

2020 DINA Update for Asia

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Technical Note

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1. 2020 new updates

1.1. Simplified DINA for 19 Countries based on PovcalNet data.

In the 2020 updates of WID, we publish the new constructed simplified Asia Distributional National Account for 19 Countries, below we will explain more details on data, methodology and findings.

We construct DINA based on three data sources: household surveys, fiscal series and national accounts. For these 19 countries, the primary data source we are using is survey tabulations from the World Bank (publicly available on the PovcalNet [website](#)). For most of the countries, only consumption tabulations are available; for a few countries, both income and consumption tabulations exist (i.e. Philippines, Nepal, and Kazakhstan); for Japan and Korea, only income tabulations are available. PovcalNet provides estimates for per capita household income (or consumption expenditure), and the share of income (or consumption) for various income (or consumption) groups in the national population. In DINA, generally the income concept is adult equal-split household income, however due to the lack of micro-survey data, we have to assume that the distribution of income per adult is equivalent to the distribution of income per capita. As soon as we have better information we will relax this assumption.

Second, normally we will correct the underestimated top income share in the survey data using fiscal data. However, for the current case, the fiscal data for these countries are not publicly accessible. Thus, we refer to the upgrade factor from the neighboring countries, for which both fiscal and survey data are available, namely Malaysia (Khalid & Yang, 2019), Thailand (Jenmana, 2018) and China (Piketty, Yang, & Zucman, 2017), India (Chancel & Piketty, 2019).

Last, the macroeconomic series used to make the estimates consistent with the national income per adult

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in purchasing power parity, are from the World Inequality Database (<https://wid.world/>).

Table 1

Below we will explain our methodology step by step.

Step 1: Per-capita survey consumption series to Per-adult survey consumption series. In DINA series, we rely on adult population (over 20 years old) to impute the income distribution. PovcalNet tabulations rely primarily on per-capita estimation, so it is important to convert the per-capita consumption tabulations to per-adult before any further corrections made to the series. A per-adult/per-capita ratio was calculated using both information on adult and whole population from WID.world macro database for each country and each survey year. Apply the per-adult/per-capita ratio to each percentile of bracket averages and thresholds of consumption distribution to convert per-capita series to per-adult series.

Step 2: Survey consumption series to imputed income series. For countries where only consumption tabulations are available, it is necessary to transform consumption estimates to income estimates using income-consumption ratios from neighboring countries where both income and consumption data are available.

- a. Compute income-consumption ratios for each income (or consumption) bracket for Philippines (PovcalNet), Thailand (Jenmana, 2018), India (Chancel & Piketty, 2019) and Indonesia (2020 Update), where both income and consumption series are available.
- b. To account for the fact that income inequality exceeds consumption inequality especially at the bottom and at the top of the distribution, countries where only consumption tabulations were available need to be transformed to income tabulations.
- c. We categorized Income-consumption ratios by periods and took the mean of the four countries by period and by percentile, to get a single ratio for each percentile level at each period.
- d. Apply the income – consumption ratio to each percentile of bracket averages and thresholds of consumption distribution to convert consumption series to income series.²

Step 3: Imputed income series to imputed fiscal series.

i. Countries without fiscal data

For countries where fiscal data are not publicly accessible, we correct the top of (imputed) survey-based income distribution using upgrade factors from neighboring countries.

- a. For given year, compute the upgrade factor (fiscal income vs. survey income) for each percentile for Malaysia (Khalid & Yang, 2019), Thailand (Jenmana, 2018), India (Chancel & Piketty, 2019) and China (Piketty, Yang, & Zucman, 2017).
- b. We take the mean of the three countries for each percentile as the imputed upgrade factor.
- c. Then using this imputed upgrade factor, we upgrade the bracket averages and thresholds for each percentile of the (imputed) survey-based income distribution for each country.

² This step was also applied to Philippines, Nepal, and Kazakhstan. Despite the availability of income tabulations since 2000, we relied on consumption tabulations and convert them to income tabulations to have a better coverage of the whole period (1990 – 2017).

ii. Countries with fiscal data

For Japan and Korea, Income tax returns statistics exist (Moriguchi & Saez, 2010), for this reason, we will follow the “Stitching” methodology described in the Dina guidelines (2020). We stitch the Lorenz curve of the top 10% fiscal shares with the Lorenz curve of the bottom 90% income share from PovcalNet income tabulations.

- a. The fiscal shares of the top of the distribution do not cover all g-percentiles. Thus, we use `gpinter` (Blanchet, Fournier, & Piketty, 2017) to have full coverage of the top 10%.
- b. We drop the top income shares produced in the previous step for survey tabulations to focus on the bottom 90% of the distribution.
- c. To “stitch” both Lorenz curves of the top 10% with the bottom 90% from two different datasets, we need to ensure that the Lorenz curve will be continuous and increasing. But at the 90th percentile, where both curves are stitched, the point is not differentiated and the curve is not convex. To solve this issue, we “constrain” the distribution of the bottom 90% to be consistent with the fiscal data at the top. For further explanations of the methodology followed, please refer to the Dina guidelines (Alvaredo et. al. 2020).
- d. The result is we have a continuous Lorenz curve but with different g-percentiles levels. To retrieve the full distribution, we re-import the data into `gpinter` to have a full set of g-percentiles.

Step 4: Upgrade to National Income and Correct for tax-exempt income. To upgrade the series to match per adult national income, we need to consider capital income and allocate it to different income groups. First, we need to impute how much capital income is missing for each income group. In order to do so, we need the level of capital income inequality and the dependency between capital and labor income. As we don’t have information on capital income, we rely on external estimates from France and US. Once missing capital income i.e. retained earnings is imputed, we accrue it to different income groups. Last, we upgrade the series proportionally to match National Income.

Step 5: Interpolate over years. The coverage of period of the survey data varies across countries in Asia (see). Some countries have great coverage of surveys like Kazakhstan and Kyrgyz Republic, while others like Myanmar and Turkmenistan only has data for one survey year. We interpolate between the years where data is not available, and then extrapolate both backward and forward if the series does not start by 1990 or end by 2019.

To replicate those steps, please see data appendix “Do-file Note” which explains how to navigate through the different do-files to produce DINA series for the 19 Asian countries using PovcalNet data.

Results

1. Countries with Consumption tabulations only
 - a. South East Asia
Graph 1
 - b. Central and East Asia
Graph 2
 - c. South Asia
Graph 3
2. Countries with Income tabulations only
 - a. East Asia
Graph 4

1.2. Simplified DINA for Indonesia

In order to estimate income distributions over the entire period with missing information on crucial income components of households and individuals, a few assumptions were made with regards to the general structure of the composition. Indonesia Household Income survey (Susenas) only provide full information on household income from employment, household businesses, capital income, and transfers in 1993, 1996, 1999, and 2002, for year 2005, 2011 and 2014, we are only able to get access to the information on employment income, household business income, and expenditure. Based on this household micro data, we have constructed our simplified Indonesia DINA. Below we will explain our methodology step by step.

Step 1: Imputing pre-tax income distribution from household expenditure. Apart from imputed rent of owners-occupiers, the BPS does not release any income data for the Susenas for the years 1992, 2008, and 2015 up until 2017. In order to overcome this data limitation, we estimated consumption distributions of these waves, and impute the distribution of income based on income-consumption ratios from the years with complete information (1993, 1999, and 2002).

Step 2: Imputing total income distribution from limited income data. A similar methodology was employed to recover total pre-tax income distribution from information on income from employment and household businesses.

Step 3: Attempts at top correction. For countries where fiscal data are not publicly accessible, we correct the top of (imputed) survey-based income distribution using upgrade factors from neighboring countries.

- a. For given year, compute the upgrade factor (fiscal income vs. survey income) for each percentile for Malaysia (Khalid & Yang, 2019), Thailand (Jenmana, 2018), India (Chancel & Piketty, 2019) and China (Piketty, Yang, & Zucman, 2017).
- b. We take the mean of the three countries for each percentile as the imputed upgrade factor.
- c. Then using this imputed upgrade factor, we upgrade the bracket averages and thresholds for each percentile of the (imputed) survey-based income distribution for Indonesia.

Step 4: Upgrade to National Income and Correct for tax-exempt income.

Results

Graph 5

1.3. Extrapolation

For the following country, DINA series are estimated based on fiscal tabulation and income survey data. In this update we extrapolation the series up to 2019, assuming the inequality level stay the same since the last data point in the following research.

China

For data details and methodology of China's DINA series from 1980 to 2015, we refer to Piketty, Yang, and Zucman (2019).

After 2013, China stop publishing survey tabulation based on Rural Household Survey (RHS) and Urban Household Survey (UHS).

After 2010, China stop publishing tax data.

India

For data details and methodology of China's DINA series from 1922 to 2015, we refer to Chancel and Piketty (2019).

After 2014, micro survey data is not available, income tax tabulation is updated till 2018.

Malaysia

For data details and methodology of Malaysia DINA series from 1984 to 2014, we refer to Khalid and Yang (2017)

After 2015, survey data is not available, income tax tabulation is updated till 2016.

Thailand

For data details and methodology of Thailand DINA series from 2001 to 2016, we refer to Jenmana (2018).

After 2016, both micro survey data and income tax tabulation are not available.

Section II: Work in progress

Hong Kong

We are currently working on Hong Kong DINA series 1980-2016. Our micro survey data is from Hong Kong census, 1981, 1986, 1991, 1996, 2001, 2006, 2011, 2016. Tax tabulation on wage income is updated till 2017.

Taiwan

We will construct Taiwan DINA in our future updates. So far, we have identified micro survey data "The Survey of Family Income and Expenditure of Taiwan (1980-2019)" and income tax tabulation updated till 2018.

Indonesia

For data details and methodology of Indonesia series from 1920 to 2004, we refer to Leigh and van der Eng (2010)

We are currently working on Indonesia DINA series 1992-2017. Our micro survey data is from National Socio-Economic Survey (SUSENAS), 1992-2017. Tax tabulation is not available in Indonesia.

Singapore

For data details and methodology of Singapore series from 1948 to 2014, we refer to Atkinson (2010).

We will construct Singapore DINA in our future updates. Micro household income survey is updated till 2018, however micro survey data is not publicly accessible. Income tax tabulations update till 2018.

Section III: Countries with no data

Currently we are not able to access to any survey data or tax data for the following countries/regions, Afghanistan, North Korea, Cambodia, Brunei, Macao, Papua New Guinea. For these countries, the

distribution of national income is imputed each year using the distribution of a particular neighboring country, for more details, please see (Countries with Regional Imputations on WID.world: A Precautionary Note, Chancel and Piketty, 2020)

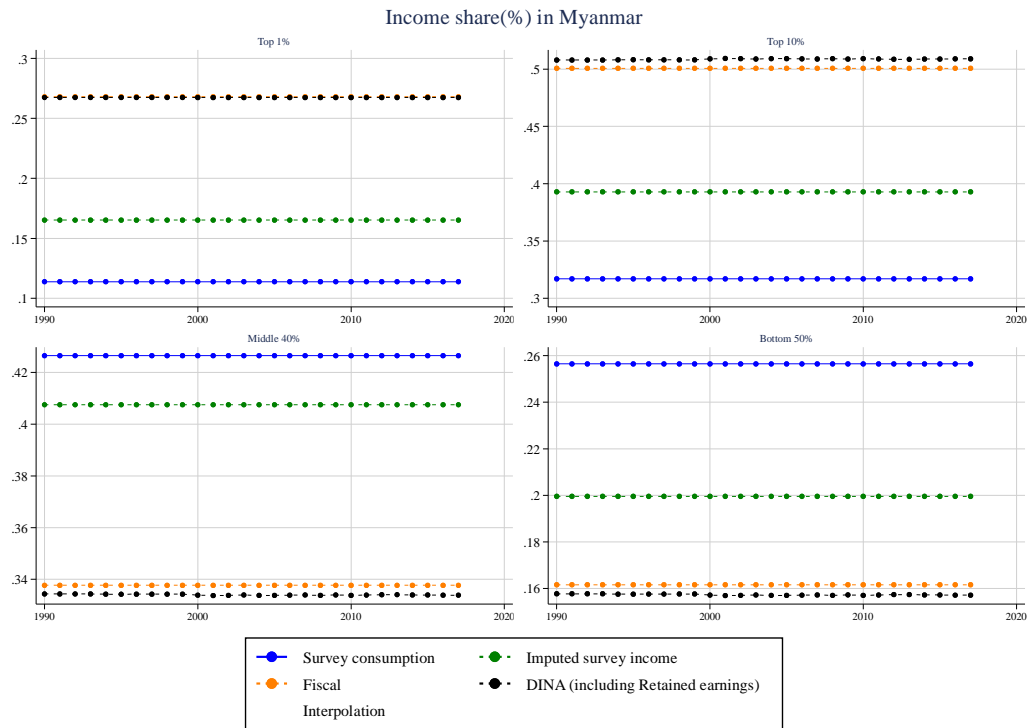
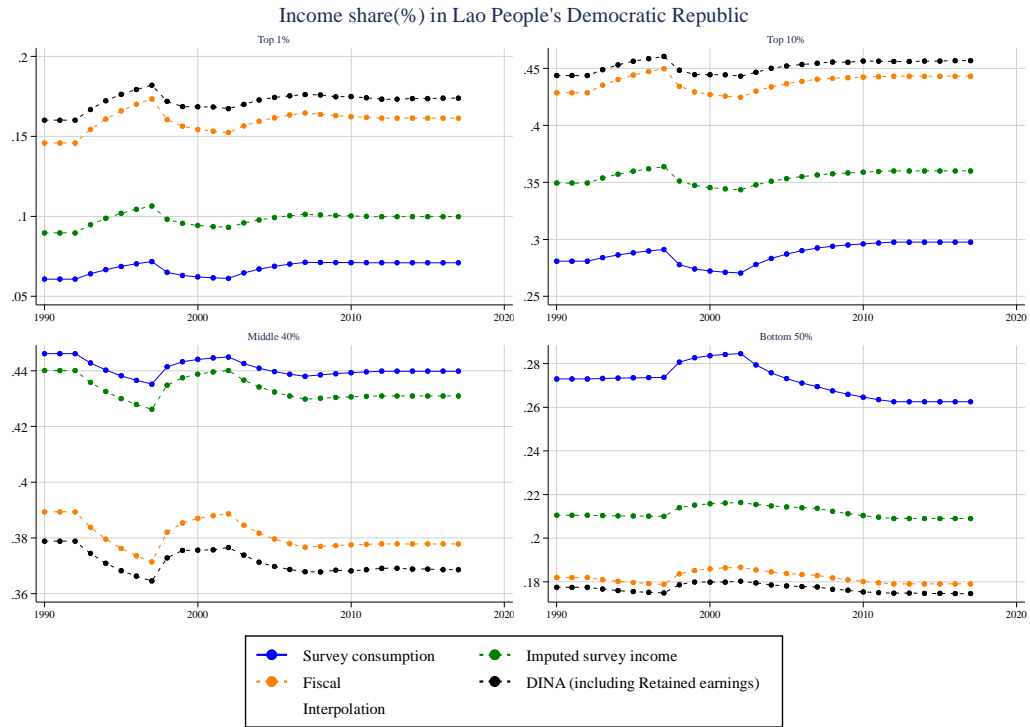
Tables and Figures

Table 1 : Survey data coverage by type for the 20 countries

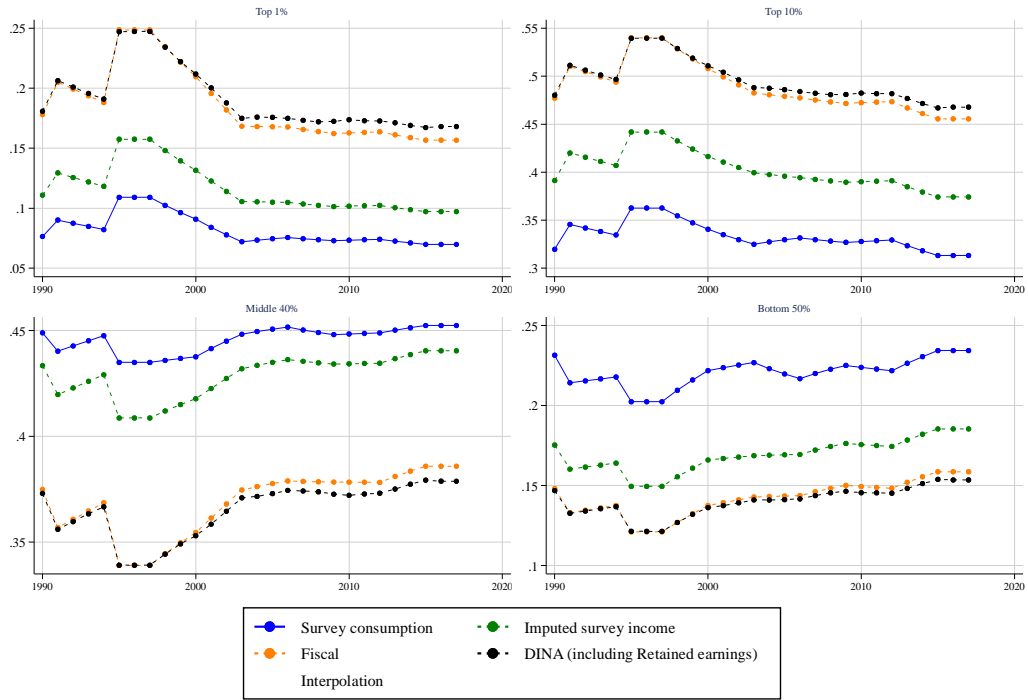
Type	Country	Survey year
Consumption	Bangladesh	[1991 ; 1995 ; 2000 ; 2005 ; 2010 ; 2016]
	Bhutan	[2003 ; 2007 ; 2012 ; 2017]
	Kazakhstan	[1996 ; (2001 – 2017)]
	Kyrgyz Republic	[1998 ; (2000 – 2017)]
	Lao People's Democratic Republic	[1992 ; 1997 ; 2002 ; 2007 ; 2012]
	Maldives	[2002 ; 2009]
	Mongolia	[1995 ; 1998 ; 2002 ; 2007 ; 2010 ; 2011 ; 2012 ; 2014 ; 2016]
	Myanmar	[2015]
	Nepal	[1995 ; 2003 ; 2010]
	Pakistan	[1990 ; 1996 ; 1998 ; 2001 ; 2004 ; 2005 ; 2007 ; 2010 ; 2011 ; 2013 ; 2015]
	Philippines	[1991 ; 1994 ; 1997 ; 2000 ; 2003 ; 2006 ; 2009 ; 2012 ; 2015]
	Sri Lanka	[1990 ; 1995 ; 2002 ; 2006 ; 2009 ; 2012 ; 2016]
	Tajikistan	[1999 ; 2003 ; 2004 ; 2007 ; 2009 ; 2015]
	Timor-Leste	[2001 ; 2007 ; 2014]
	Turkmenistan	[1998]
Uzbekistan	[1998 ; 2000 ; 2002 ; 2003]	
Vietnam	[1992 ; 1998 ; 2002 ; 2004 ; 2006 ; 2008 ; 2010 ; 2012 ; 2014 ; 2016]	
Income	Japan	[2008]
	Kazakhstan	[1993]
	Korea, Republic of	[2006 ; 2008 ; 2010 ; 2012]
	Nepal	[1995 ; 2003 ; 2010]
	Philippines	[2000 ; 2003 ; 2006 ; 2009 ; 2012 ; 2015]
	Indonesia	[1993, 1996, 1999, 2002, 2005, 2008, 2011, 2014]

No Data	Afghanistan	[-]
	North Korea	[-]
	Cambodia	[-]
	Brunei	[-]
	Macao	[-]
	Papua New Guinea	[-]

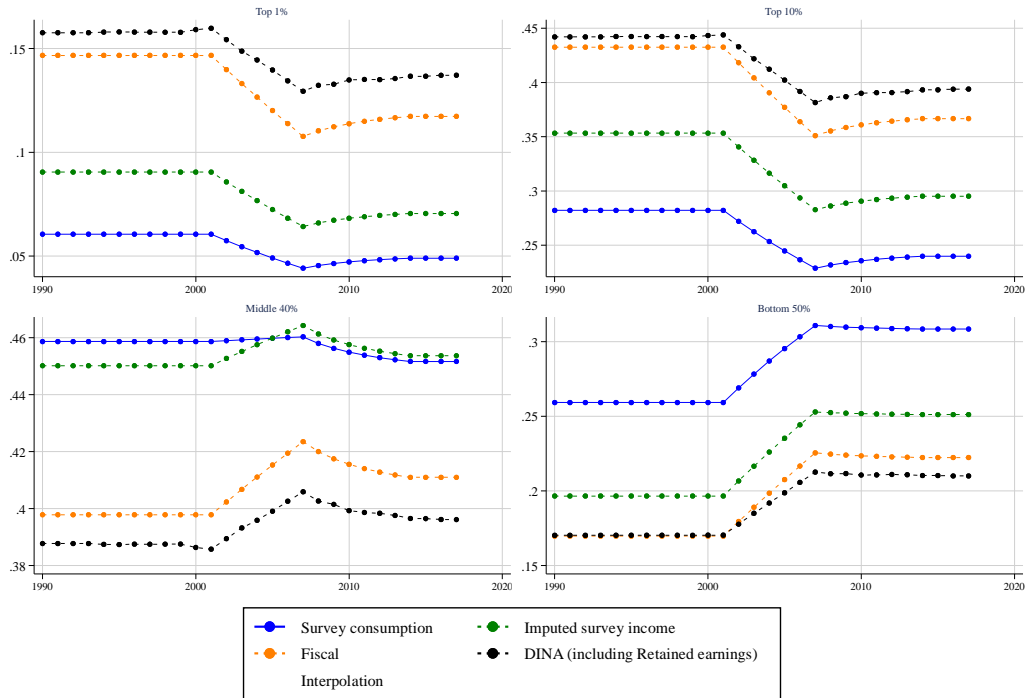
Graph 1



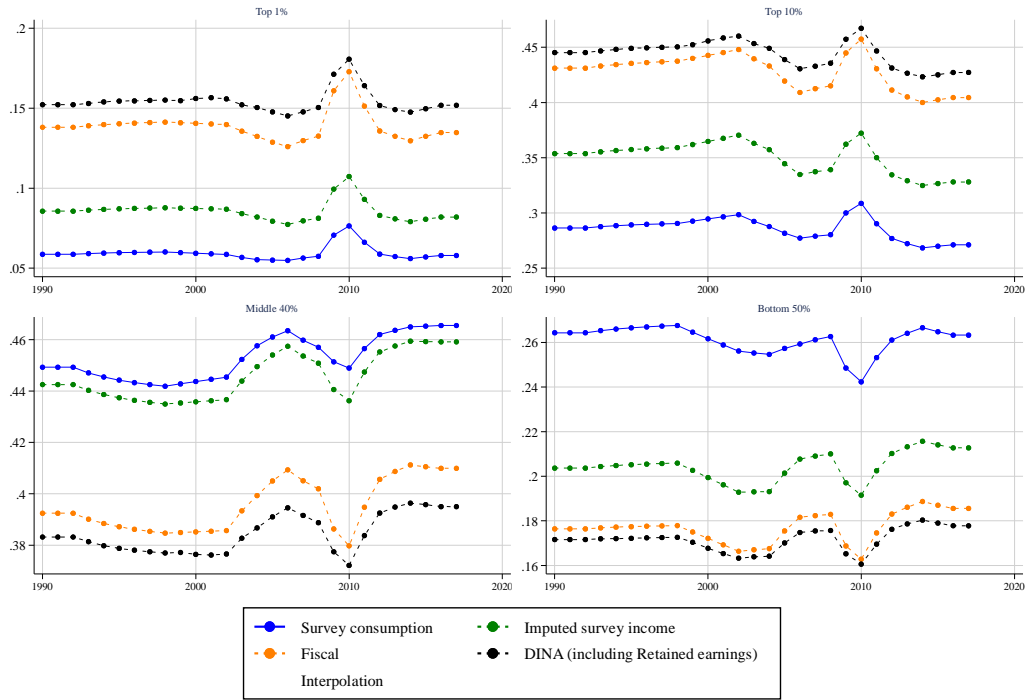
Income share(%) in Philippines



Income share(%) in Timor-Leste

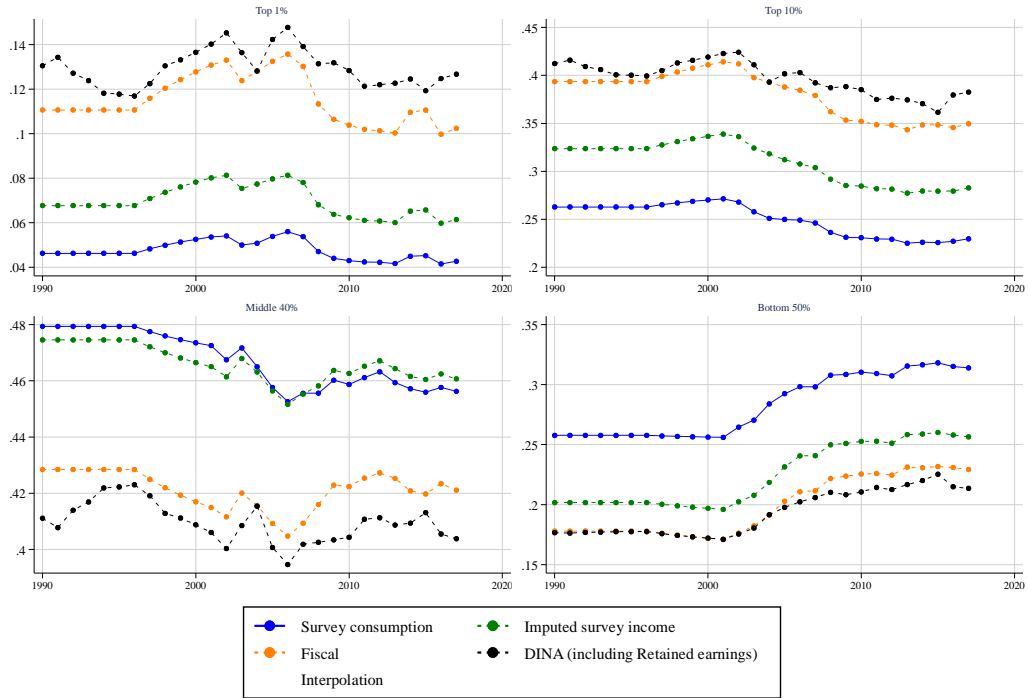


Income share(%) in Vietnam

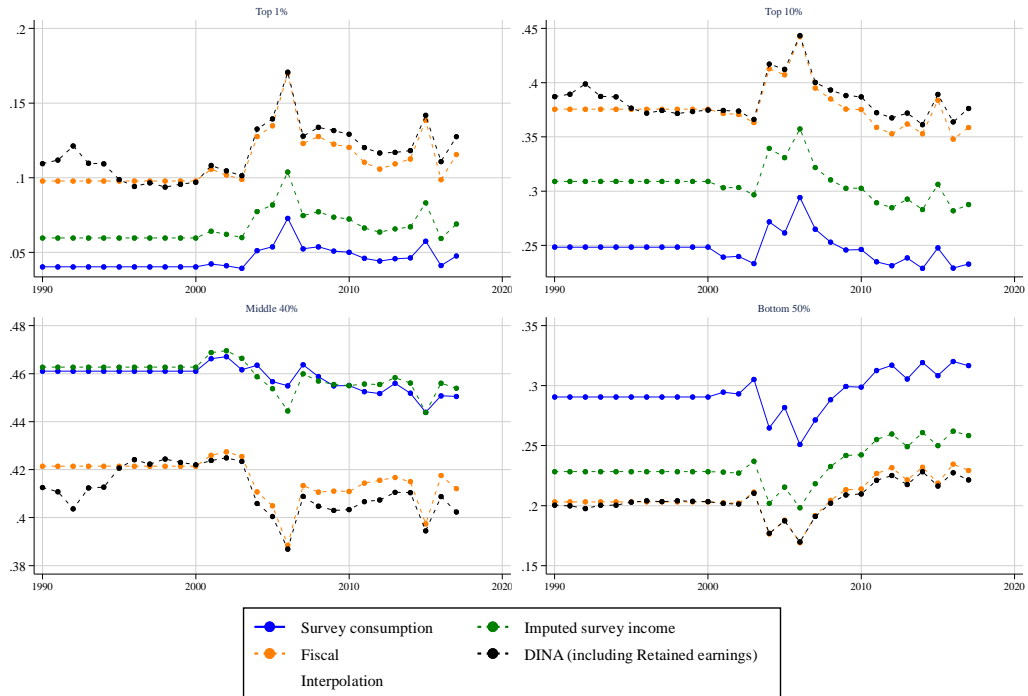


Graph 2

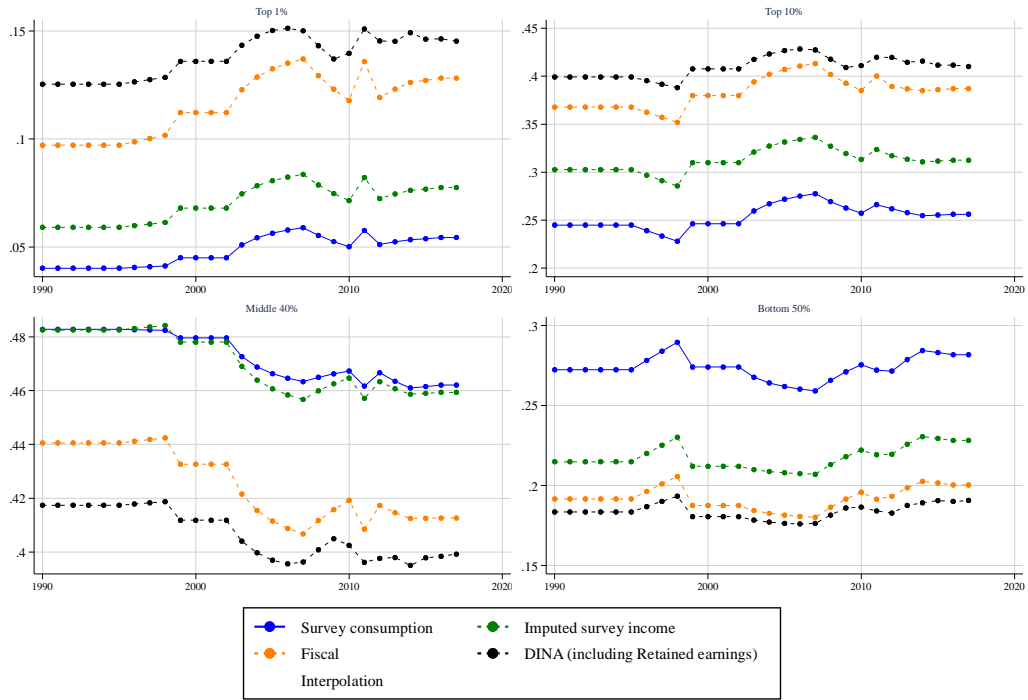
Income share(%) in Kazakhstan



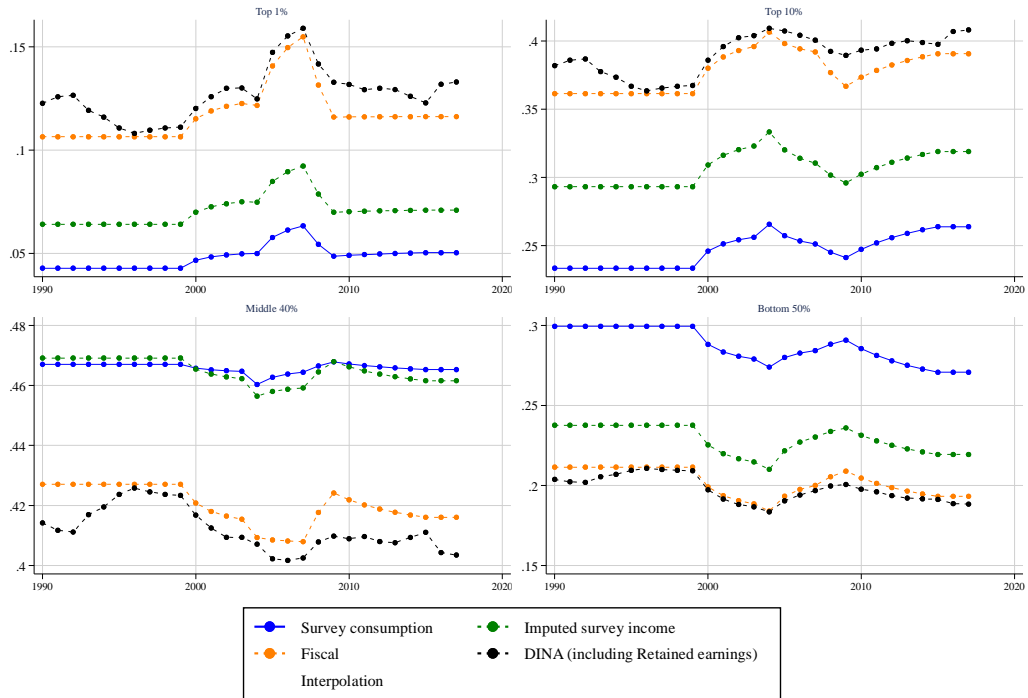
Income share(%) in Kyrgyz Republic



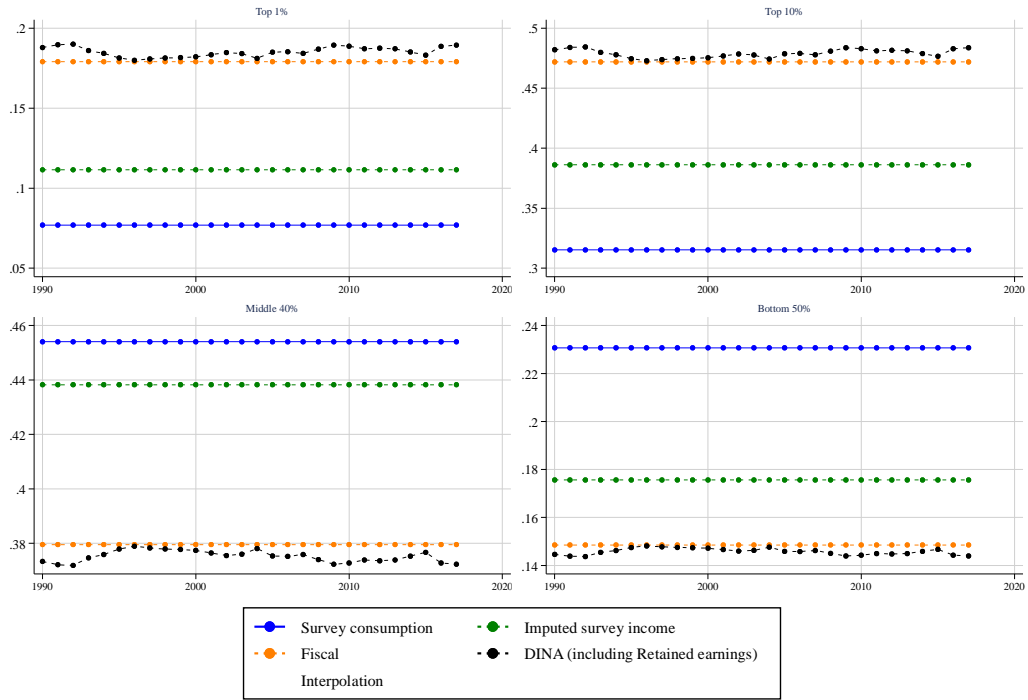
Income share(%) in Mongolia



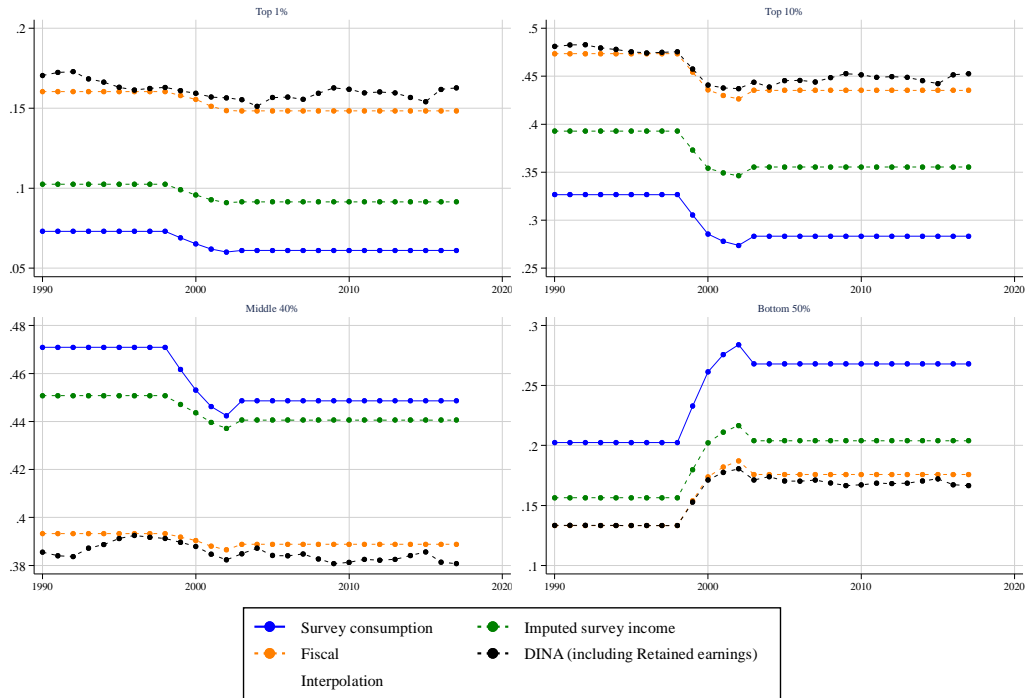
Income share(%) in Tajikistan



Income share(%) in Turkmenistan

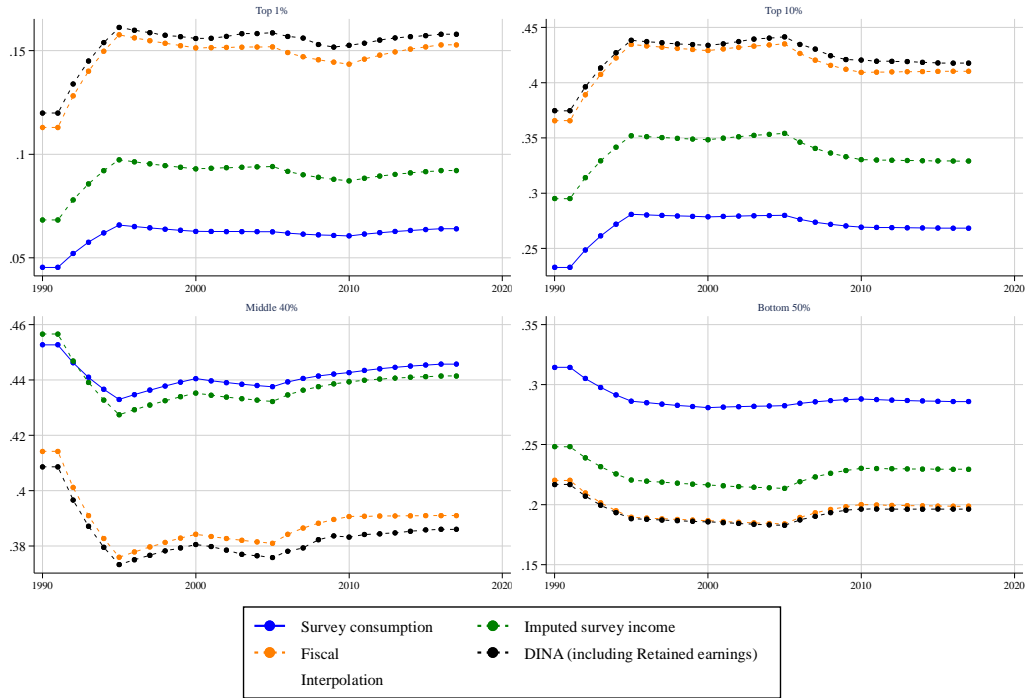


Income share(%) in Uzbekistan

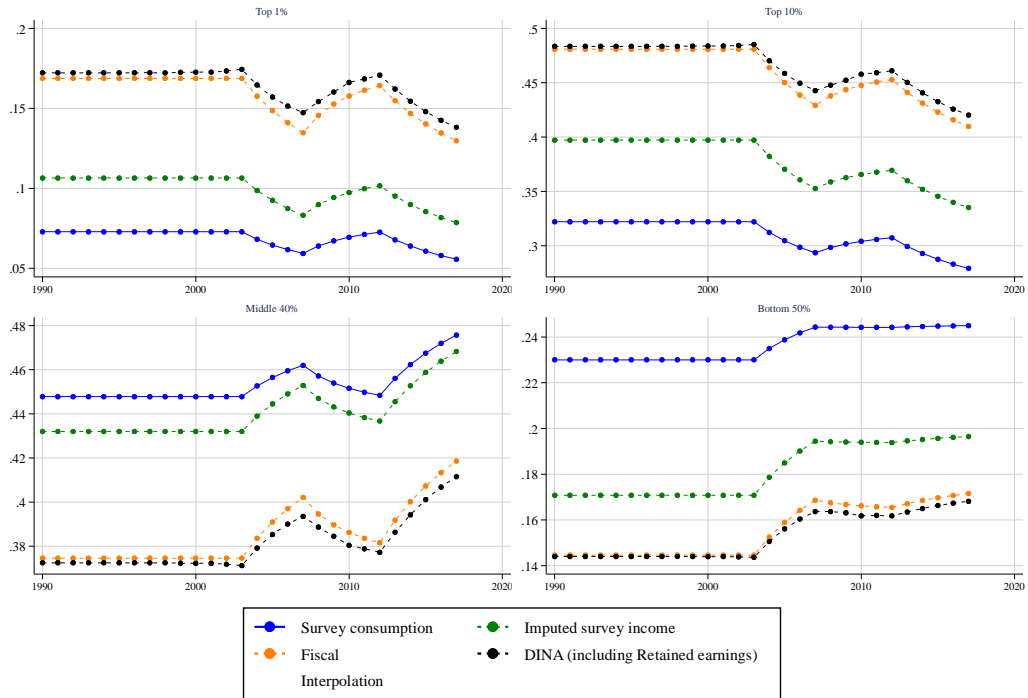


Graph 3

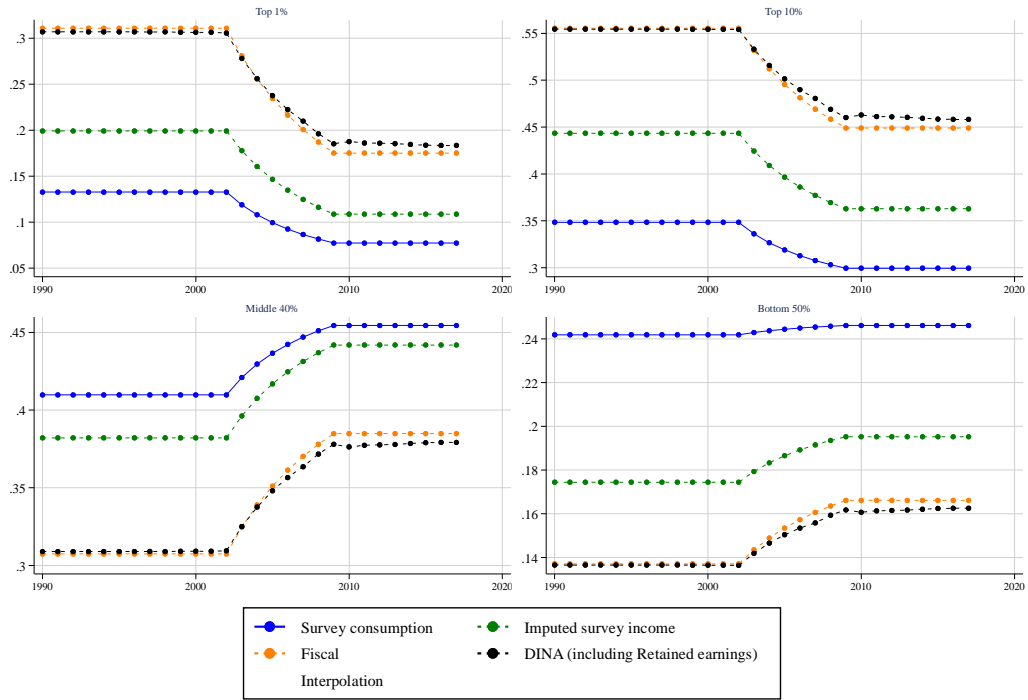
Income share(%) in Bangladesh



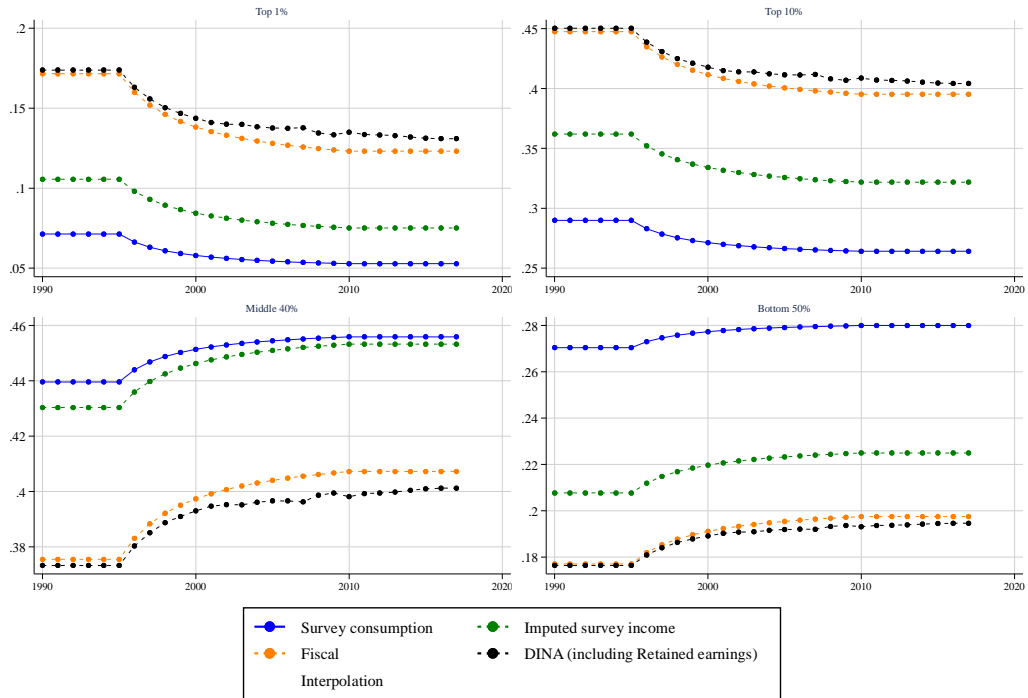
Income share(%) in Bhutan



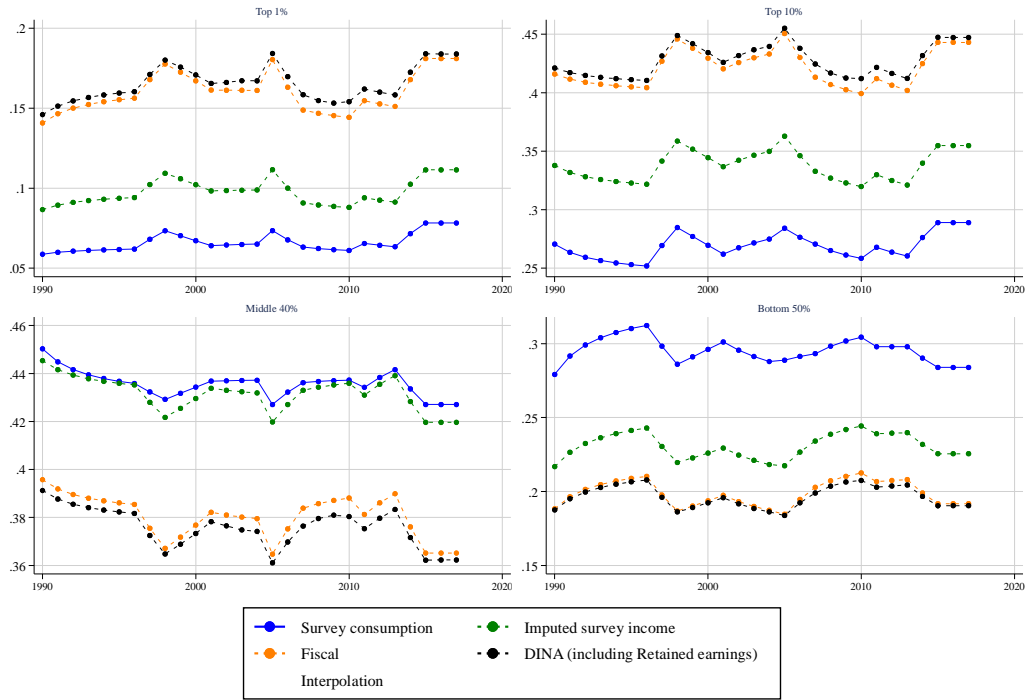
Income share(%) in Maldives



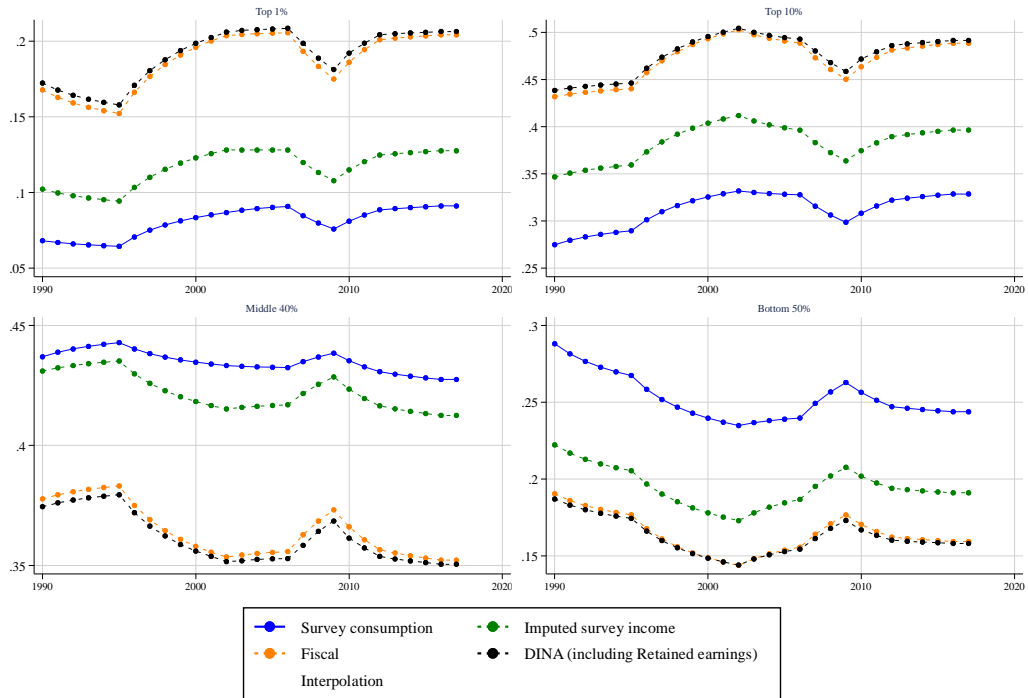
Income share(%) in Nepal



Income share(%) in Pakistan

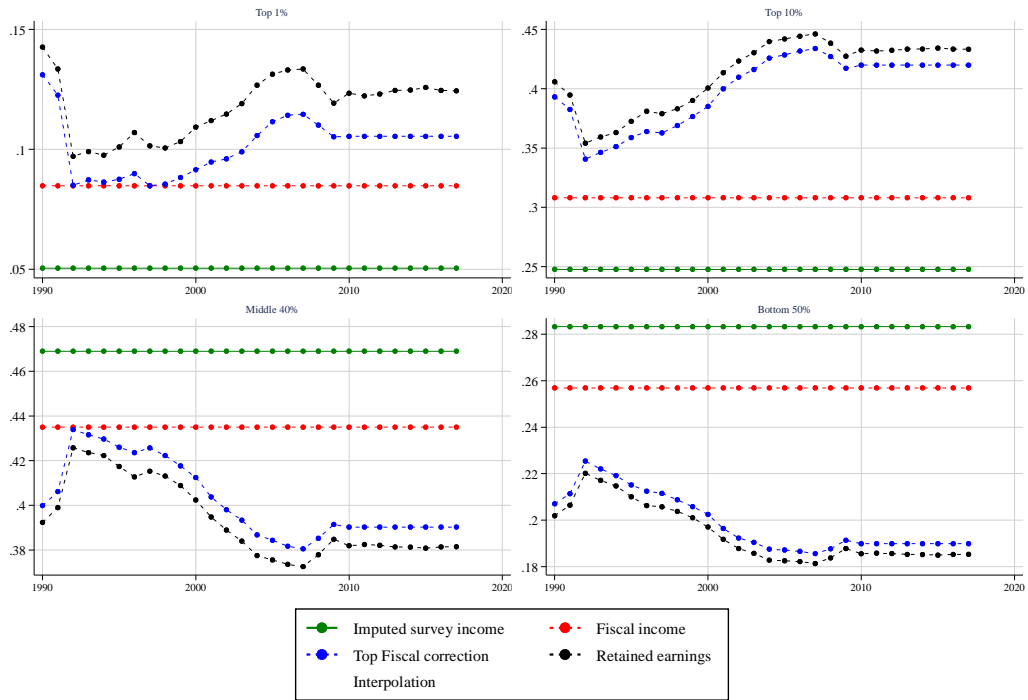


Income share(%) in Sri Lanka

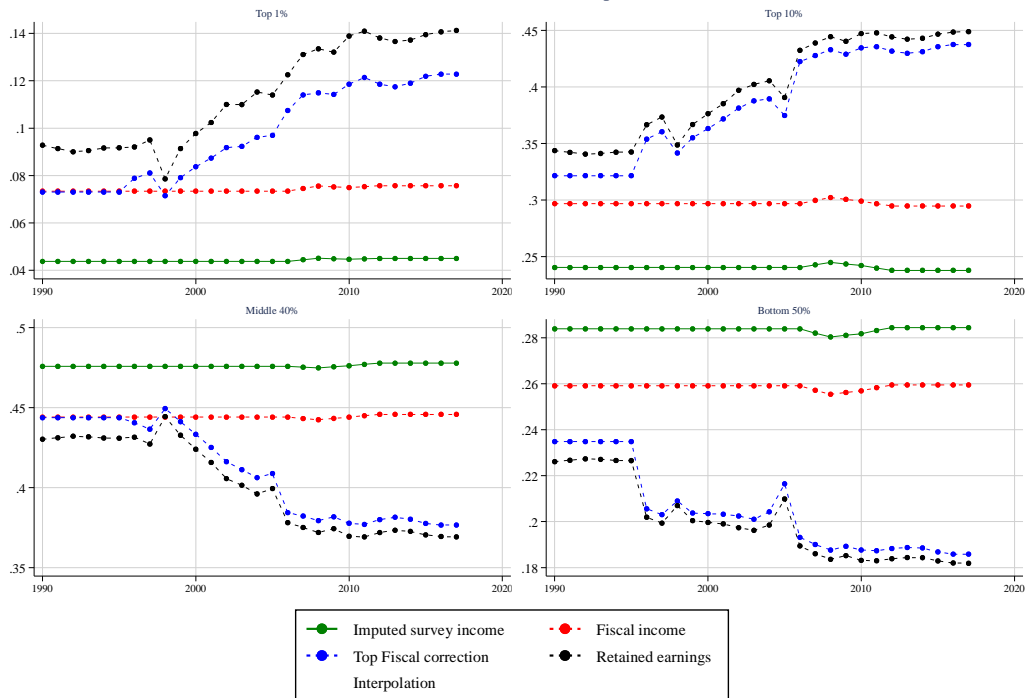


Graph 4

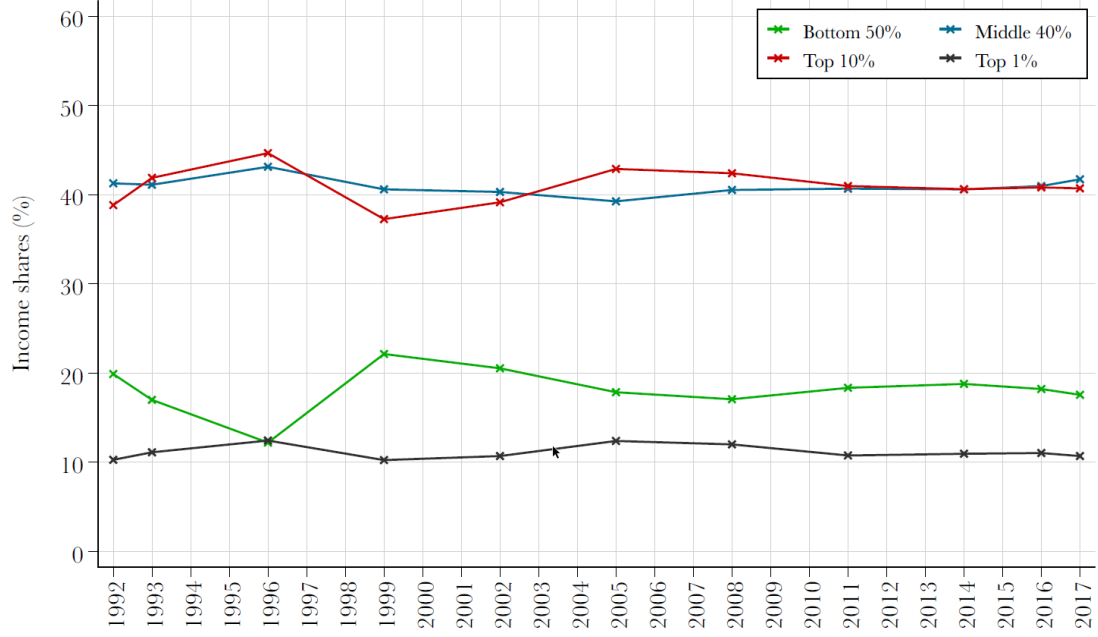
Income share(%) in Japan



Income share(%) in Korea, Republic of



Graph 5



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