27.00	-140.00	-7.00	-50.00
Asset Income	629.00	518.14	127.04	8.81	-25.00

The calculation of interest inflows makes an important distinction between different forms of credit. One form of interest arises because of *consumer credit* which, in principle, consists of loans undertaken by households to fund consumption. Interest on consumer credit has no exact counterpart in SNA, and hence NTA employs a broader measure of interest outflows – interest paid by households. This measure is a composite that includes interest paid on consumer goods, home mortgages, and debt incurred by family businesses.

Property income, interest or other property income, leads to age reallocations because of financial transactions between the public sector and the private sector. The public sector may extend credit to private individuals who, for example, participate in student loan programs or farm loan programs. If so, the result will be a private interest outflow. The private sector may extend credit to governments to finance public debt. If so, the result will be a private interest inflow. Public ownership of firms, land, and sub-soil minerals will also lead to flows in the form of property income which influence the age distribution of income.

In a similar fashion, financial transactions between private domestic units and the rest of the world (ROW) will lead to property income flows which influence the age distribution of asset income. For example, individuals may shift resources from younger to older ages through foreign investment leading to an outflow at young ages and inflows in the form of property income and/or dis-saving at older ages.

Financial transactions between firms do not have any clear effects on the age profile of asset income. If, for example, businesses extend credit to other businesses, property income outflows and property income inflows will be larger at each age, but the net flow of asset income will be zero. It is assumed that the age profile of the owners of corporations with property income inflows and the age profile of the owners of corporations with property income outflows are identical in shape. Note that property income flows between corporations will be non-zero to the extent that the flows are between corporation and the government or ROW.

A complete accounting of inter-sectoral interest flows may be available for some countries. In many cases, however, this information is unavailable. In these instances,

estimates of inter-sectoral flows are made using methods described in detail in Appendix C.

Allocating asset income by age

The methods for allocating asset income by age require a comprehensive income and expenditure survey with the following information:

- Property income (interest income, dividends, and rent);
- Mixed income (income from a business, farm, self-employment income, etc.)
- Imputed rent from owner-occupied housing;
- Interest expense;
- Household roster with the age of the head.

In NTA assets and asset income are assigned to the age group of the household head. Except in rare cases data are not available on individual ownership of assets or asset income within the household. In the absence of such information, assigning assets or asset income to individuals is impractical.

Private capital income consists of three components identified above: (1) the net operating surplus of households; (2) capital's share of mixed income of households; and (3) the net operating surplus of corporations and NPISHs.

The net operating surplus of households is the return to capital on owner-occupied housing. Its age profile is estimated by the age profile of imputed rent from owner-occupied housing.

The age profile of capital's share of net mixed income of households is estimated by the mixed income of the household. The split of mixed income between capital and labor is thus assumed to be independent of the age of the household head.

The age profile of the net operating surplus of corporations and NPISHs is assumed to be proportional to the age profile of property income of the household. Thus, the undistributed operating surplus of corporations is assumed to have the same age profile as the distributed operating surplus of corporations (Table 6).

Table 6. Age Profiles for Asset Income

Component of Asset Income	Age Profile Employed*
Net operating surplus of households	Imputed rent from owner-occupied housing
Capital's share of net mixed income	Self-employment income, farm income, business income, etc.
Net operating surplus of corporations and NPISHs	Property income (interest income, dividends, and rental income)
Interest outflows, households	Interest expense
Interest outflows, other private	Property income (interest income, dividends, and rental income)

| Other property income outflows | Property income (interest income, dividends, and rental income) |
| Property income inflows | Property income (interest income, dividends, and rental income) |

*Age profile is constructed from a representative household income and expenditure survey.

The age profile of interest outflows for households is estimated by the age profile of interest expense.

The age profiles of *Other private interest outflows, Other property income outflows,* and *Property income inflows* are assumed to be proportional to the age profile of property income. This requires some explanation. These outflows are dominated by flows from firms, not from consumers, such as interest and dividend payments by corporations. Thus, the appropriate age profile for these flows is the age profile of property income used as a proxy for credit and equity interests held in corporations. The implication of this approach can be seen in the case where all capital income of corporations is distributed to the individuals who own shares or who have extended credit to the corporate sector. The capital income of corporations, the property income outflows from those corporations, and the property income inflows to households (individuals) would all have the age profile of property income. The net flow to individuals would be the property income inflows which would be identical to the capital income of the corporate sector.

Interest inflows are assumed to have the same profiles as other property income. Hence, credit extended to the household sector results in age reallocations. For example, if young adults accumulate consumer debt, the age profile of interest outflows will be younger than the age profile of interest inflows for household credit. In contrast interest flows within the corporate sector do not result in age reallocations.

Private Saving

Private saving is the final balancing item in National Transfer Accounts. At each age, reallocations must equal the lifecycle deficit. Age reallocations in turn must equal net transfers plus public asset-based reallocations plus private asset-based reallocations. Private asset-based reallocations are equal to private asset income less private saving. Hence,

Private saving = Lifecycle deficit – transfers – public asset-based reallocations – private asset income.

This identity holds at each age. Total private saving, thus calculated, must equal net private saving as calculated in NIPA.

Illustrative Values

The illustrative values presented here should not be taken as a standard or model to which other countries conform. Values may vary widely from country to country. These estimates were constructed by the research team at Nihon University Population Research

Institute (Ogawa et al. 2008). The estimates are preliminary and subject to revision. The most recent estimates are available on the NTA website.

Private Transfers

Inter-household transfers are gifts and donations received and given either directly to another household or to a NPISH. Note that inter-household transfers are modest in Japan – the peak inflow is about 15,000 yen or roughly US$150. Most inter-household transfers are to and from prime age adults while net flows to older adults are relatively modest. Inter-household inflows may indirectly benefit the young and old to the extent that they are received by household heads who, in turn, provide support to dependent family members.
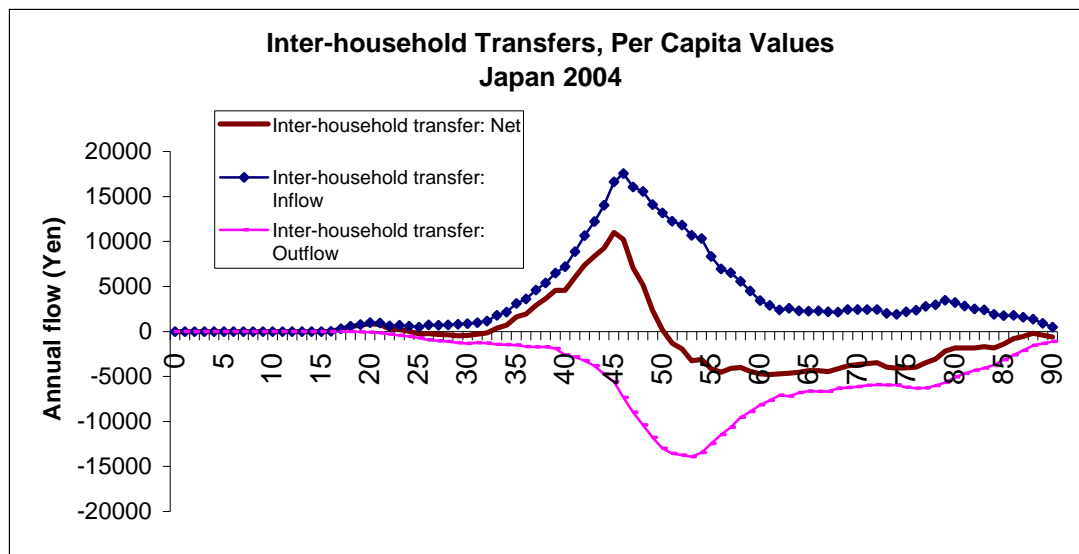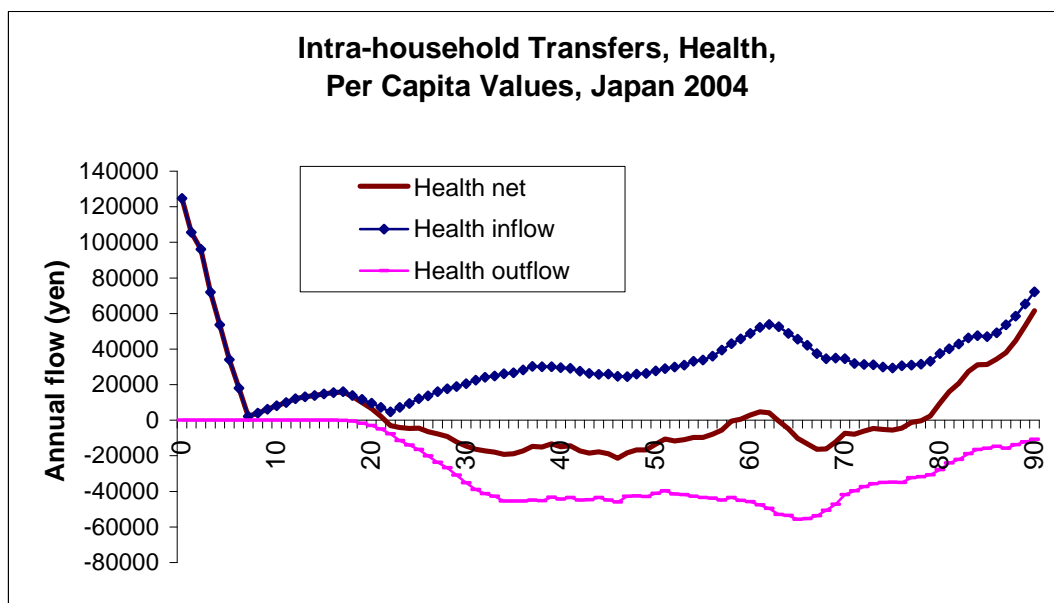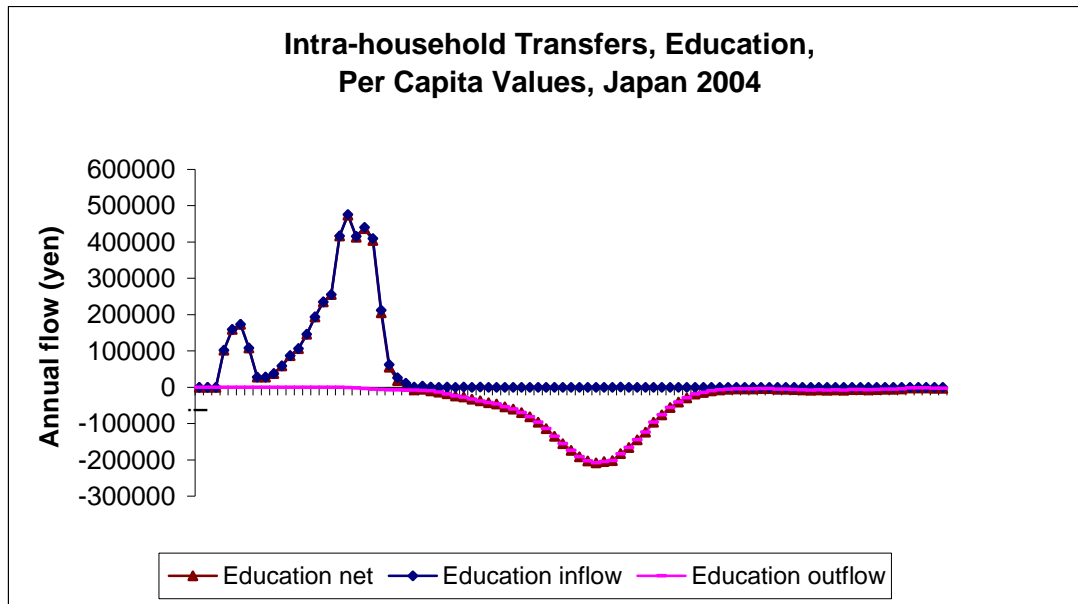

The following figure presents per capita intra-household transfers in Japan. Inflows peak at around age 20, when the costs of children are high, and again to those in their late 50s. The inflow also increases with age for those for 80 and older. Outflows rise from the late teens, peak in the late 40s, and then decline gradually. Net intra-household transfers are positive approximately for those below age 30 and those above age 75. They are negative for those between 30 and 75, approximately. An interesting feature of Japan is that the net intra-household transfers are negative for those in their late sixties and early 70s. Perhaps they are supporting both their adult children and their parents, but determining this based on the results presented in this graph is not possible.

Intra-household Transfers, Per Capita Values
Japan 2004

Annual flow (yen)

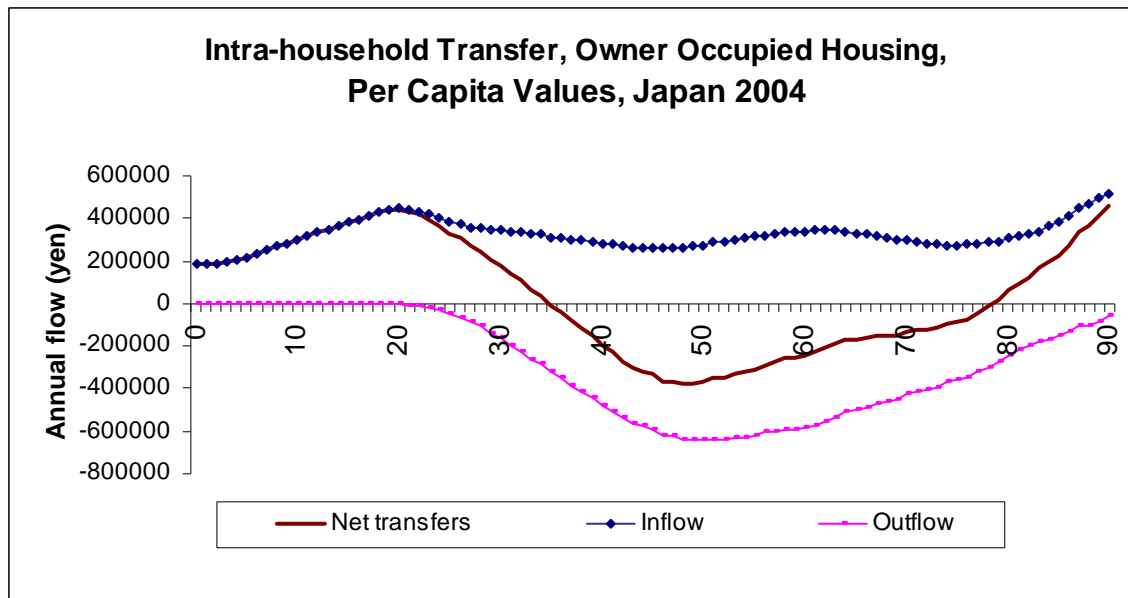- Net transfer
- Inflow
- Outflow
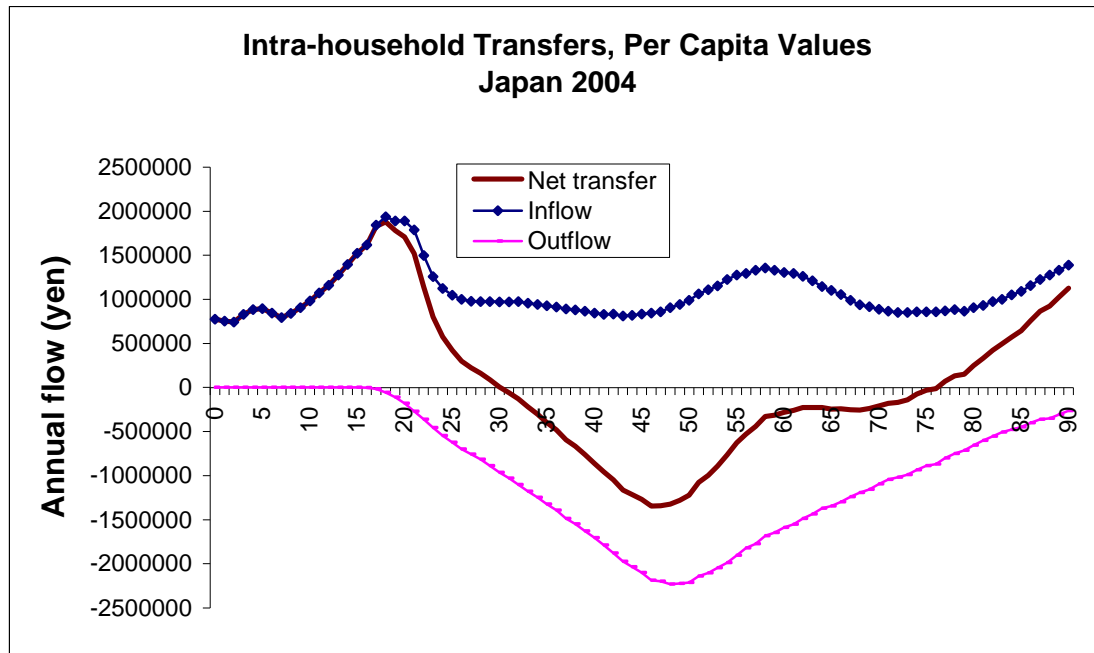
The next two figures report intra-household transfers for consumption of education and health, respectively. Intra-household transfer inflow for education is quite similar to education consumption profile because in Japan those attending school do not rely to any significant degree on their own labor income or students loans to fund their education. Rather their schooling is funded almost entirely by transfers from family members. The peak in education transfer outflows occur at about age 50, which is essentially one-generation length above the age of the peak inflow. Few of the outflows are from those over the age of 60. The pattern is consistent with education transfers flowing primarily from parents to children. There is little evidence of education transfers from grandparents.

Health spending in Japan has a strong age gradient, as elsewhere, with consumption high among the very young and the very old. Japan has an expansive public health care system, although private spending is far from negligible. The most significant net inflows are to the young and to the very old.

**Intra-household Transfers, Education,
Per Capita Values, Japan 2004**

Annual flow (yen)

- Education net
- Education inflow
- Education outflow

**Intra-household Transfers, Health,
Per Capita Values, Japan 2004**

Annual flow (yen)

- Health net
- Health inflow
- Health outflow

Transfers for owner occupied housing are shown in the next two figures. The inflows to non-heads are equal to the consumption of each non-head in that sector. The inflows for housing are not concentrated on any particular age group, but flow to all ages. Young children have somewhat lower inflows reflecting their lower consumption of housing. The outflow reflects age variation in ownership of owner-occupied housing as reflected in the age of the household head. Thus, outflows begin to rise in the early 20s, peak at around age 50, and then decline. The net flows are positive for those in their mid-thirties and younger and those 80 and older. Otherwise, the net flows are negative.

**Intra-household Transfer, Owner Occupied Housing,
Per Capita Values, Japan 2004**

A complex and important objective is to understand the connections within the household between transfers and asset-based reallocations. These arise in several ways. First, asset income and dis-saving are identified with the age group of a particular individual (or age group). However, asset-based reallocations arise when the household consumption exceeds labor income plus net public and private cash transfers. Thus, households rely on asset income or dis-saving to fund their consumption because one or more of their members have large lifecycle deficits. In a similar vein, household saving occurs when the sum of labor income, asset income, and net public and private cash transfers exceeds private consumption. In some households, all of the saving may be a consequence of the surplus of the household head, but in some households non-head household members have labor income more than sufficient to cover their own needs and that of dependent household members. The value of this surplus is counted as a transfer from the household member in question to the household head. The outflows and inflows of these transfers sheds light on the relationship between individual measures of income and consumption and household measures of saving.
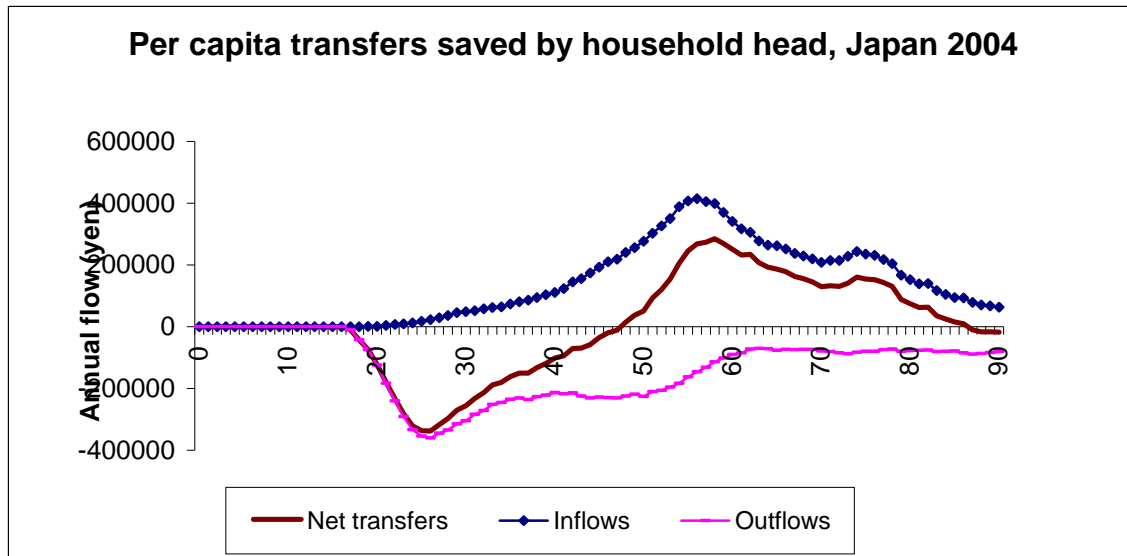
Per capita transfers funded by asset income are shown in the figure below. Both the inflows and outflows are concentrated among those in their sixties, seventies, and eighties in Japan. These are predominantly intragenerational transfers between the head and the spouse. Children and the very old, i.e., those in their mid-eighties and older, are net recipients of transfers funded by asset income. The net values are small relative to the gross flows, but they are far from negligible. Those in their late teens and early twenties have net transfer in excess of yen 100,000 ($US 1000), for example.

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Per capita transfers funded by asset income Japan, 2004
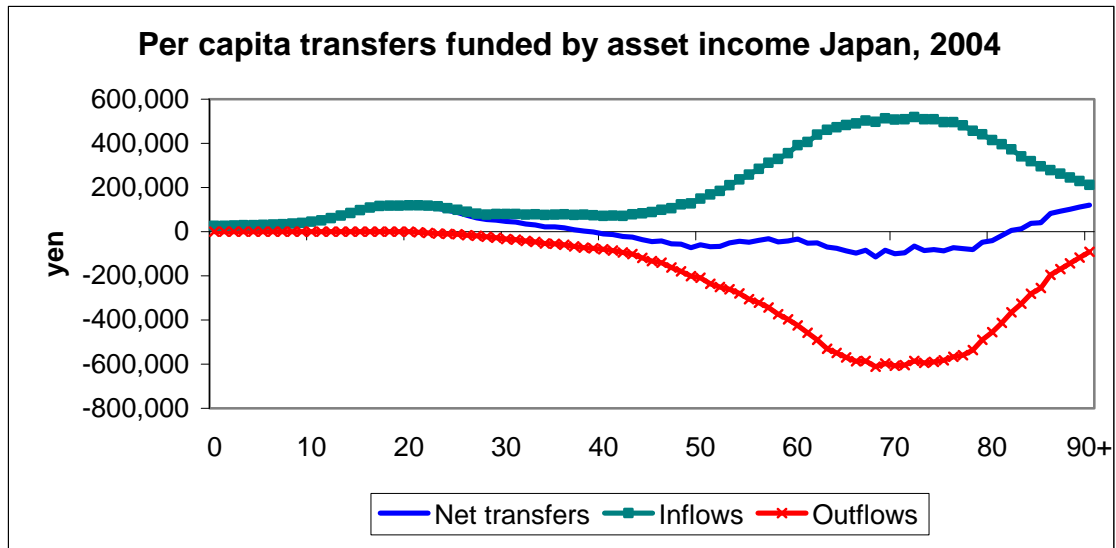
Per capita transfers funded by saving are similar in some respects to per capita transfers funded by asset income. The largest inflows and outflows occur in the late 50, 60s and early 70s. Again, many of these transfers are intra-generational, from heads to spouses. The net transfers identify more clearly the inter-generational flows and these are similar to those funded by asset income. Children, young adults, and those in their eights are net recipients of transfers funded by dis-saving on the part of those between the ages of 35 and 80.

**Per capita transfers funded by saving, Japan, 2004**
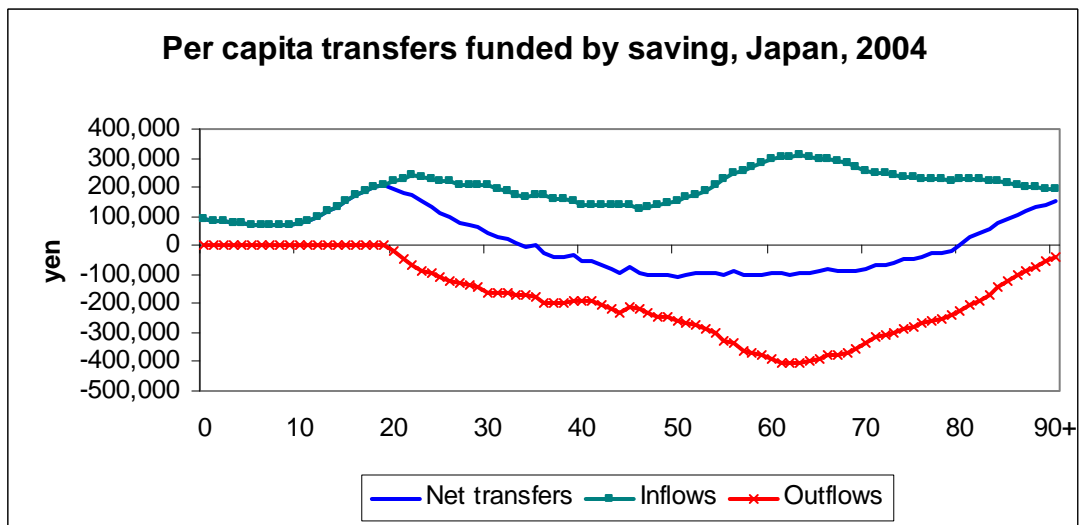
The final figure in this section presents the age profiles of saving transfers, i.e., the intra-household transfer surplus. Any surplus held by non-heads that is not devoted to current consumption transfers is transferred to the household head and saved. In Japan, the surpluses of those in their 20s and 30s are substantial as are the inflows of those in their 50s and older.

Per capita transfers saved by household head, Japan 2004

Annual flow (yen)

Legend: Net transfers · Inflows · Outflows

Private Asset-based Reallocations: Private Asset Income

Private asset income consists of capital income plus property income. In Japan, asset income increases steadily with age and peaks in the late 70s. Capital income is the most important component of asset income. Net private interest income is also quite important in Japan, while net property income other than interest is quite small.

Per Capita Private Asset Income Components, Japan, 2004

Legend: Capital income · Interest income, net · Other property income, net
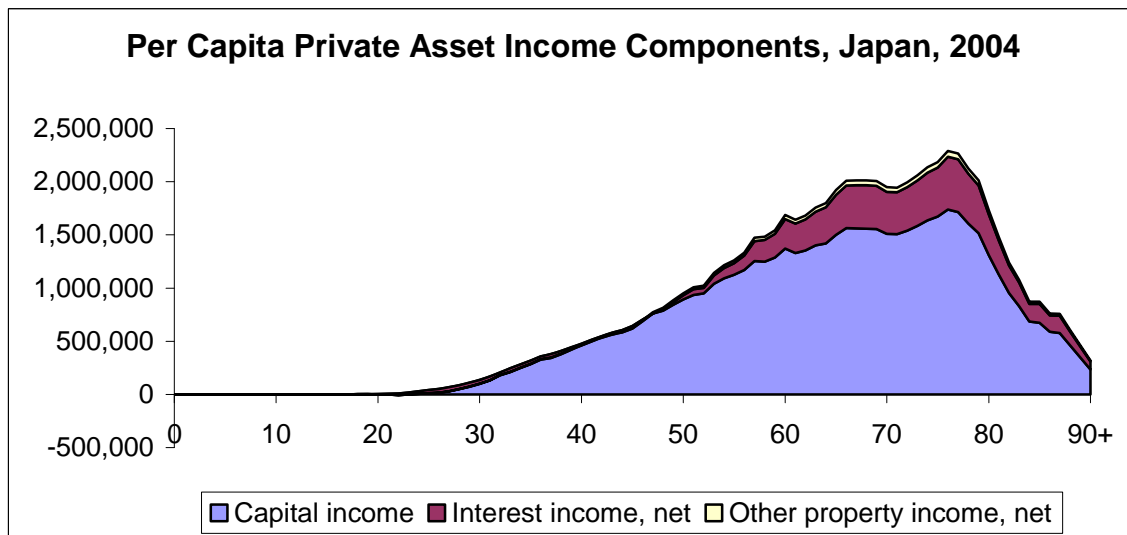
Interest

"Consumer interest" as it is used here is interest paid by households and encompasses interest on all household debt including consumer debt, housing debt, or business debt. The flows in Japan are strongly upward. Interest outflows peak for those in their 50s and are quite small for those in their 60s. Interest inflows follow the property income profile for Japan which is heavily concentrated at older ages.

Consumer Interest, Japan, 2004
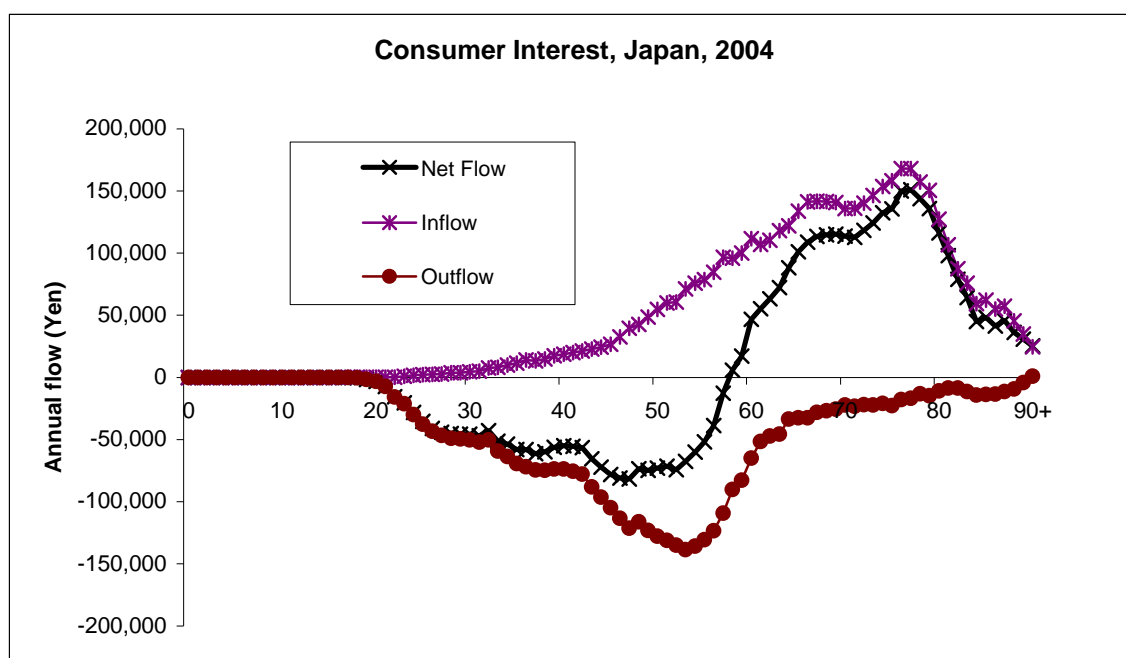
Private interest flows to and from the public sector are shown in the next figure. The shape of the age profile of the inflows and the outflows are identical. The inflows to the private sector exceed the outflows (Japan has a large public debt), thus net private flows are positive and accrue to older Japanese.

Private Interest Flows to and from the Public Sector, Per Capita Values, Japan 2004.
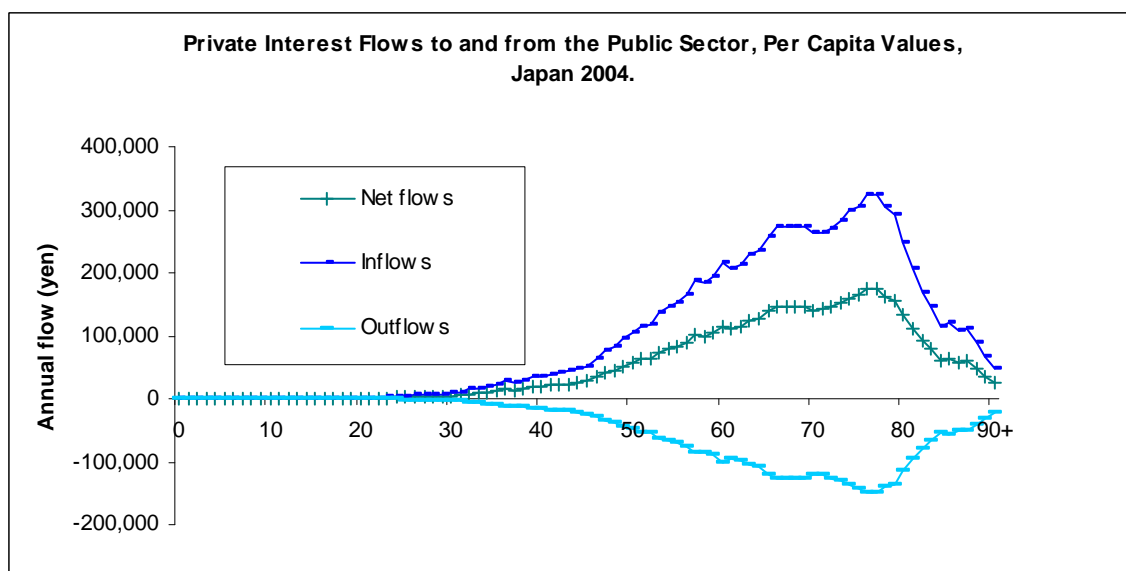

The final component of private interest is composed of flows between private institutions and between private institutions and ROW excluding consumer credit. In a closed economy these flows would net to zero both in aggregate and for each age because the age profiles for the outflows and the inflows are identical. In the case of Japan, the

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interest inflows exceed interest outflows because interest inflows from ROW exceed interest outflows to ROW. The result is a net inflow primarily to older Japanese.

**Other Private Interest, Japan 2004, Per Capita Values.**
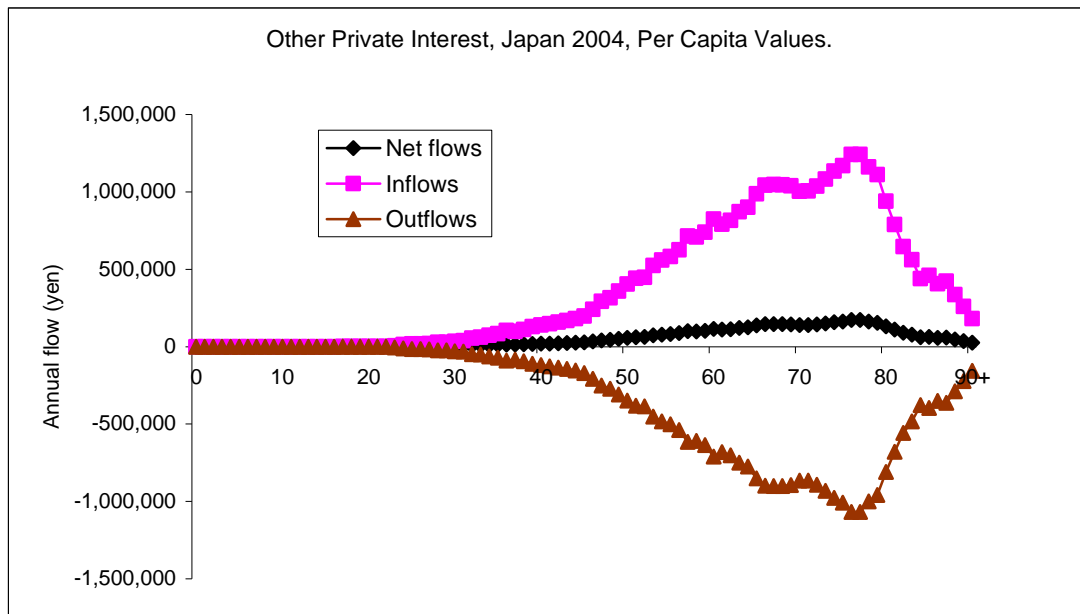
Net private interest flows are combined below. The net combined inflows turn positive in the late 40s and are very large at older ages. No single source dominates: consumer credit, net interest from the public sector, and net interest from ROW all play a role.

**Private Interest, Net Flows, Per Capita Values, Japan 2004**
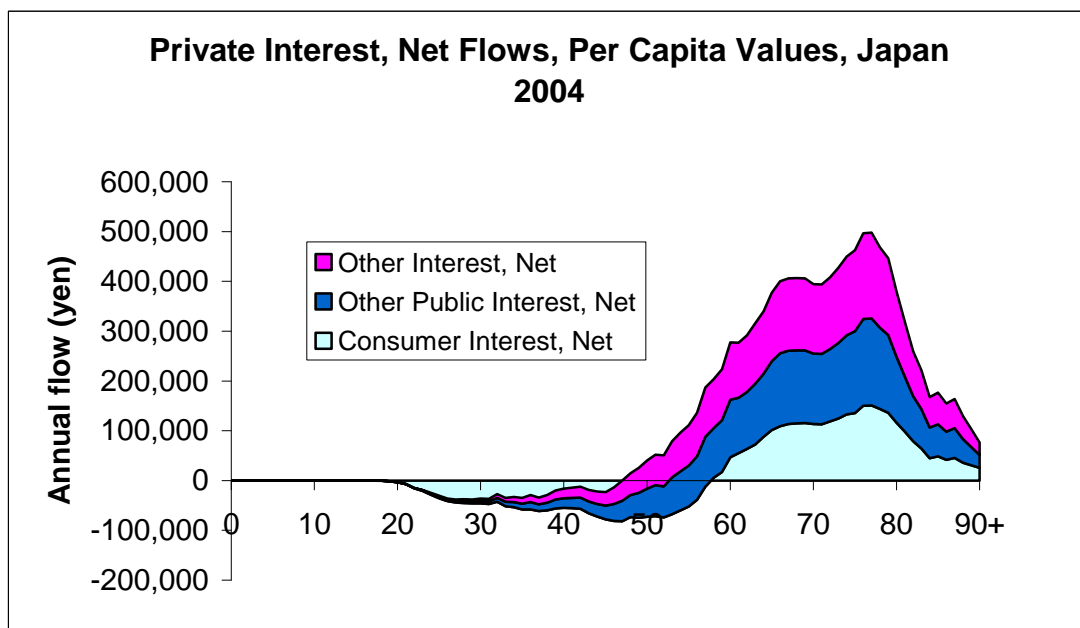
Property income other than interest

Property income other than interest includes dividends, rent, and similar financial flows. The age profile of property income for the household is used to represent all of these flows. The net flows arise because of flows between the private and public sector and between the private sector and ROW. Net private property income other than interest is very small in Japan as compared with other forms of asset income.

Other Property Income, Per Capita Value, Japan 2004.
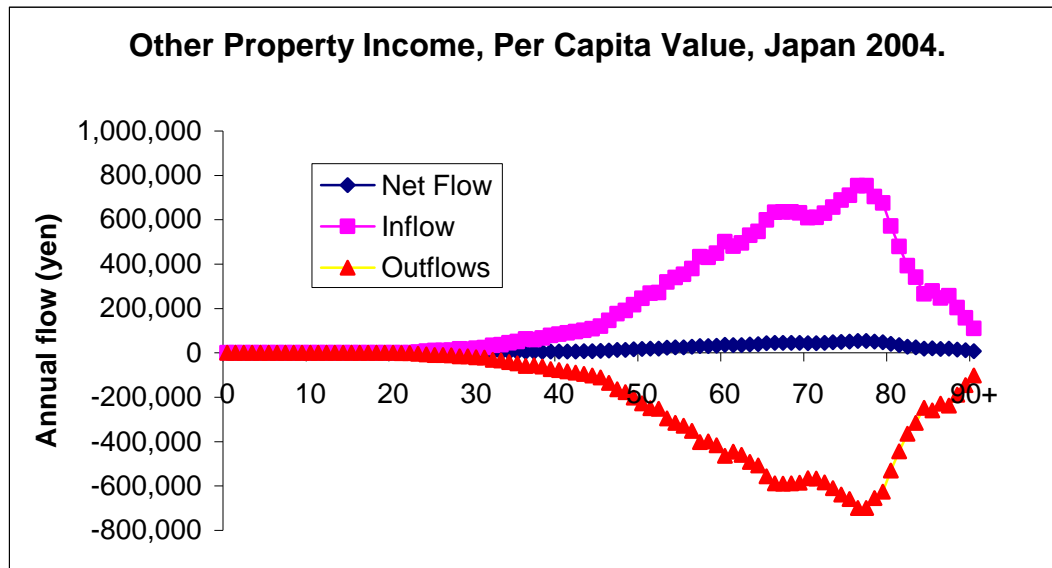
Per Capita Private Asset-based Reallocations

Young adults in Japan are dis-saving and saving does not turn positive until around age 30 (in the cross-section). Asset income exceeds saving at these ages. Saving and asset income both rise steeply for those between their mid-thirties and late fifties. Over this age range, almost all asset income is saved but nothing more. Private asset-based reallocations are never negative, but they are small until the late 50s. There is a striking dip in saving and a corresponding increase in asset-based reallocations for those in their 60s and early 70s. Saving, asset income, and asset-based reallocations all decline beginning in the late 70s and continuing through the 80s.

Per Capita Private Asset-based Reallocations, Japan, 2004

Legend: Asset-based Reallocations — Asset income — Saving
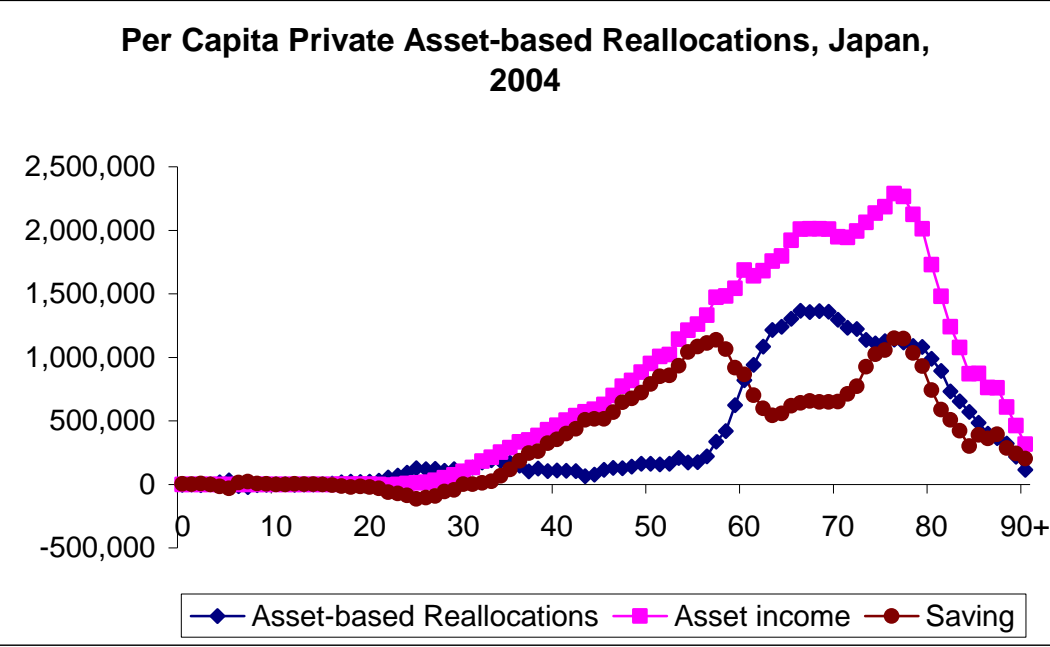
Appendix A. Adjustment Factor in Inter-household Transfers

There are three possible ways to adjust for the inter-household transfer inflows and outflows:

1. If we let *TF* be the control total for net private transfers and $TFBI_{agg}$ the total aggregate inter-household inflows and $TFBO_{agg}$ the total aggregate inter-household outflows, the multiplicative adjustment factor for *TFBO* and *TFBI* is:

$$TFB_{adj} = \frac{TF}{TFBO_{agg} + TFBI_{agg}}$$

2. The following adjustment factors for inflows $TFBI_{adj}$ and for outflows $TFBO_{adj}$ can also be used if one adjustment factor, computed above, is not sufficient.

$$TFBO_{adj} = 1 + \frac{TF - TFBI_{agg} - TFBO_{agg}}{2 \cdot TFBO_{agg}}$$

$$TFBI_{adj} = 1 + \frac{TF - TFBI_{agg} - TFBO_{agg}}{2 \cdot TFBI_{agg}}$$

3. The last method is if adjustment is to be made to either inflow or outflow but not both, the multiplicative adjustment factors $TFBO_{only\_adj}$ or $TFBI_{only\_adj}$ are computed as follows:

$$TFBO_{only\_adj} = \frac{TF - TFBI_{agg}}{TFBO_{agg}}$$

$$TFBI_{only\_adj} = \frac{TF - TFBO_{agg}}{TFBI_{agg}}$$

The abovementioned computations may result in very different outcomes if the difference between *TF* and $TFBI_{agg} + TFBO_{agg}$ is at all large. Country teams should be very careful in deciding which method makes the most sense for them and then should check the results to make sure they are reasonable.

Appendix B. Mathematical Presentation for Intra-household Transfers

1. Intra-household Transfer Outflows

   a. *Preparation of Data*

   $Yl(i, j)$: labor income

   $TGCash(i, j)$: public cash transfer inflows

   $TGTax(i, j)$: taxes paid

   $TFB(i, j)$: inter-household transfers

   $CC(i, j, x)$: sector-specific current consumption

   $CD(i, j, x)$: sector-specific durable consumption

   b. *Current surplus or deficit for each member (i) and for the household (j)*

   $$X(i, j) = Yl(i, j) + TGCash(i, j) - TGTax(i, j) + TFB(i, j) - CC(i, j)$$

   $$Surplus(i, j) = \max[0, X(i, j)]$$

   $$Deficit((i, j) = \min[0, X(i, j)]$$

   c. *Calculate the tax rate*

   $$tax(j) = \min[1, Deficit(j) / Surplus(j)]$$

   $where:$

   $$Surplus(j) = \sum_i Surplus(i, j)$$

   $$Deficit(j) = \sum_i Deficit(i, j)$$

   d. *Intra-household transfer outflow*

   $$Shortfall(j) = \max[0, Deficit(j) - Surplus(j)]$$

   $$TFWO_c(i, j) = tax(j)Surplus(i, j) \text{ for } i \neq 1$$

   $$TFWO_c(i, j) = \min[0, -tax(j)Surplus(i, j) - Shortfall(j) + Deficit(i, j)] \text{ for } i \neq 1$$

2. Inflows and Outflows by sector

   a. *Sector Inflows*

$$TFW_{xxx}I_c(i,j,x) = \frac{CC(i,j,x)}{CC(i,j)} Deficit(i,j) \text{ for } i \neq 1$$

$$TFW_{xxx}I_c(i,j,x) = \frac{CC(i,j,x)}{CC(i,j)} \max[0, Deficit(i,j) - Shortfall(j)] \text{ for } i = 1$$

   b. *Sector Outflows*

$$TFWxxxO_c(i,j,x) = \frac{TFWxxxI_c(j,x)}{TFWI_c(j)} TFWO_c(i,j)$$

   where:

   xxx = can be Education or Health or Other Consumption

3. Saving

   a. *Any surplus held by non-heads that is not taxed for current consumption transfers is transferred to the head to be saved:*

$$TFWSO(i,j) = -Surplus(i,j) - TFWO_c(i,j) \text{ for } i \neq 1$$

$$TFWSO(i,j) = 0 \text{ for } i = 1$$

   b. *The head receives all of this excess surplus as an inflow:*

$$TFWSI(i,j) = 0 \text{ for } i \neq 1$$

$$TFWSI(i,j) = -\sum_i TFWSO(i,j) \text{ for } i = 1$$

4. Transfers for Durable Consumption

$$TFWxxxO_d(i, j, x) = CD(i, j, x) - CD(j, x) \text{ for } i = 1$$

$$TFWxxxO_d(i, j, x) = 0 \text{ for } i \neq 1$$

$$TFWxxxI_d(i, j, x) = 0 \text{ for } i = 1$$

$$TFWxxxI_d(i, j, x) = CD(i, j, x) \text{ for } i \neq 1$$

where:

xxx = Housing or Other Durable Consumption

5. Construction of Age Profiles of Total Intra-household Inflows and Outflows

$$TFWO(i, j) = \sum_{xxx} TFWxxxO_c(i, j) + \sum_{xxx} TFWxxxO_d(i, j)$$

$$TFWI(i, j) = \sum_{xxx} TFWxxxI_c(i, j) + \sum_{xxx} TFWxxxI_d(i, j)$$

Appendix C. Calculation of Public and Private Interest.

The interest flow matrix is presented in Table C.1. Inflows and outflows for each sector are known (the row and column totals), but the flows between sectors are not known. Here and in the tables below outflows are reported as positive values. The methods are illustrated using values for Japan 2004 (Ogawa et al. 2008).

Table C.1. Aggregate Interest, Japan, 2004. Yen billions.				
	Inflows to:			
Outflows from:	Public	Private	ROW	Total
Public				12,558.0
Private				52,448.9
ROW				8,782.5
Total	6762.5	65,362.5	1,664.4	73789.4

Household interest outflows are reported in Table C.2. The total outflow is known from SNA. Outflows from households must be matched by inflows to public, private, or ROW sectors. Interest payments by households to governments are assumed to be available from administrative records. Here it has been assumed that interest payments by Japanese households to the government are 0. The remainder is allocated between private and ROW in proportion to total inflows reported in Table C.1.

Table C.2. Aggregate Interest Outflows, Households, Japan, 2004. Yen billions.				
	Inflows to:			
Outflows from:	Public	Private	ROW	Total
Public				
Private	0.0	6333.6	161.3	6,494.9
ROW				
Total	0.0	6333.6	161.3	6,494.9

Interest flows excluding interest outflows from households are reported in Table C.3.

Table C.3. Aggregate Interest Flows Excluding Outflows from Households, Japan 2004. Billions of yen.				
	Inflows to:			
Outflows from:	Public	Private	ROW	Total
Public				12558
Private				45954
ROW				8782.5
Total	6762.5	59028.9	1503.1	67294.5

Table C.2 considers only interest flows from households to the public sector. Other interest flows involving the public sector are treated in Table C.4. Public interest outflows are allocated between private and ROW in proportion to the inflows to those sectors in Table C.3. Likewise public interest inflows not treated in Table C.2 are

allocated to the private and ROW sectors in proportion to the outflows from those sectors reported in Table C.3.

Table C.4. Aggregate Other Public Interest, Japan, 2004. Billions of yen.				
	Inflows to:			
Outflows from:	Public	Private	ROW	Total
Public		12246.2	311.8	12558
Private	5677.5			5677.5
ROW	1085.0			1085.0
Total	6762.5	12246.2	311.8	19320.5

The final private interest flows are treated in Table C.5. These flows consist of interest paid by the private sector to other private institutions and ROW and interest received by private institutions from private institutions and ROW. The values in Table C.5 are calculated as residuals.

Table C.5. Aggregate Private and ROW Interest, Japan, 2004, Billions of yen.				
	Inflows to:			
Outflows from:	Public	Private	ROW	Total
Public				0.0
Private		39085.3	1191.3	40276.5
ROW		7697.5	-	7697.5
Total	0.0	46782.7	1191.3	47974.0

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Ogawa , Naohiro, Andrew Mason, Amonthep Chawla, and Rikiya Matsukura (2008) "Japan's Unprecedented Aging and Changing Intergenerational Transfers". NTA Working Paper. Additional data at http://www.ntaccounts.org.