

Appendix to "From Soviets to Oligarchs: Inequality and Property in Russia, 1905-2016"

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Appendix to "From Soviets to Oligarchs: Inequality and Property in Russia, 1905-2016"

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Keywords : Income Inequality; top incomes; distribution; Russia; wealth inequality; private property



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From Soviets to Oligarchs:

Inequality and Property in Russia 1905-2016

Appendix *

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This appendix supplements our paper and describes the full set of data files and computer codes (NPZ2017.zip) that were used to construct the series.

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Appendix A. National income and wealth accounts series

Appendix B. Income and wealth distribution series

The zip file NPZ2017.zip includes the following files (in addition to the pdf files of the main paper and present appendix):

NPZ2017MainFiguresTables.xlsx : figures and tables presented in the main paper

NPZ2017NationalAccountsData.zip : all national accounts files

NPZ2017DistributionSeries.zip : all distribution series files

Appendix A. National income and wealth accounts series

Our detailed national income and national wealth series are presented in the file **NPZ2017AppendixA.xlsx**. This file includes a large number of tables presenting different breakdowns and decomposition of national income and national wealth by income and asset categories, following SNA 2008 concepts and the distributional national accounts guidelines of Alvaredo et al (2016). A general discussion about data sources, methodological and conceptual issues regarding national accounts is provided in the paper. The file includes more detailed explanations on how our series were constructed.

We also provide access to a directory including the raw material from official and non-official series that were used to construct these series (**NPZ2017NationalAccountsData)**.

The zip file **NPZ2017NationalAccountsData.zip** contains both the .xlsx file with the detailed series and the raw material directory and is included in the zip file **NPZ2017.zip**.

All details about our computations and the way we used the various pieces of raw statistical data are given in the data files. Here we simply outline the main steps, references and assumptions behind the data construction. To be completed.

Appendix A.1. National balance sheets

Appendix A.1.1. Housing

The methodology that we use to estimate the market value of housing (residential structures and the underlying land) in Russia consists in combining the official statistics of the housing stock area with the house market prices (the comparison method). We proceed in two steps. In the first step, we multiply the housing area by the relevant house prices. In the second step, we apply correction factors to account for potential composition biases in the house prices.[1] Finally, for the early 1990s, we have assumed that the house prices evolved in relation to the general price inflation. The estimation is performed at the level of eight federal districts,[2] distinguishing in each between public and private dwelling stock, and further between urban and rural dwelling stock.

The corresponding annual data on the dwelling area (in square meters) in federal districts are found in the official publications of the Statistical Office of Russia (Rosstat) (e.g. *Zhilishchnoye khozyaystvo,* Statistical Yearbook of Russia, etc.; for 1990 from World Bank 1995, Tab. 3.8). Rosstat has also been publishing average selling prices of new and existing dwellings (per square meter) on the quarterly and annual basis. Realized market prices have been collected in administrative centers and larger cities.

In step 1 we multiply prices of the existing dwellings by the housing stock area – in each federal district for private and public housing, distinguishing further between urban and rural housing. However, several adjustments were required. In order to account for the potential composition bias, we have applied 0.85 of reported housing

[1] Namely, that the dwellings which have been sold might not be representative of the total housing stock, for example if the market transactions are more prevalent on particular locations (e.g. city centers) or for dwellings of the certain quality standard.

[2] The Russian Federation is administratively divided into eight federal district: Central Federal District, Northwestern Federal District, Southern Federal District, North Causcas Federal District, Volga Federal District, Ural Federal District, Siberian Federal District, Far Eastern Federal District

prices to the private urban dwelling area and 0.65 to the public urban dwelling area.[3] Next, the rural house prices are taken as 0.4 of reported housing prices in particular districts. Obviously, a move from the realized market transactions of dwellings to the total housing value has been the most difficult step in our estimation procedure, potentially accompanied with many uncertainties (Palacin and Shelbourn 2005).

Fortunately, we can compare our results to several alternative estimates. Most importantly, Rosstat (2014a, Table 12) has published the market value of the private housing in Russia in the 2002-2012 period – as a part of the methodological paper for the calculation of imputed owner-occupier rents. Rosstat uses a conceptually equivalent methodology,[4] but it is nonetheless remarkable that the two estimates are so close to each other, suggesting that we have managed in large part to minimize composition bias by controlling for the regional price variation and the urban-rural price differential. The current revision of the series, where we match regional house prices of dwellings of different quality[5] to the corresponding census figures, will hopefully further improve the accuracy of our estimates. But, above all, we hope that in the near future Rosstat will start publishing official housing series as a part of national balance sheets, including both private and public housing. Another available estimate is Yemtsov (2010) for the private housing in Russia in 2003. Yemtsov estimates housing value by capitalizing market rent. The figure he obtains - 175% of the national income in 2003 - is again very close to our estimate (185% of the national income). Overall, our housing series display plausible orders of magnitude that are in line with the available alternative estimates. All series are presented in **NPZ2017AppendixA.xlsx**.

Finally, nationally representative house prices are available since 1996. This is clearly related to the fact that only by the mid-1990s the privatization of the housing

[3] We have thus assumed that the urban public housing has been located on less favorable locations, or has been of inferior quality than the urban private housing stock.

[4] Rosstat (2014a, p. 21) explains the methodology as follows: “The calculation of the market value of residential buildings was carried out by multiplying the corresponding area of residential buildings, distributed according to two criteria - according to the material of the walls and the year of construction - by the respective prices, separately for apartment houses and individual houses. The calculation was carried out separately for urban and rural settlements.” (authors’ translation from Russian)

[5] Distinguishing between low-quality dwellings, medium-quality dwellings, high-quality dwellings, and luxury dwellings.

stock provided a sufficiently large reservoir of housing units on the market. Private ownership was quite limited in urban areas during the Soviet era. Still in 1990, almost 80 per cent of the urban housing stock was in the state ownership (see Statistical Yearbook of Russia). Accordingly, sporadic evidence of house prices in larger cities in the early 1990s (e.g., Kosareva et al. 2000, p. 166;[6] Daniell and Stryuk 1997) are not representative of the country as a whole. These indicate very high prices, which should be related to the very low supply and to a large extent comprised real estate transactions for the commercial use (World Bank 1995, p. 28).

Our strategy has been instead to assume that between 1990 and 1995 house prices evolved in relation the general price inflation. In a paucity of (often contradictory) price information, we believe that the most robust evidence of the house price evolution in the first transition years in Russia, and Eastern Europe in general, has been that house prices outpaced to a certain degree the general price inflation (Stryuk 1996; Kosareva et al. 2000, Tab. 3.12; Palacin and Shelburn 2005). In the immediate post-socialist hyperinflationary environment, the housing preserved its real value (World Bank 1995, p. 30; Kosareva et al. 2000). Indeed, indirect evidence suggests that the proportionally higher rise of house prices relative to consumer prices stimulated housing purchases and investments, which served as a hedge against the rampant inflation that virtually wiped out all financial saving. This could have additionally motivated many Russians with tenancy rights to privatize flats (ibid.).

We have assumed that house prices outpaced consumer prices by 2%, and applied it backwards to 1990. The resulting housing value increases from 110% of the national income in 1990 to 240% of the national income in 1996. The estimate for 1990 can be compared with the official Soviet housing estimate based on replacement costs.[7] Official estimates are of magnitude between 80-90% of the national income in the 1980s, thus not far removed from our benchmark (moreover, there is an indication of the bias in the direction of underestimation, as the Soviet methodology for housing remains to a large extent elusive regarding the housing coverage and details of

[6] Based on the data of the Russian realtors guild.

[7] Dwellings (excluding underlying land) were a part of the so-called non-productive assets in the Soviet wealth accounting (e.g. Nesterov 1972). We assume, following Goldsmith (1965, 1985), that the land underlying dwellings is equivalent to 30% of the value of dwelling structures.

pricing (Moorsteen and Powell 1966; Powell 1979)).[8] But, obviously, there is no compelling reason that two measures should tally in practice, especially in the socialist economy.[9] However, all indicators substantiate the finding of a strong increase in housing value in the early 1990s. This was a universal phenomenon,[10] as Kosareva et al. (2000, p. 166) note, "no matter whether it was a standard residential property or a higher-quality property with an improved plan, custom design, and better location". The emergence of real estate market implied that market forces acted on widespread distortions in prices and urban patterns (Bertaud and Renaud 1997; World Bank 2001)[11]. The location especially came to play the main role with the marketization of residential land. Broadly speaking, the development of housing in Russia and Eastern Europe could be seen as a part of the global trend documented for developed countries (Knoll et al. 2014; Piketty and Zucman 2014).

Appendix A.1.2. Agricultural land

The agricultural land market is still very underdeveloped in Russia. More than twenty years after the abandonment of the Soviet state-run agriculture and the turn to the private market-based agriculture, the huge potential of the Russian agriculture has been largely unexploited. As a result, the data on agricultural land market transactions is scarce, making, in turn, the market value estimation of the agricultural land a particularly challenging task.

In the absence of official estimates of the land value in Russia, we pursue the comparison method as applied above for the housing, which consists in multiplying the land area by the relevant current market prices. However, in contrast to the

[8] The capitalization of rent is not meaningful since the 'social' rent was heavily subsidized (it made less than 5% of household income; it remained fixed since 1929) (Morton 1980). See Alexeev (1991) for the attempt to estimate market house rents in the Soviet Union.

[9] Theoretically, in market equilibrium replacement costs should equal market house value (DiPasquale and Wheaton 1992; Jaffee and Kaganova 1996)

[10] The replacement values of housing saw equally sharp rise with the virtual explosion of construction material prices, much higher in magnitude than had been the rise of consumer prices (World Bank 1995, p. xix).

[11] A peculiarity exhibited by socialist cities is lower densities in city center than on the urban periphery (Bertaud and Renaud 1997).

housing exercise, where we had at our disposal unusually detailed and reliable house prices, the market prices of the agricultural land are practically non-existent.

Due to the specific character of the agricultural land privatization in Russia, and the subsequent developments (see below), land leasing has been the predominant form of market transactions involving land, while the land sales account for a very small share of the market activity in Russia. Namely, privatization of agricultural land in Russia proceeded by transferring in the early 1990s the state-owned agricultural land into the joint ownership of farmers on former collective and state farms (*kolkhozes* and *sovkhozes*)[12] (the so-called Nizhny Novgorod model; Wegren 1998). Farmers were granted land shares, representing paper claims on a piece of land in the joint shared ownership (without actually allotting specific physical plots, but with the right to eventually convert a share into the physical plot in the individual ownership) (Lerman and Shagaida 2007, p. 21). Most farmers-shareowners have chosen to leave the land in the joint shared ownership and to lease out their shares, largely to corporate farms (former collective and state farms that have been incorporated in the meantime). The large agricultural enterprises farm today most of the agricultural land in Russia (Lerman and Sedik 2013, Tab 22.5).[13]

As a result of the privatization, the ownership of the agricultural land has markedly changed since the Soviet era, when the land was entirely in the state ownership. Today almost two-thirds of the agricultural land is in the private ownership and one-third in the state ownership. Close to 90 percent of the privately owned agricultural land (more than 50 of the total agricultural land) is owned through land shares, and the remaining modest share in the form of demarcated land plots (Lerman and Shagaida 2007, p. 16). A conversion of land shares into the physical plots in the individual ownership is rather cumbersome and expensive procedure, hampered by numerous administration constraints.

[12] The restitution to previous owners, as practised in many other ex-communist countries in Eastern Europe, was not considered due to the longer time passed since the forced collectivizations and land expropriations in Russia.

[13] According to the 2006 agricultural census, the large enterprises in Russia cultivate on average 11,846 ha. For comparison, the average size of the very large farms in the US is around 863 ha (Lerman and Sedik 2013, Tab. 22.8)

Accordingly, one needs to take into account both land leasing and land sales transactions to assess the value of the agricultural land. The official statistics is quite detailed concerning leasing and sale of the state-owned land. Both transaction volumes and prices are annually published.[14] On the other hand, the information is very limited for market transactions between individuals.[15] We conduct two variants to estimate the value of the agricultural land. First, we use the selling prices of the state land at auctions, in particular for the land sold to peasant farms and agricultural enterprises.[16] The value of agricultural land is obtained by applying prices to the land area. Prices are available at the federal district level.[17] The second variant applies the official cadastral land value (per ha) to land area. Rosstat stipulates the latter approach[18] in the official methodology for the estimation of the market value of the agricultural land (*Metodologicheskiye rekomendatsii po otsenke zemli*).[19] Both variants give similar land values, but we follow the latter as it compatible with the official methodology (and hopefully, soon to be available official land estimates). Furthermore, we believe that the cadastral valuation – however imperfect proxy for the actual market values – is at the moment the preferable appraisal of the agricultural land value at the macroeconomic level in Russia, in the first place due to its exhaustive regional treatment of the huge and highly heterogeneous Russian agricultural land area. For the 1990s we have assumed that the land value moved in line with the price index of agricultural products.

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[14] In the annual publications of Rosreestr (Federal Agency for State Registration, Cadastre and Cartography): *State (National) Report "On situation with and utilization of land in the Russian Federation"*

[15] The number of transactions is published in the official statistics, but, as Lerman and Shagaida (2007, p. 16) point out, this makes a negligible part of the actual activity, since individuals predominantly do not register land transactions. Moreover, buying and selling of land was prohibited until the passing of the Agricultural Land Market Act in 2003. Prices of land transactions between individual are not available. A complete lack of any public information on market land prices has often been indicated as one of the chief obstacles for the development of the functioning land market.

[16] Namely, the Rosresstr statistics do not distinguish separately sales of agricultural land in the total land. Since important part of the land transactions involves the sale for construction use (for individual housing or dacha construction).

[17] Clearly, selling prices of the state agricultural land can be removed from market prices, and due to various (political, social or cultural) reasons poorly reflect an actual supply and demand relationship. In principle, the state land should be sold at the prevailing market price, but this is not possible in practice due to a lack of the established market prices.

[18] Yet, we are not aware of the actual land estimates produced by Rosstat.

[19] Thus, Rosstat notes in *Metodologicheskiye rekomendatsii* that cadastral value should be based on the market values. Rosressrr generally assessed land values by discounting lease payments. It applies 33 years as the payback period (Rosreestr 2015).

The resulting series display very low value of agricultural land in Russia – less the 20% of national income today. These values are consistent with the sporadic evidence on land prices, suggesting an extremely low value of the agricultural land in Russia. The most relevant evidence on land lease prices (which is the predominant form of market land transactions) between individuals is the BASIS survey (Lerman and Shagaida 2007), carried out in three regions representative of the advanced, intermediate and backward agricultural production (respectively, Rostov, Nizhny Novgorod and Ivanovo). According to the survey, a price of the lease per hectare per year ranged between 350-450 rubles in 2003. For example, by applying the same payback period (an inverse of the capitalization rate) of 33 years (as used for the cadastral valuation) in order to move from land lease to market price, we arrive at the market price very close to the one we use.[20]

The principal reason for the low value of agricultural land in Russia is very low or non-existent demand. The transformation of the Russian agriculture proceeded with series of shocks. Artificially large Soviet agriculture suddenly shrank with the removal of subsidies and the rise of input costs after price liberalization (Liefert and Swinnen 2002). It was accompanied by the exodus of the population from the agricultural sector, leaving much land idle, frequently turned to the construction use or into wastelands. Besides, the rural population in Russia is much poorer on average (it was among the lowest income strata during the Soviet Union; McAuley 1979). It is poorly informed, faced by numerous administration barriers, lacking necessary financial means, with no access to bank credit, etc. All this discourages serious engagement in the agricultural activity.

Finally, imperfect property rights are the factor substantially limiting demand for the agricultural land. Privatization has created large strata of holders of land shares that in effect do not have full control over the land. Without doubt, the agricultural land – as no other component of the national wealth – encapsulates a peculiar history of the property relations in Russia. From communal land tenure in the tsarist Russia to the Soviet forced collectivization, Russia pursued different development path than

[20] Obviously, assuming the appropriate capitalization rate is a very delicate issue.

Western Europe. Moreover, to many observers, loose property rights in agriculture in the post-Emancipation period revealed the fundamental gulf between Russia and the West[21] (see Dennison 2011 for the comprehensive overview). The so-called 'peasant myth', as famously outlined by the Russian agricultural economist Chayanov (1966), has endured to this very day, frequently casting doubt upon the adaptability of the Russian village to the market-based agriculture with profit-maximizing agents and clearly defined property rights.[22] On the other hand, Gerschenkron (1962) provides the classic statement of the so-called institutional argument, according to which the Russian fundamental 'otherness' is rather a result of the specific historical institutional development in Russia, which adversely affected labour mobility (e.g. peasant immobility during tsarist period; urban immobility (*propiska*) during the Soviet era, etc.) and in turn the property rights development (Dennison 2011). More generally, it has been perceived as the main cause of the Russia's economic 'backwardness'. Accordingly, the lesson for today is that the improvement in the agricultural institutional and legal framework is a requisite for the successful development of the Russian agriculture.

Appendix A.1.3. Other domestic capital

We define other domestic capital as all non-financial assets excluding the housing and the agricultural land. It comprises the non-financial assets of the corporate sector, the public infrastructure, the capital of small proprietors, etc. As a starting point in our estimation approach, we use the official Rosstat's estimates of the fixed capital stock available for the 2011-2015 period, produced in compliance with the SNA 2008 standard. In particular, Rosstat has published fixed assets classified by categories of dwellings, other (non-residential) buildings, constructions, machinery and equipment, means of transport and other fixed assets. Both gross and net of depreciation values are provided. In order to obtain estimates for years prior to 2011,

[21] For example, contrasting the collectivistic sprit of the Russian (peasant) to the western individualism. This view was propagated by the literary giants, such as Herzen or Tolstoy (Dennison 2011).

[22] Gregory (1994, p. 54) thus notes that the Soviet leadership justified its reluctance to return to the private agriculture in the late1980s by alluding to the presumed failure of the private agriculture in the post-emancipation period of the tsarist Russia or during the New Economic Policy (NEP) period (1921-8). Gregory (1994) shows both of these assertions to be wrong.

we have used the perpetual inventory method (PIM). Specifically, we start with the net stock of fixed assets in 2011 and apply backwards the gross fixed capital formation series in constant 2011 prices adjusted for the consumption of fixed capital.

Gross fixed capital formation series are available from the national accounts for the following four types of fixed assets: i) dwellings; ii) non-residential buildings and structures; iii) machinery and equipment, and means of transport; iv) other fixed assets. We initiate PIM by taking 2011 stocks for asset types from ii until iv.[23] Consumption of fixed capital for each type of fixed asset is estimated by multiplying the inverse of the expected service life by the gross fixed capital stock (assuming thus straight-line depreciation profile). For non-residential buildings and structures, we assume the average expected service life of 55 years, for machinery and equipment 13 years (Erumban and Voskoboynikov 2014). These assumptions are found to be consistent with the official data available for 2011-2015. Finally, thus obtained net fixed capital series in constant prices is converted into current prices using the appropriate price indices specified by Rosstat: 'the producer price index in construction' for non-residential buildings and constructions; 'the acquisition price index for machinery and equipment of investment purpose' for the machinery and equipment. The land underlying non-residential buildings is taken as 20 per cent of the net value of structures. The value of inventories is taken from the enterprise annual survey (*Finansi Rossii*).

Unfortunately, Rosstat does not provide a sectoral ownership composition of the fixed capital. Instead, the sectorization of the other domestic capital between corporate, household and government sectors has been approximated as follows. First, the other domestic capital in the government ownership is taken as reported in the *IMF Government Finance Statistics*.[24] The remaining part is divided between the corporate and the household sector in the way that the other domestic capital of the household sector (largely capital of small businesses) is taken as rising from the mid-1990s until today from 0.1 to 0.15 of the total net other buildings and structures and from 0.1 to 0.2 of the machinery and equipment. The residual value is attributed to

[23] We also estimate dwelling stock in this way in the attempt to distinguish between structures and the underlying land for the housing component (see section A.1.1)

[24] The data has been prepared by the Russian Treasury and it is also available at its website.

the corporate sector. Note that the non-financial capital of corporations is included in the so-called book-value national wealth, while in our benchmark market-value national wealth series corporations are valued instead through their equity. See the next section for more details.

The value of the other domestic capital in 1990, which is our benchmark year for the Soviet period, comes from the 'balance of fixed assets' statistics (one of the four main 'balances' under the Material Product System (MPS); Arvay 1994; Nesterov 1972, 1997). The method was based on annual surveys of enterprises' and government organizations' balance sheets, using as starting points periodic general censuses of the total capital stock undertaken in the socialist countries (in 1960 and 1973 in the Soviet Union) (Goldsmith 1965, 1985; Moorsteen and Powell 1966; Powell 1979; Kaplan 1963).[25] The figure for other domestic capital in 1990 based on this source should be seen as reliable due to the comprehensive coverage of the capital, made possible by the centralized reporting system of the Soviet command economy. And plausibly it should be preferred to the backward application of PIM outlined above, due to the very large uncertainty regarding both price and investment series[26] during the chaotic period in the early 1990s (hyperinflation, mass privatization, large-scale capital retirements, etc.). The series for fixed assets are reported in Statistical Yearbooks (*Narhoz*), in 1973 prices (Soviet estimate prices), which we convert to current prices using the appropriate price indices for construction works and for the machinery and equipment.[27] The constructed series for fixed assets for the 1960-1990 period are included in **NPZ2017AppendixA.xlsx**.

[25] The method is conceptually akin to PIM, using the year of the general inventory as the benchmark year.

[26] It is also not feasible due to a lack of investment series by the fixed asset type for the early 1990s.

[27] For machinery and equipment we use the alternative western price index constructed by Becker (1974), CIA (1979) and Treml (1991), due to the well known hidden inflation in the wholesale machinery prices. The widespread practice in socialist economies was to simulate the "new product" by making minor adjustments to the existing ones rather than to raise administrative prices.

Appendix A.1.4. Financial assets and liabilities

The Bank of Russia has published complete Financial Accounts and Financial Balance Sheets of all institutional sectors for 2011-2015. These are fully in compliance with SNA 2008. In order to reconstruct sectoral financial balance sheets for the period 1990-2010, we rely on various official sources, in the first place on the official monetary statistics of the Bank of Russia. First, we look at the financial assets (exclusive of equity and investment fund assets) and liabilities of the household and the government sector.

Appendix A.1.4.1. Household financial assets and liabilities

Currency and deposits has been traditionally the most important financial asset of the Russian households. In the Soviet Union, it was basically the sole saving alternative available to the population (in addition to limited residential investment). Russian households started the transition with the substantial value of deposits and currency holdings, equivalent to almost 80 per cent of the national income, largely as a result of the (forced) saving amid limited consumption opportunities in the shortage economy of the Soviet Union (the so-called “ruble overhang”). But the rampant inflation of the early 1990s wiped them out overnight. In the course of the following two decades, households have accumulated deposits and currencies equaling to around 40 per cent of the national income. Other types of financial assets, such as holdings of debt securities, have played a very limited role in the portfolio of Russian households.[28]

The data on household deposits before 2011 (inclusive of the Soviet period) is available in the official publications (e.g. Statistical Yearbook of Russia; *Sotsial'noye polozheniye i uroven' zhizni naseleniya Rossii*, etc.). Currency held by households is set to 75 per cent of the cash in circulation (monetary aggregate M0).

[28] Goldsmith (1965, p. 89), for instance, notes that population's holding of government bonds in the Soviet Union could be hardly claimed as private ownership since they are “are frozen, without interest and without definite repayment date”.

On the other hand, the Russian households entered the transition with the negligible debt burden. Goldsmith (1965, p. 89) thus pointed out as "the outstanding feature of…financial relations [in the Soviet Union] the virtual absence of the debt of the household sector". With the high inflation of the early 1990s, this modest debt was eliminated along with private financial assets. Since then, the household debt has risen quite moderately. In particular, the low housing affordability has prevented any substantial rise in mortgages (the housing was generally acquired through free privatization). The housing loans account thus for less than a third of the total loans of Russian households. The data on household debt are found in the official monetary statistics.

Appendix A.1.4.2. Government financial assets and liabilities

Financial balance sheets of the government sector are reconstructed using various official sources. First, the general government deposits in the central bank and credit institutions are documented in the financial survey of the Bank of Russia. For 1990, we take government deposits in Gosbank (*Narhoz* 1990). This category has comprised to a large extent assets of the Stabilization fund until 2008, and after its split the National Welfare Fund and the Reserve Fund. Other government assets are taken from the *IMF Government Finance Statistics*.

Detailed data is available for the domestic and external government debt. Domestic debt in the form of credit lines or debt securities (Government Short-Term Bonds (GKO) and Federal Loan Bonds (OFZ)) is found in monetary statistics. In 1990, domestic government debt referred to the debt to Gosbank (*Narhoz* 1990) (moreover, the credit to the government made the largest asset item of the Gosbank's balance sheet). External debt before 1992 is taken from Fischer (1992).

Appendix A.1.4.3. Equity assets

The data on the capitalization of the equity market in Russia is used as the

benchmark to estimate the total equity assets of Russian institutional sectors before 2011. The market capitalization of the Russian equity market in recent years makes on average 70 per cent of equity assets held by household, government and foreign institutional sectors as reported in the Financial Accounts. By extension, the remainder pertains to unquoted shares and equity of limited liability companies and partnerships, which the Bank of Russia values by the book value of equity liabilities. Our approach has been to assume that households, the general government and the rest of the world directly own the total value of listed corporations represented by the stock market capitalization (we disregard thus cross-ownership between corporations). The information on the capitalization of the Russian equity market is available from *Naufor Factbook* or *the World Bank Development Indicators*. We add to this the value for non-listed entities approximated as 30 per cent of the national income throughout years.

This figure is divided between the household, the government and the rest of the world sector as follows. The equity of the rest of the world in Russian corporations is taken from the international investment position. It is consistent with the amounts reported in the Financial Accounts for the recent years. For private and government equity holdings we keep the proportions documented in the Financial Accounts for the recent years.

Appendix A.1.4.4. Foreign Assets and Foreign Liabilities

the International Investment Position of the Bank of Russia

For other countries in Eastern Europe, the data is taken from the official International Investment Position in the balance of payment statistics compiled by country's central banks and supplemented with the data from the External Wealth of Nations by Lane and Milesi-Ferretti .

Appendix A.2. National Income

Appendix A.2.1. National Income Series for Russia, 1991-2016

For the post-1990 period, we use the official Rosstat's national accounts series. The official income accounts data are fully in line with the SNA 2008 standard from 2011 onwards. For years before 2011, we make two major adjustments: first, we add imputed rents of owner-occupied housing; and second, we provide the modified series for the consumption of fixed capital based on the market value of fixed capital.

The imputed rents of homeowners are not accounted for in the official statistics before 2011. For the 2002-2010 period, we take the available Rosstat's estimates (2014a, T. 12) without any modification. For the 1995-2002 period, we estimate imputed rents of owner-occupiers based on our series of market value of private housing (see section A.1.1.), by applying the following simple formula used by Rosstat (2014a):

$$U_t = [(1 + s_t)*r_t^* + d_t]W_t$$

where:

U_t – gross operating surplus of owner-occupied housing service

W_t – mid-year market value of private housing

d_t – coefficient of fixed capital consumption

r_t^* – annual real rate of return[29]

$(1 + s_t)$ – inflation rate

The resulting series are between 4-7 per cent of GDP. We have assumed that actual house rents make 10 per cent of the total amount, while the remainder relates to imputed rents of owner-occupiers. We add only imputed rents and assume that actual rents are included in the official data. The relatively small proportion of actual rents is due to the high rate of homeownership in Russia and, as a result, quite limited rental market. Note that very high homeownership rates are characteristic for

[29] The real rate of return on residential dwellings, r_t^*, is kept fixed at 2.5%, as used by Rosstat (2014a).

former communist countries in Eastern Europe.[30] In order to limit the volatility during the hyperinflationary period of the early 1990s, we take imputed rents of owner-occupied housing to be equal to 3% of GDP. The inclusion of imputed rents leads to an increase in items of income accounts of the household sector (e.g. GVA, operating surplus, primary and disposable income), but household savings are not affected since owner-occupied housing service is fully consumed by the households (final consumption is equal to the output for own final use).[31]

The series for the consumption of fixed capital are adjusted using our depreciation series estimated by the perpetual inventory method (PIM). See section A.1.3. for details. For 1991-1995, we set the consumption of fixed capital as 15% of GDP.

Accounts for institutional sectors are available since 1995.

A.2.2. Historical National Income Series

For the 1960-1990 period, we use Ponomarenko's (2002) retrospective national accounts series. The methodology he uses consists in adjusting the official Goskomstat's series based on MPS to the relevant SNA definitions. To bridge the gap in the coverage between the two accounting standards, it includes the value added of non-material services (the production of the so-called non-productive sphere) not accounted for in the MPS, such as finance, education, health, transport etc. Further adjustments are made for widely known shortcomings of the official Soviet statistics, in the first place the military spending, for which he uses alternative western estimates (e.g. CIA estimates).

Obviously, the coverage is not the main stumbling block to the comparability between the two systems. GDP is essentially a measure of market economy, and there is no workable solution to arrive at meaningful market values in the socialist accounting (see below). Ponomarenko provides instead series based on official Soviet

[30] For example, the Czech Republic has somewhat larger rental market and, therefore, higher proportion of actual rents.
[31] Actually, savings are usually negative due to the intemediate consumption in the form of dwelling maintenance or house insurance. However, we disregard this item.

established prices. He also makes various calculations in basic prices to account for "social" distortions.[32] As for the consumption of fixed capital, Ponomarenko uses the official depreciation series.[33] These were aggregated from the regular reports of enterprises and government organizations. The latter were required to calculate depreciation allowances according to the officially prescribed parameters that were applied to book values of the capital (a mix of prices from the last general revaluation and of subsequent acquisition prices), which were, however, quite close to current replacement values due to general price stability in socialist countries.[34] The series are of magnitude around 15% of GDP.

For the earlier Soviet period, we use series based on adjusted factor cost (AFC) valuation[35] (Bergson 1961; Morsteen and Powell; CIA 1990). Although having said that no method can account for the fundamental difference between the systems (which AFC aspires), there is no major structural break in the series as AFC estimates are generally were quite close to the official series (Marer 1985, p. 15) (since they were based on the latter). Finally, for the pre-revolutionary Russia we use estimates of Gregory (1982) covering 1885-1913 period, as well as the NEP period.

A.2.3. Real National Income

Real growth rates for the post-1990 period are based on the official Rosstat's estimates. However, there is a great uncertainty regarding the size of the output collapse in the early 1990s (e.g., see Schleifer and Treisman 2005). We make upward correction of growth in the 1990-5 period by revising the GDP deflator, as using the official Rosstat growth rates would imply implausibly high living standards in Russia during the Soviet period (as a proportion of the Western European living standards). The growth rates for the 1960-1990 period are from Ponomarenko (2002). Before 1960, we use the growth rates for the Soviet Union and the Russian Empire from the Maddison Project (2013) dataset.

[32] E.g., large subsidies on housing or on basic necessities; high turnover taxes on manufactured consumer goods or alcohol.
[33] Capital repairs need to be excluded from the official depreciation series and included in intermediate costs.
[34] Moreover, a larger increase in prices was often followed by the general capital census.
[35] AFC was developed by Bergson

The resulting long-term development series[36] Russia's per adult national income was stagnating at about 35-40% of Western European levels between 1870 and World War 1. Tsarist Russia was a poor and illiterate country. The ratio between Russia and Western Europe rose spectacularly to as much as 65% in the aftermath of World War 2. This reflects the modernization strategy followed by the Soviet state after the Bolshevik revolution—based on rapid industrialization and mass investment in basic education—as well as the mediocre growth performance of Western countries during the 1914-1945 period. Russia's relative position then reached a plateau and stagnated at about 55-65% of Western European levels between 1950 and 1990. One can even detect a relative decline starting in the late 1970s and during the 1980s, from more than 65% to less than 60% (despite the growth slowdown in the West during this period).

[36] We use purchasing power parities (PPPs) from the latest International Comparison Program (ICP) 2011 round to obtain values in PPPs for the base year (see Blanchet and Chancel 2016 for the general WID methodology).

Appendix B. Income and wealth distribution series

Our detailed income and wealth distribution series are given in the zipped directory **NPZ2017DistributionSeries.zip**. This directory includes our final benchmark distribution series NPZ2017FinalDistributionSeries.zip, as well as alternative series and the complete computer codes and all detailed computations and raw material (household survey tabulations, income tax data, billionaire data) that we used to construct these series. For more details on the organization of these files, see ReadMeNPZ2017DistributionSeries.doc. The main robustness checks and variant series are presented in **NPZ2017AppendixB.xlsx** and are summarized on Figures B1-B57, which we briefly describe below.

Appendix B.1. Income distribution series

The general methodology that we use in order to construct our income distribution series is summarized in the main paper (section 2.2.1). It basically consists of three steps: in step 1 we use raw household income survey tabulations and generalized Pareto interpolation techniques (Blanchet, Fournier and Piketty, 2017) in order estimate raw series on the distribution of raw survey income and raw fiscal income by g-percentile (before any correction); in step 2 we use high-income-taxpayers income tax data in order to correct upwards these estimates and obtain corrected estimates of the distribution of fiscal income by g-percentile; in step 3 we use national accounts and wealth data in order to include tax-exempt capital income data (such as undistributed profits, imputed rent and other "non-fiscal income") and to obtain corrected estimates of the distribution of pre-tax national income by g-percentile. All details are provided in the data files and computer codes. Here we discuss a number of additional issues about variant series and robustness checks.

This methodology in three steps mirrors that used in the case of China by Piketty-Yang-Zucman (2017), with a number of important differences. As explained in the main paper (section 2.2), the main difference is that we need to make assumptions about the profiles of "deduction rates" (i.e. the average bracket-level ratio of deductions to gross revenue) on the one hand, and "declaration rates" (i.e. the average bracket-level fraction of taxpayers submitting a declaration). The raw

tabulations by income bracket released by Russia's tax authorities for income years 2008-2015 are reported on Table B11 (see also Table B10 for aggregate statistics on Russia personal income tax). As one can see, there are typically about 5 million declarations each year (about 5% of adult population), including 0.5 million declarations over 1 million rubles in assessable income (gross revenue).

In our benchmark estimates, we assume a flat profile of deduction rate (same deduction rate for all brackets), and a rising profile of declaration rate (up to 100% for very high income taxpayers). This profile was chosen so as to deliver plausible levels of log-linearly-estimated Pareto coefficients (i.e. coefficients defined by $a_i=\log[(1-p_i)/(1-p_{i+1})]/\log[thr_i+1/thr_i]$). In effect, the raw data includes too many large declarations in the raw data as compared to the number of lower declarations, so that one needs to assume a fairly steep profile for the declaration rate in order to obtain plausible coefficients (i.e. a_i= not too close to 1, and $b_i=a_i/(a_i-1)$ not too large: plausible inverted Pareto coefficient b_i are usually not higher than 3-4 at the very most, including in highly unequal countries).

We also provide variant series based upon alternative assumptions for the profile of declaration rates and deduction rates. The different profiles are reported in file NPZ2017AppendixB.xlsx, Table B13. All detailed results are presented in the subdirectory Gpinter and can be reproduced by using the WID.world/gpinter interface based upon generalized Pareto interpolation techniques (Blanchet, Fournier and Piketty, 2017). The Stata format do-file generating the fiscal correction is do_gpinter_RussiaRLMS. It is based upon piecewise-linear correction factors f(p) above p_0=0.9 up to the percentiles p_1, p_2 and p_3 corresponding to the assessable income thresholds 10 million, 100 million and 500 million rubles.

Generally speaking, our estimates show the impact of the wealth correction is much more limited than the fiscal correction (see Figures B20-B24). As a consequence, using alternative wealth inequality series (see below) to impute tax-exempt capital income has limited consequences on final income series (see Figures B30-B31). What is more relevant is the choice of the variant for using income tax declarations (see Figures B40-B42) (variants 2.2-2.5 correspond to different profiles for the

declaration rate, and variants 3.1-3.4 to different profiles for the deduction rate; the benchmark series correspond to variant 2.1).

Note however that the upward correction on raw survey inequality estimates is very large in all cases. The reason can be easily seen from the raw income tax tabulations, which indicate very high top income levels. Incomes reported on declarations represent about 28-32% of total assessable income and 8-12% of total taxable income (see Table B10). Given that most of the income comes from large declarations (from the tabulations one can infer that at least three quarters come the declarations over 1 million rubles), and that many middle-large declarations are missing (otherwise log-linear Pareto coefficients are simply too close to 1), it is not too surprising that tax data leads to a very substantial upgrade of top 1% income shares.

For years 2008-2015 we use our benchmark corrections, and we report on Figure B42 the corresponding inverted Pareto coefficients b(p) estimated at quantile p=0.9 for the different variants. In effect b(0.9) declines from 3.4-3.5 to 2.8 over the period 2008-2015 with variant 2.1 and takes intermediate values between variants 2.2-2.3 3.1-3.2 (less inequality) and 2.4-2.5 3.3-3.4 (more inequality). We report on Figure B43 our benchmark inverted Pareto coefficients that we use for the 1980-2007 period. All variants, computer codes and robustness checks are presented in the subdirector Gpinter in zipped directory NPZ2017DistributionSeries.zip.

Appendix B.2. Wealth distribution series

As explained in the main paper (section 2.2), the data sources at our disposal in order to estimate wealth inequality in Russia are very limited. Unlike in other countries, where we can use a combination of sources and methods, all we have in Russia at this stage is billionaire data. Therefore we proceed as follows.

First, we compute average standardized distributions of wealth for the US, France and China from WID.world series (that is, we divide all thresholds and bracket averages for all 127 generalized percentiles by average wealth, and we compute the arithmetic average for the three countries). We note that variations across countries

and over time in these standardized wealth distributions mostly happen above p_0=0.99. I.e. below p_0=0.99 the ratios of the different percentile thresholds to average wealth are relatively stable over time and across countries, at least as a first approximation (most of the variation seems to take place within the top 1%). Therefore we choose to use the same normalized distribution for Russia below p_0=0.99 as the average US-France-China normalized distribution.

The difficult question is to know how to link the distribution from p_0=0.99 to billionaire level, and also to make an assumption about the average number n of adults per billionaire family (sometime Forbes includes very large family groups in the same billionaire family, sometime it is just one individual or one married couple). We first re-estimate 127 generalized percentile within the top 1% of the normalized distribution in order to reach billionaire level. In our benchmark series we assume n=5 and a linear correction factor f(p) from p_0=0.99 up to billionaire level (because this seems to work relatively well for the US, France and China).

We also variant series based upon alternative assumptions: n=2,4,6,8 instead of n=5, and also a piecewise linear f(p) with a fraction f=0,0.2,0.4,0.6,0.8,1 of the total correction between p_0=0.99 and p_1=0.999 (and a fraction 1-f between p_1=0.999 and billionaire level). The results are presented on Figures B53-B56.

Finally, we also present variant series based upon the wealth rankings from Finanz magasin rather than Forbes. Finanz provide rankings for broader groups of millionaire than just billionaires (they typically cover 300-500 wealth Russians rather than 100 in Forbes at the end of the period), but they do not cover all years, and most importantly they seem to miss important segments of wealth holders in the bottom part of their list (the inverted Pareto coefficient seems unplausibly high, around 8-10, vs a more plausible 3-4 in Forbes rankings). The results are presented on Figure B57.

All variants, computer codes and robustness checks are presented in the subdirector GpinterWealth in zipped directory NPZ2017DistributionSeries.zip.

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Figure A1: National wealth accumulation: Russia vs China & rich countries

(national wealth (private+public), in % national income)

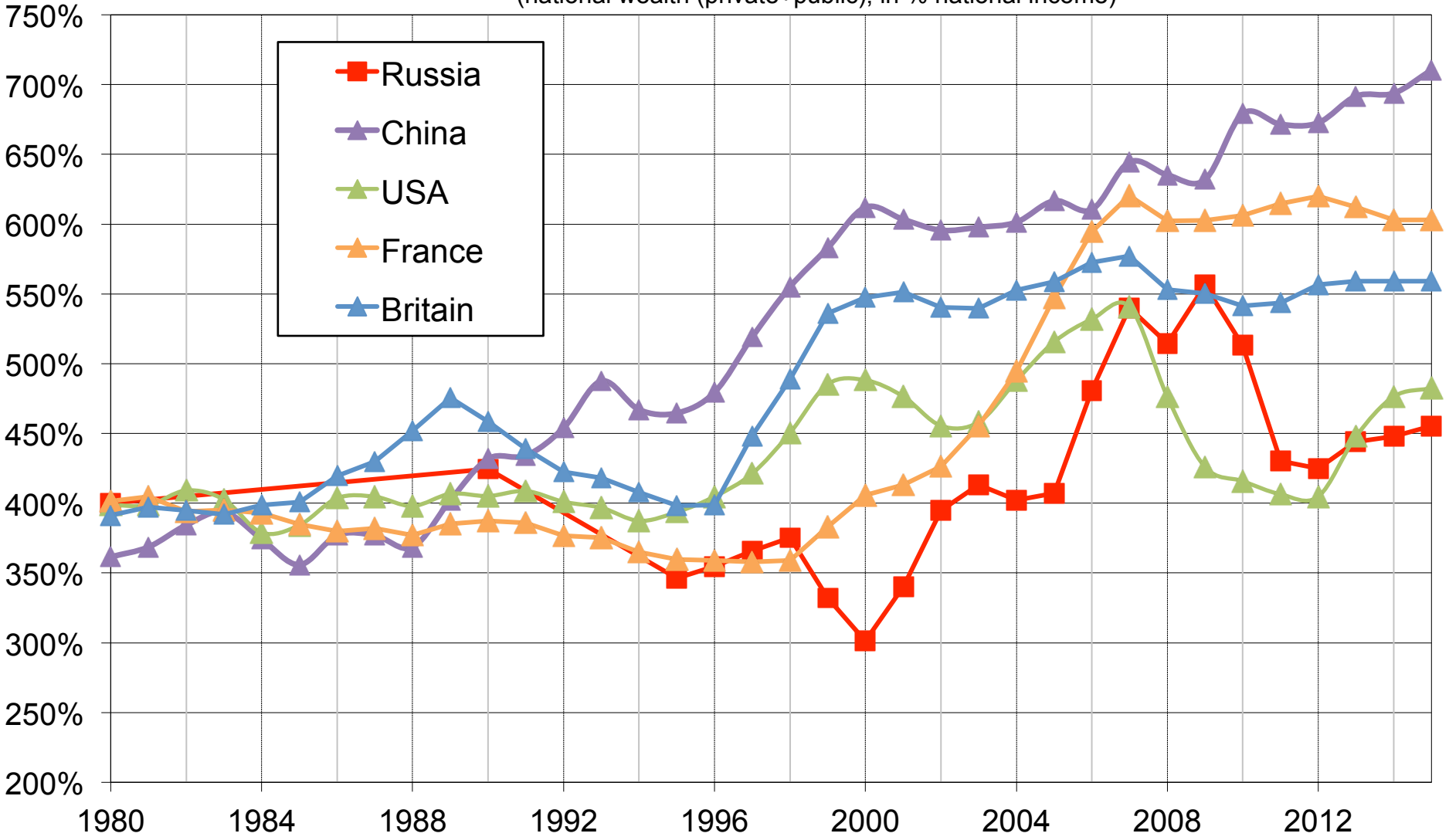


Figure A10. Net foreign assets: Russia vs other ex-communist countries

(1) (net foreign assets as a fraction of national income)

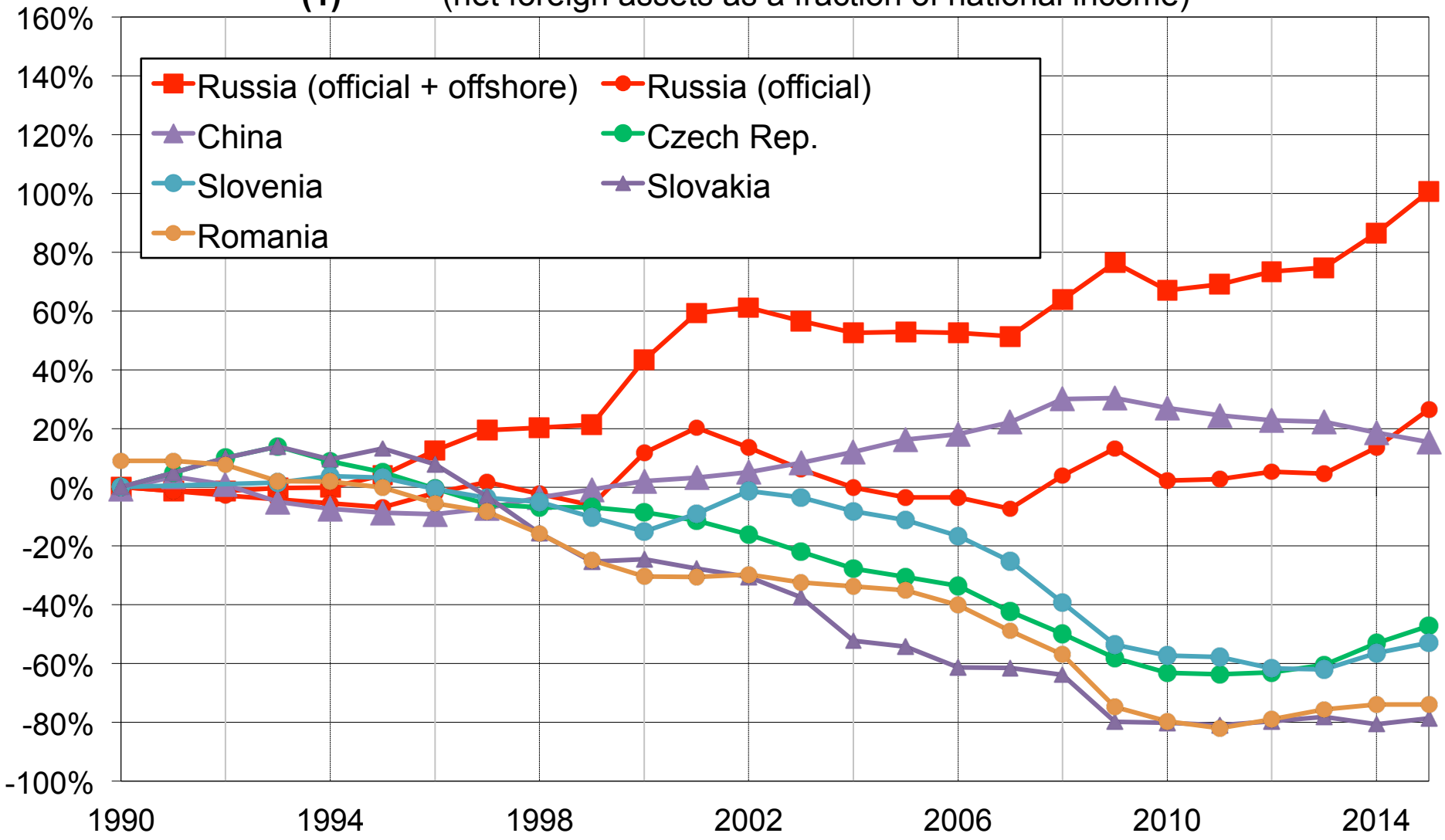


Figure A11. Net foreign assets: Russia vs other ex-communist countries (2) (net foreign assets as a fraction of national income)

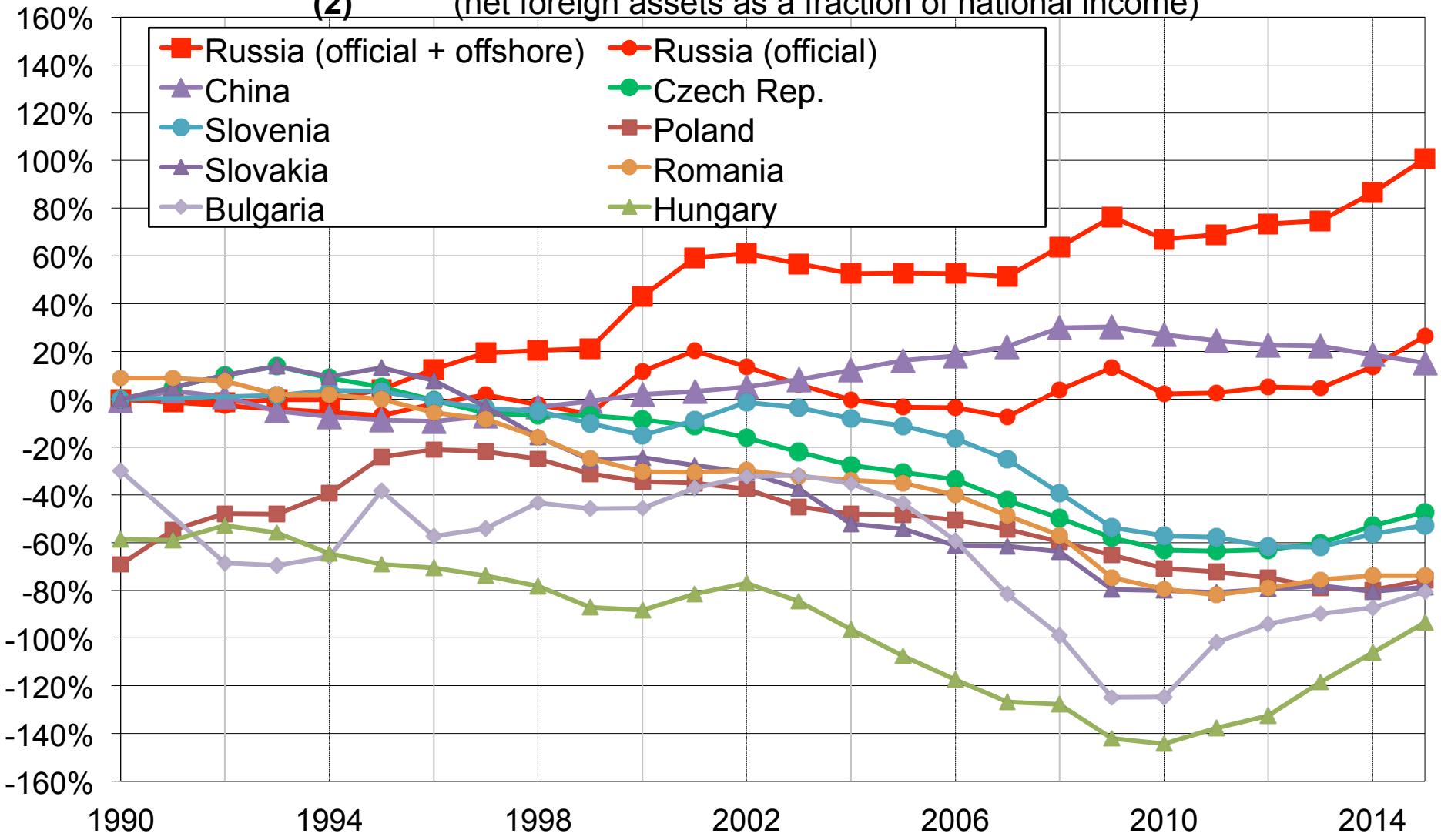
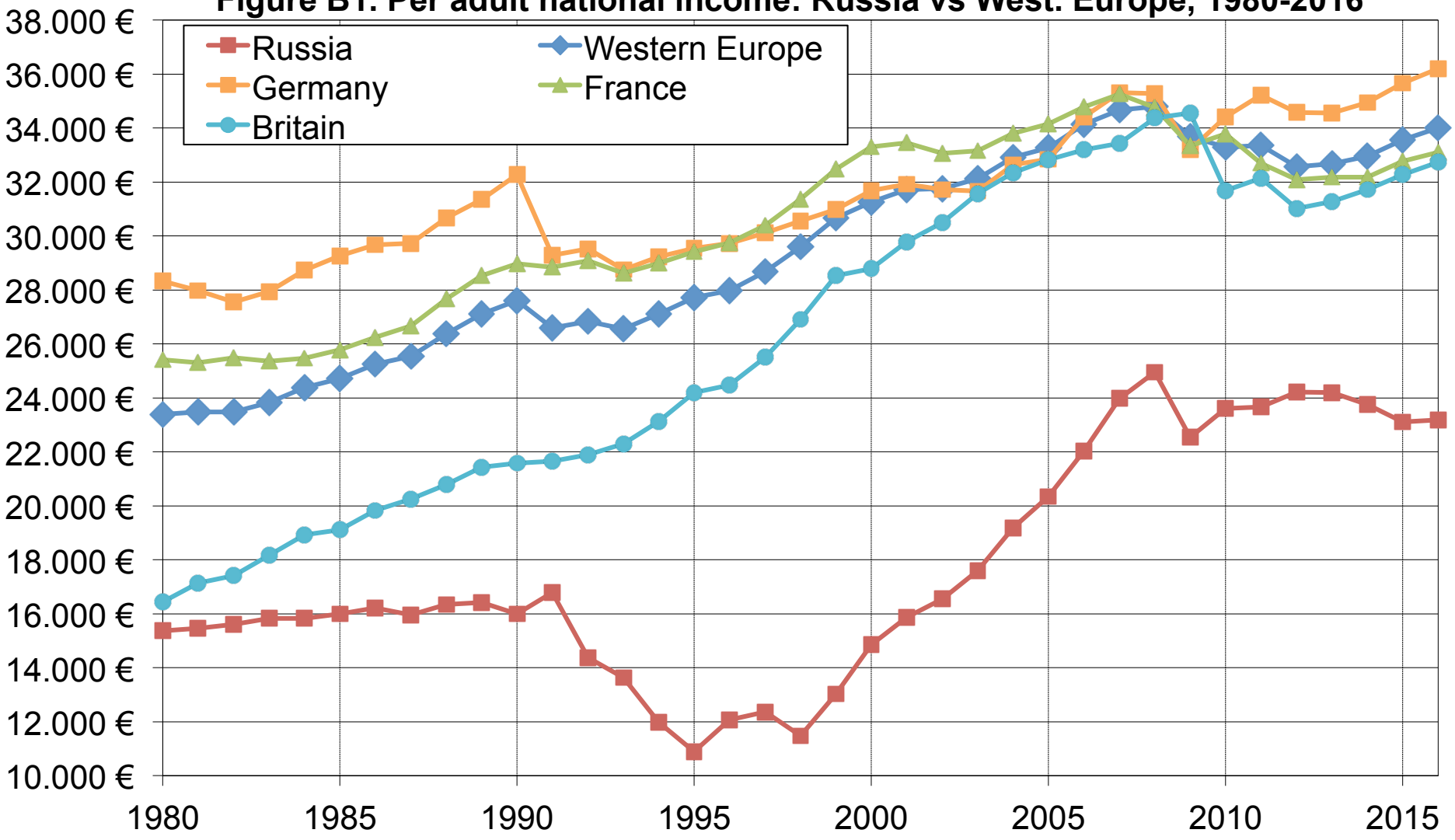
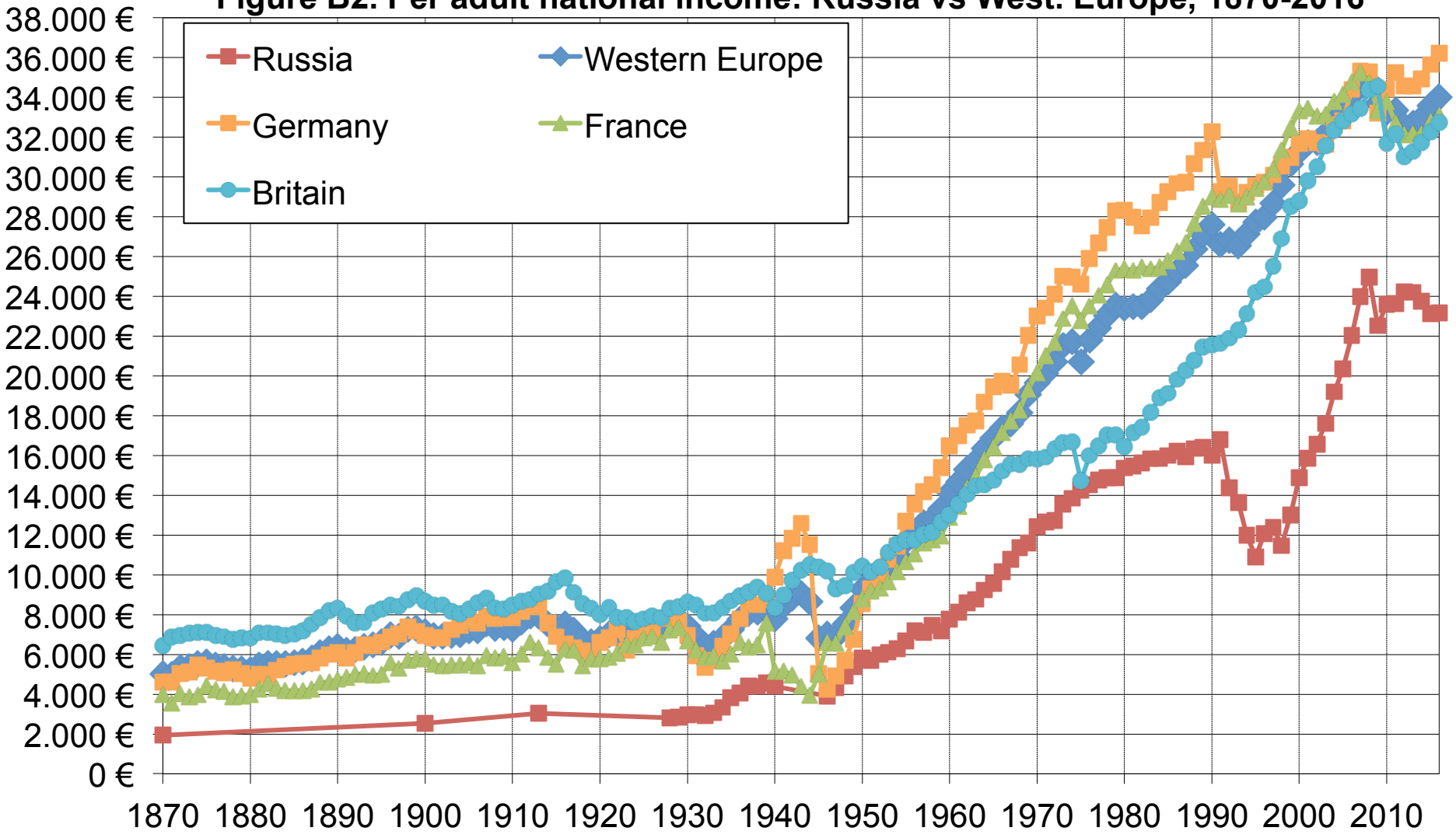


Figure B1. Per adult national income: Russia vs West. Europe, 1980-2016



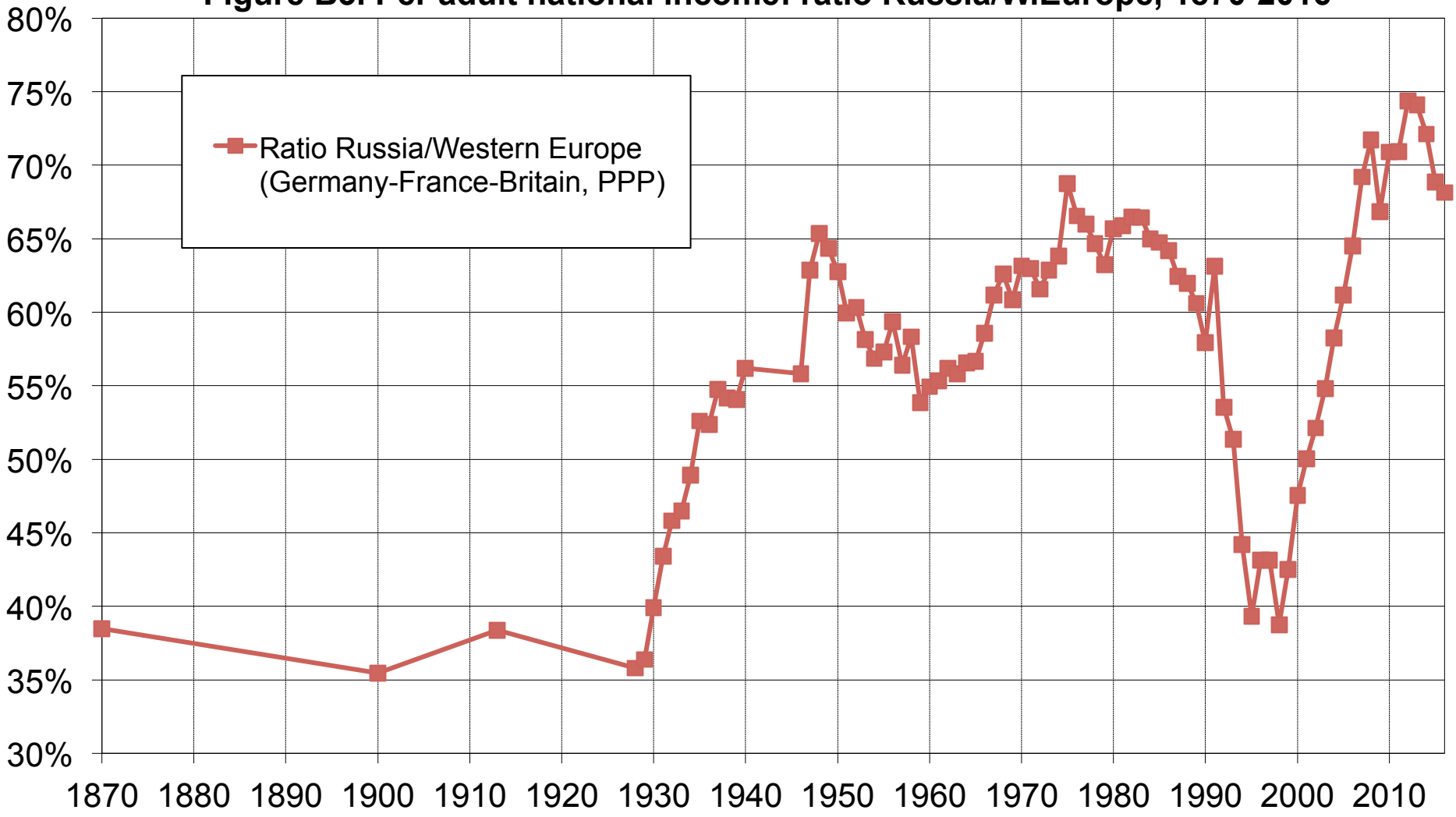
Per adult national income in euros 2016 PPP. Western Europe = arithmetic average Germany-France-Britain.

Figure B2. Per adult national income: Russia vs West. Europe, 1870-2016



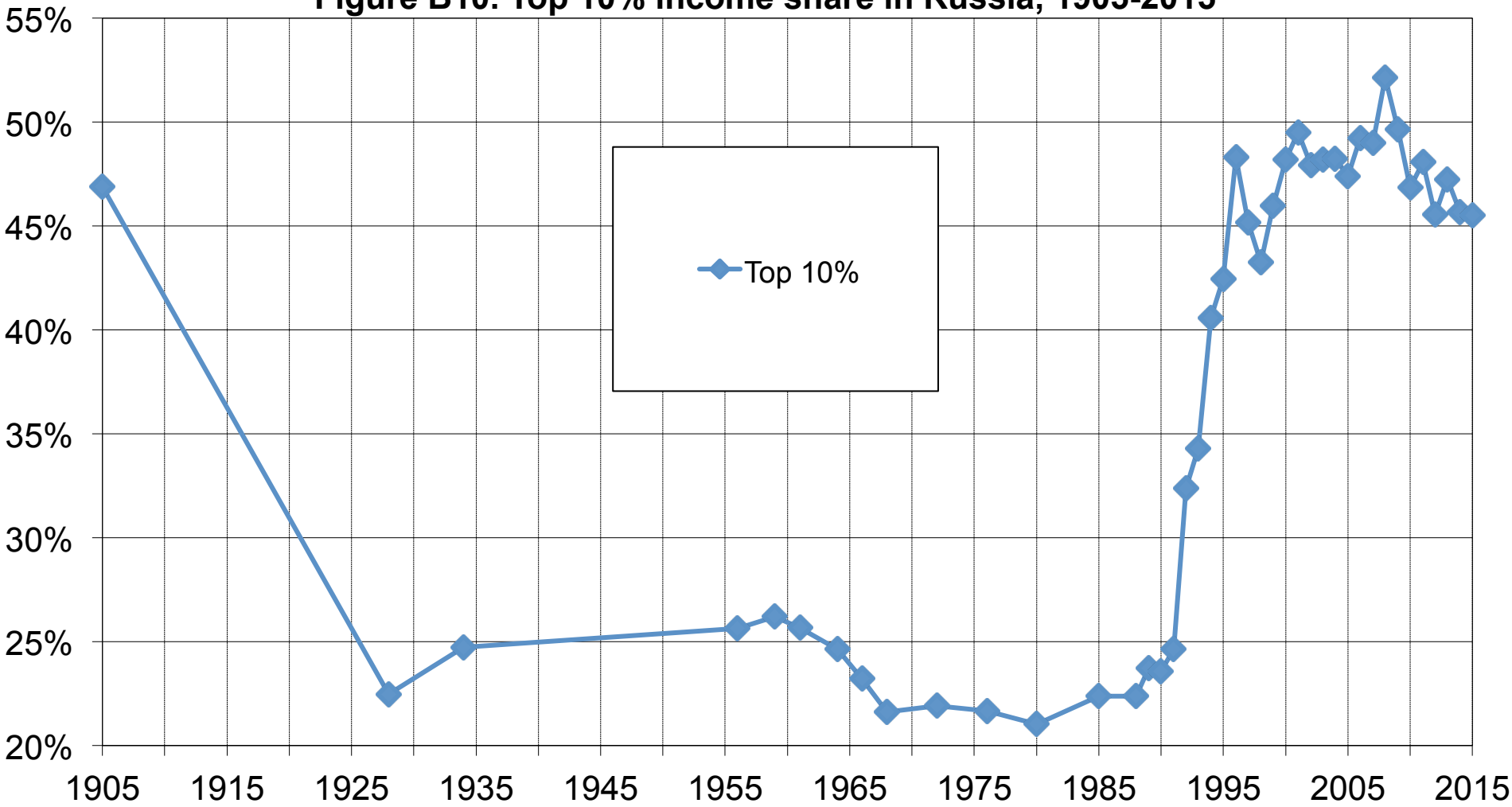
Per adult national income in euros 2016 PPP. Western Europe = arithmetic average Germany-France-Britain..

Figure B3. Per adult national income: ratio Russia/W.Europe, 1870-2016



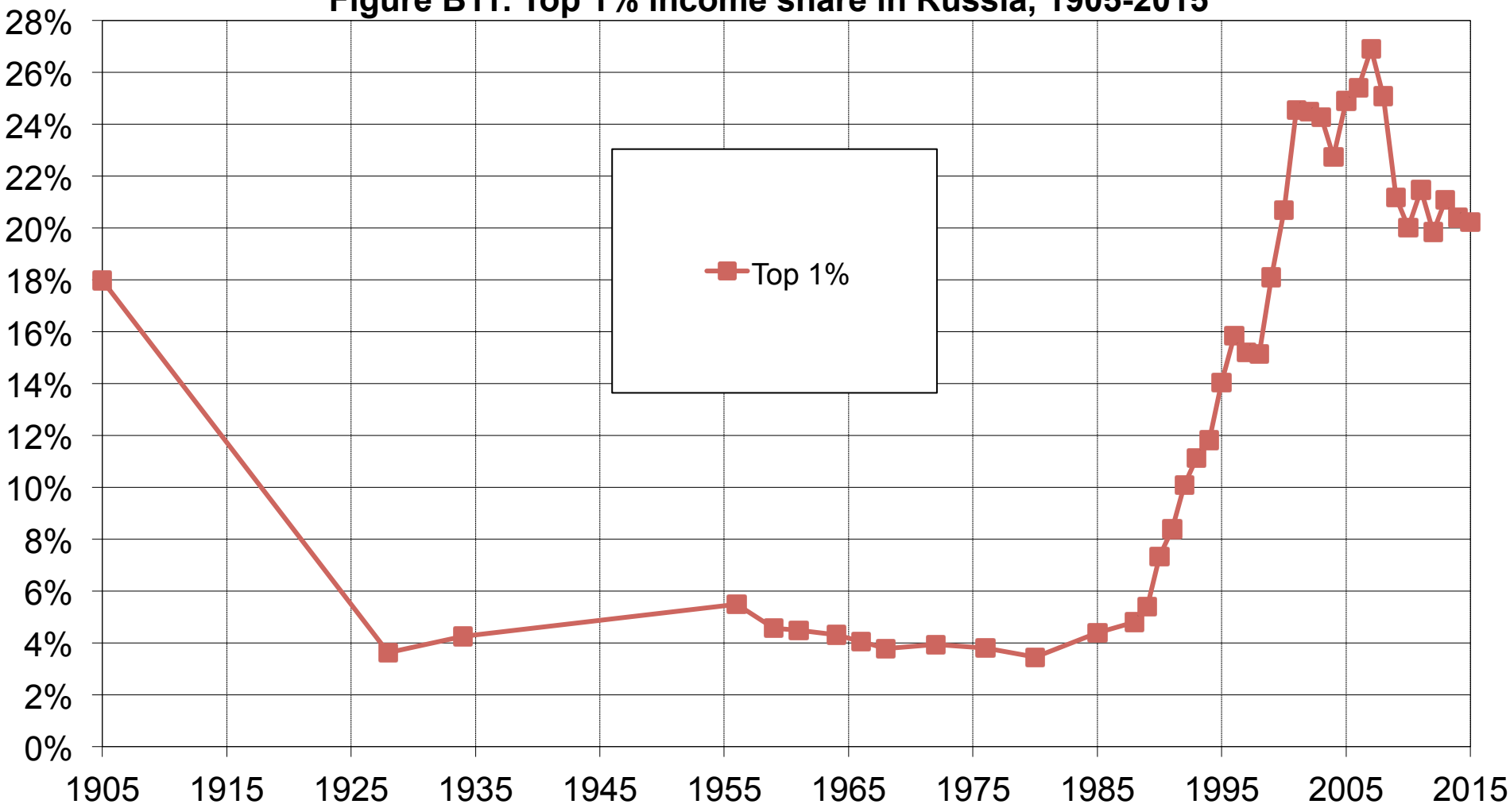
Per adult national income in € 2016 PPP. Western Europe = arithmetic average Germany-France-Britain.

Figure B10. Top 10% income share in Russia, 1905-2015



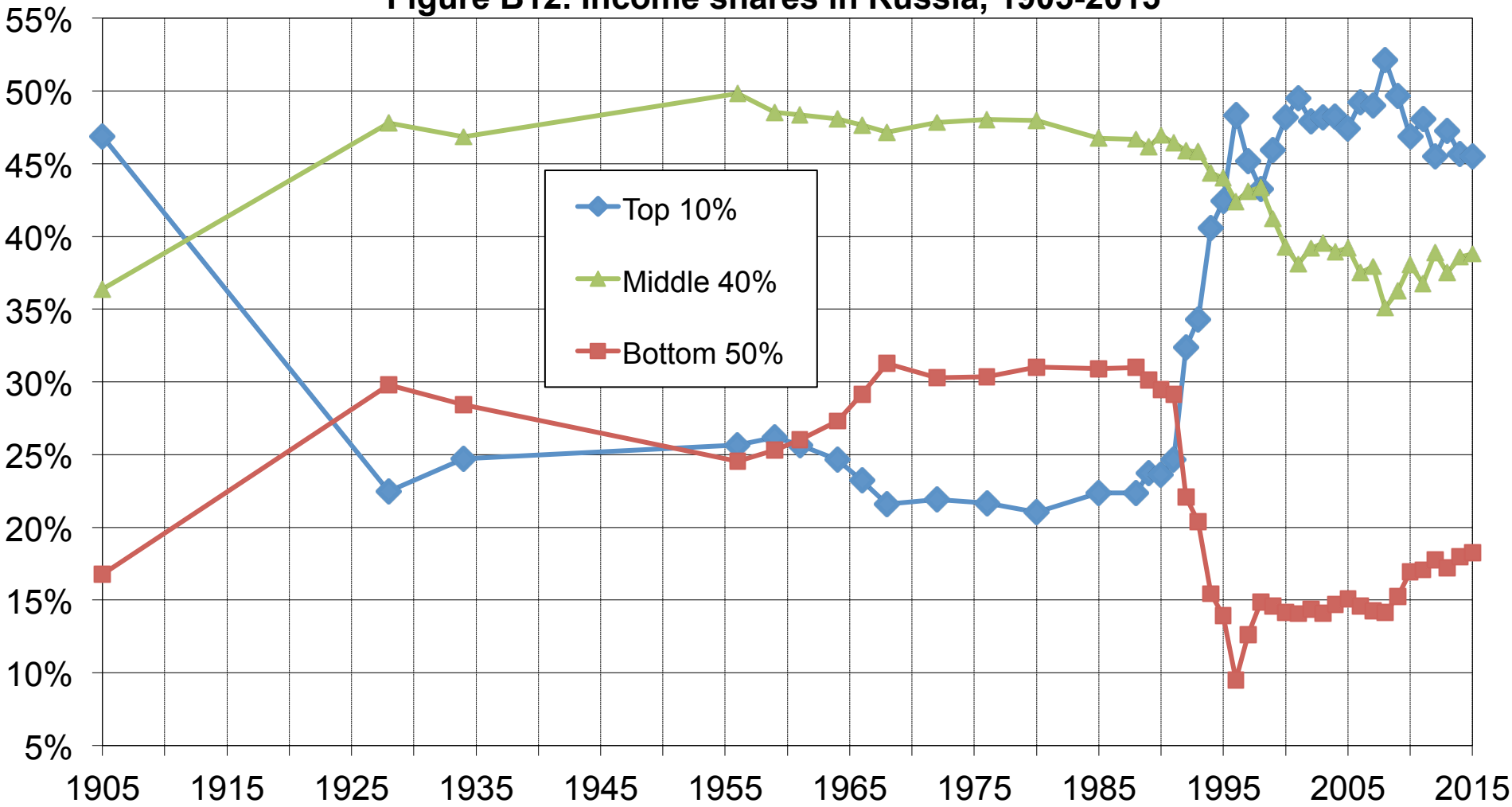
Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among adults.
Corrected estimates combine survey, fiscal, wealth and national accounts data. Raw estimates rely only on self-reported survey data.
Equal-split-adults series (income of married couples divided by two).

Figure B11. Top 1% income share in Russia, 1905-2015



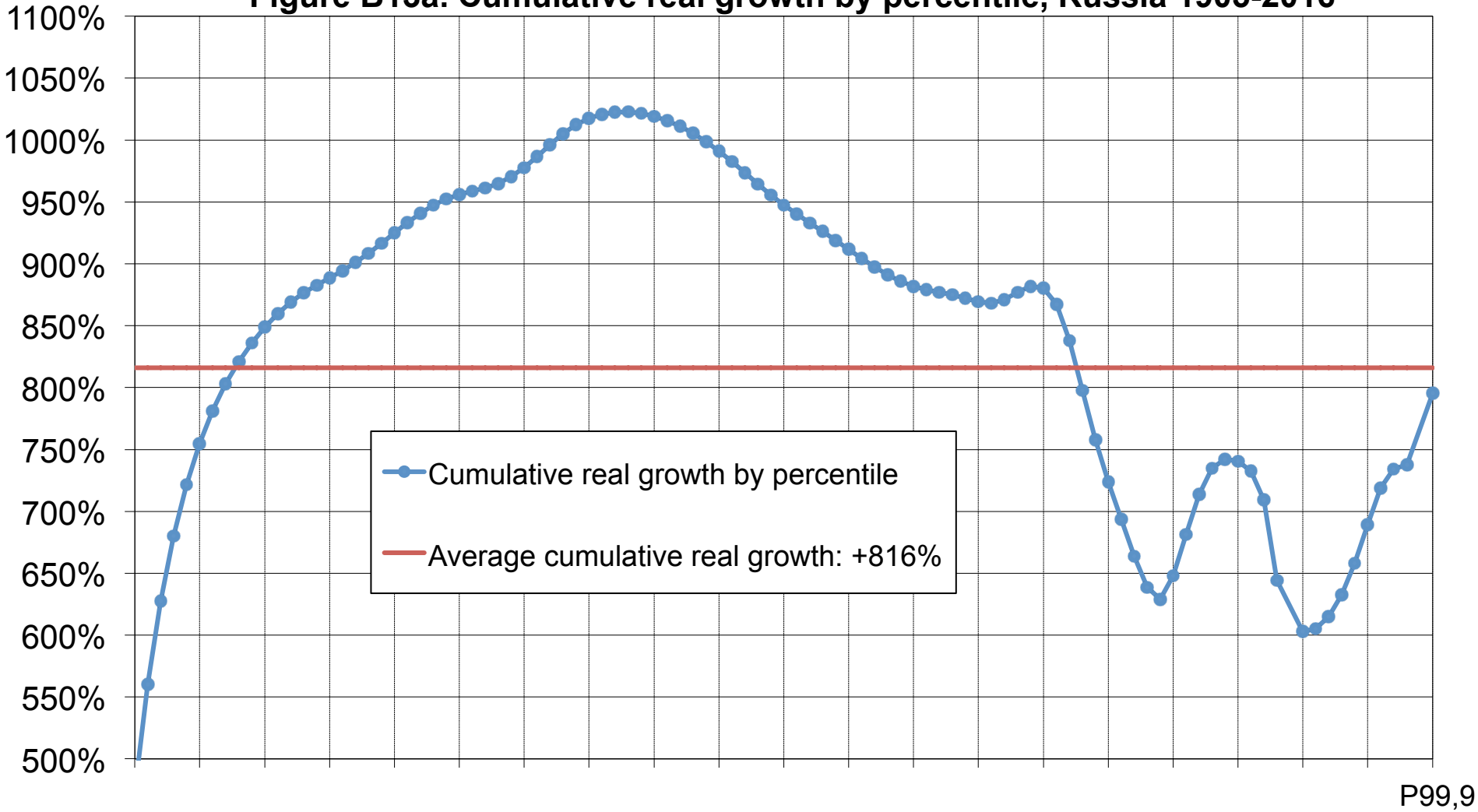
Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among adults.
Corrected estimates combine survey, fiscal, wealth and national accounts data. Raw estimates rely only on self-reported survey data.
Equal-split-adults series (income of married couples divided by two).

Figure B12. Income shares in Russia, 1905-2015



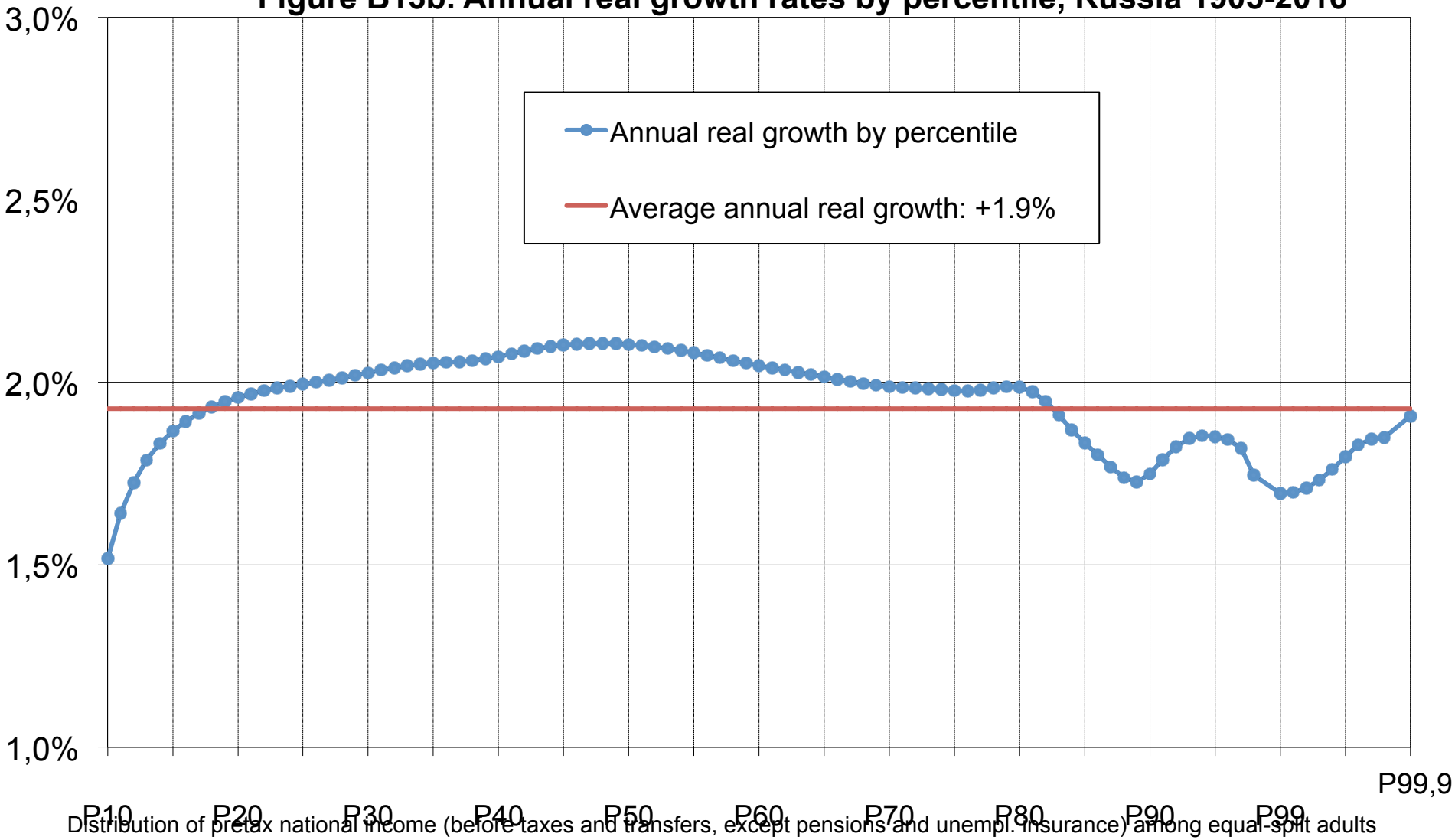
Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among adults.
Corrected estimates combine survey, fiscal, wealth and national accounts data. Raw estimates rely only on self-reported survey data.
Equal-split-adults series (income of married couples divided by two).

Figure B13a. Cumulative real growth by percentile, Russia 1905-2016



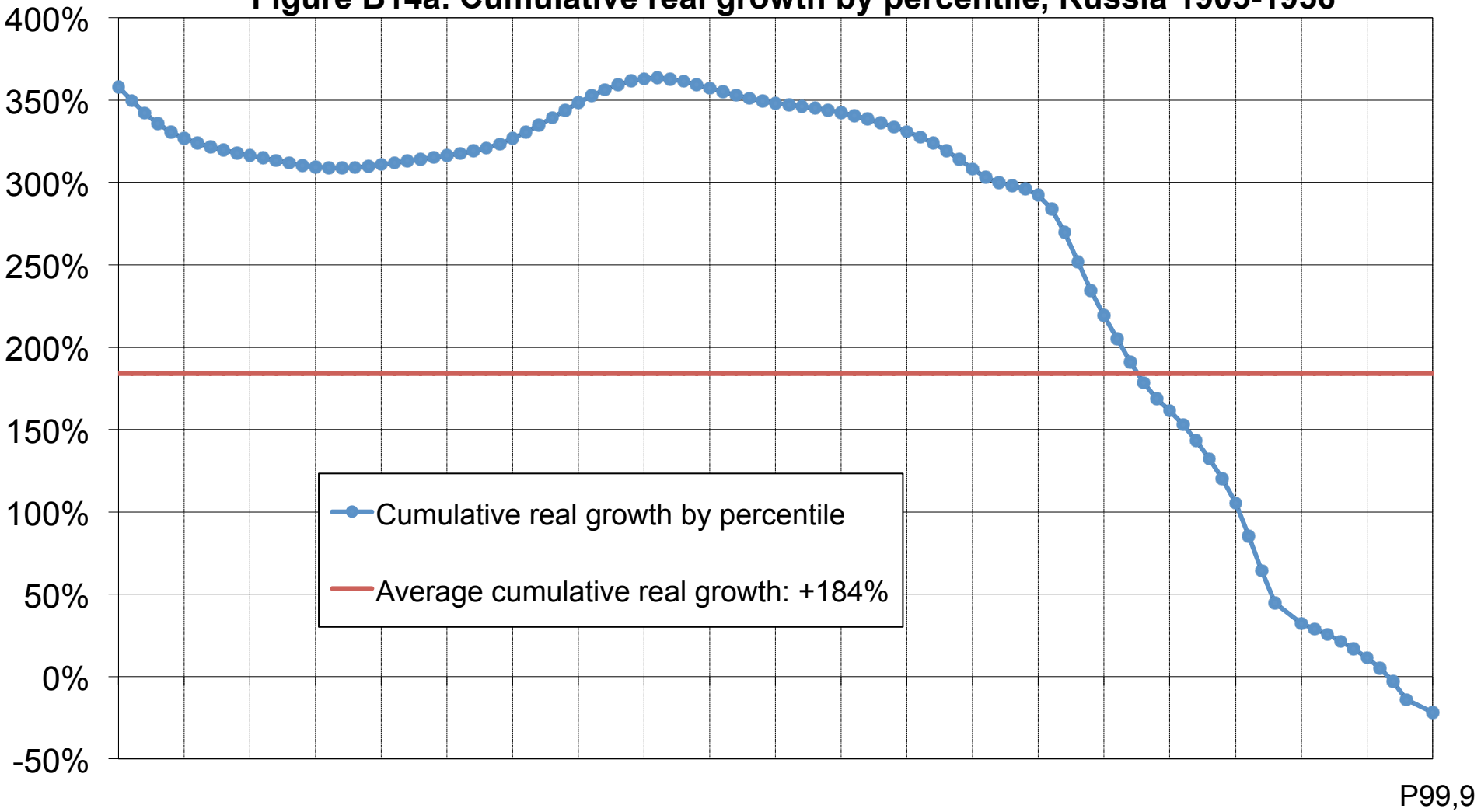
Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among equal-split adults (income of married couples divided by two). Corrected estimates combine survey, fiscal, wealth and national accounts data.

Figure B13b. Annual real growth rates by percentile, Russia 1905-2016



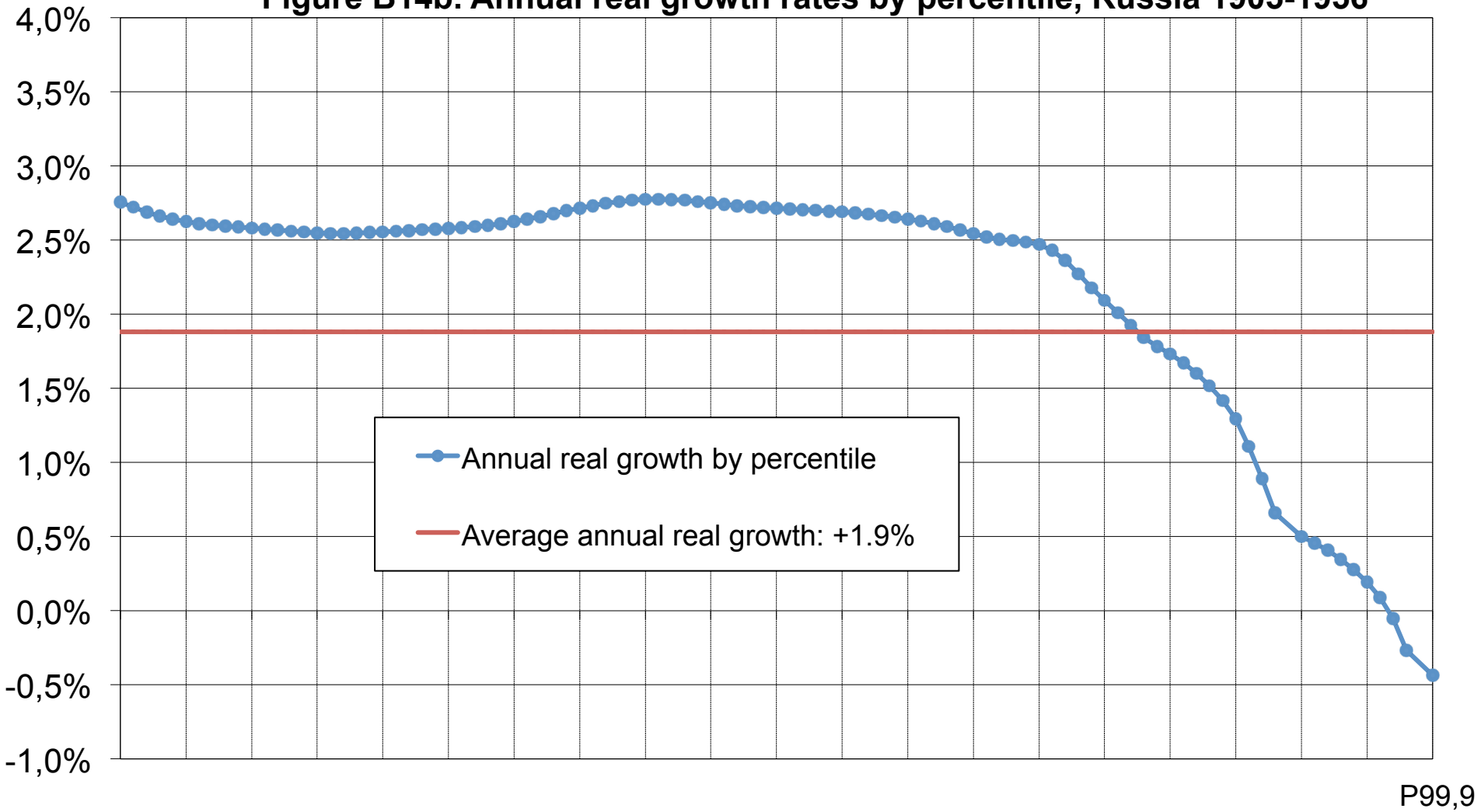
Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among equal-split adults (income of married couples divided by two). Corrected estimates combine survey, fiscal, wealth and national accounts data.

Figure B14a. Cumulative real growth by percentile, Russia 1905-1956



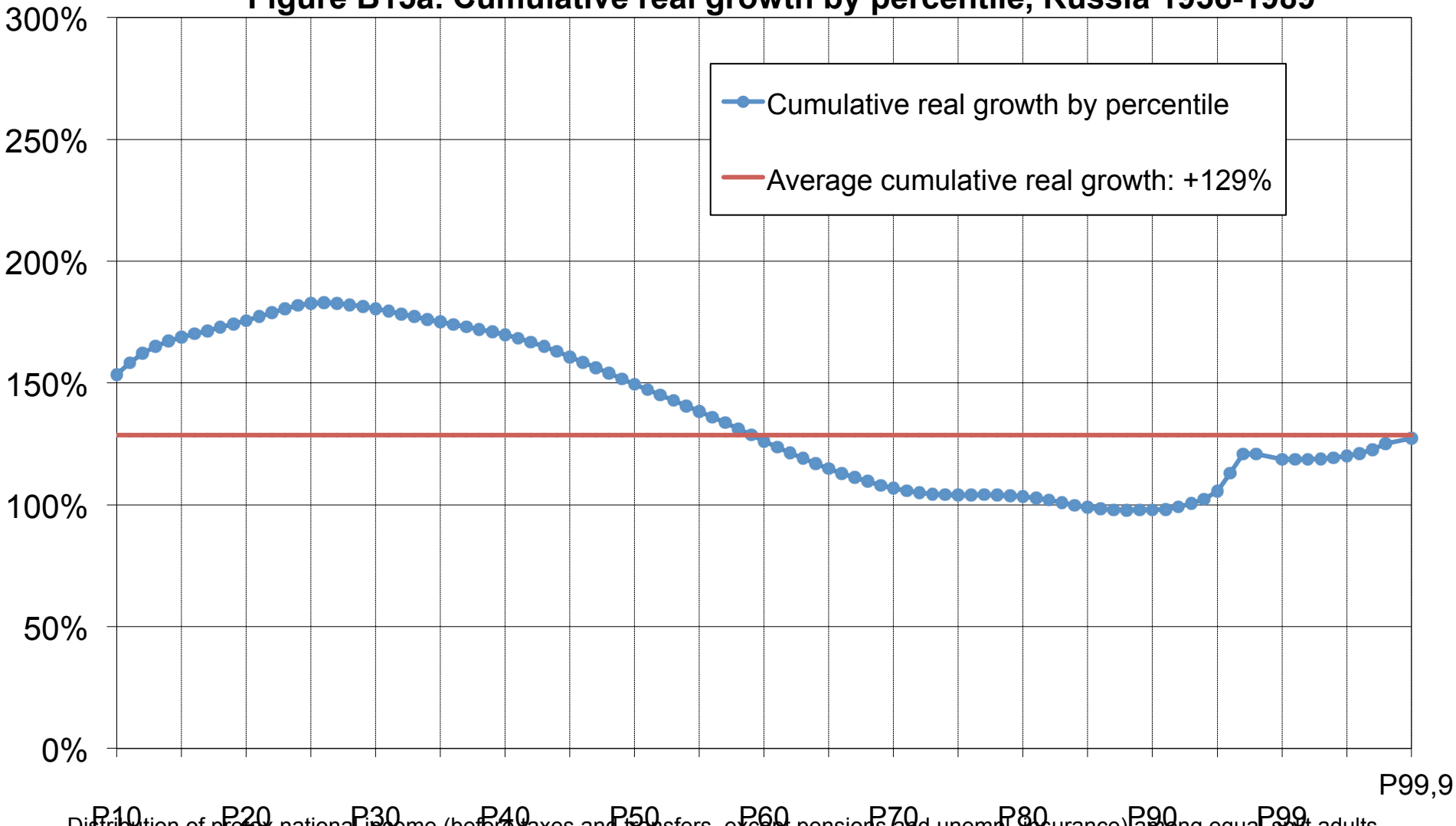
Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among equal-split adults (income of married couples divided by two). Corrected estimates combine survey, fiscal, wealth and national accounts data.

Figure B14b. Annual real growth rates by percentile, Russia 1905-1956



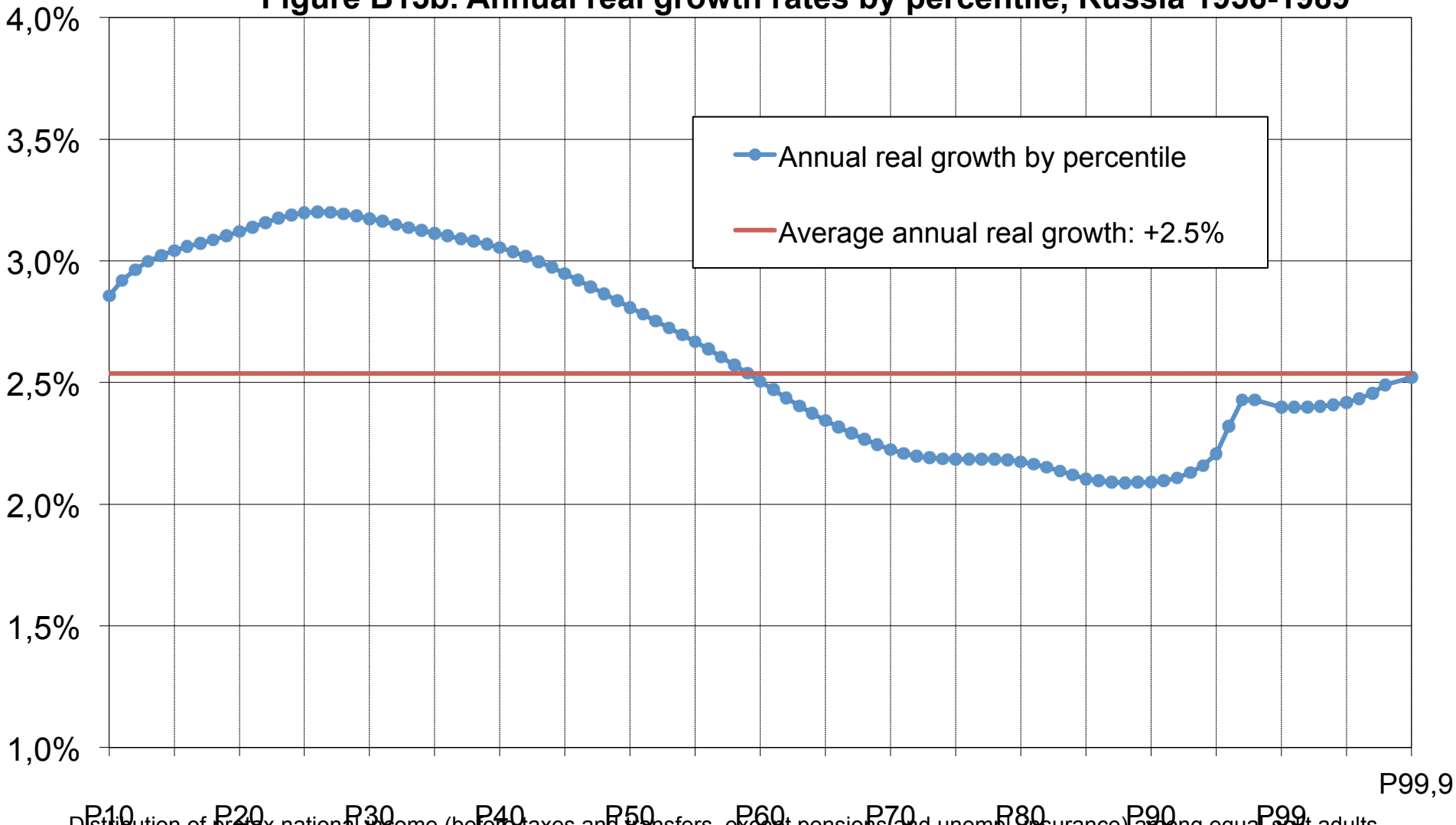
Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among equal-split adults (income of married couples divided by two). Corrected estimates combine survey, fiscal, wealth and national accounts data.

Figure B15a. Cumulative real growth by percentile, Russia 1956-1989



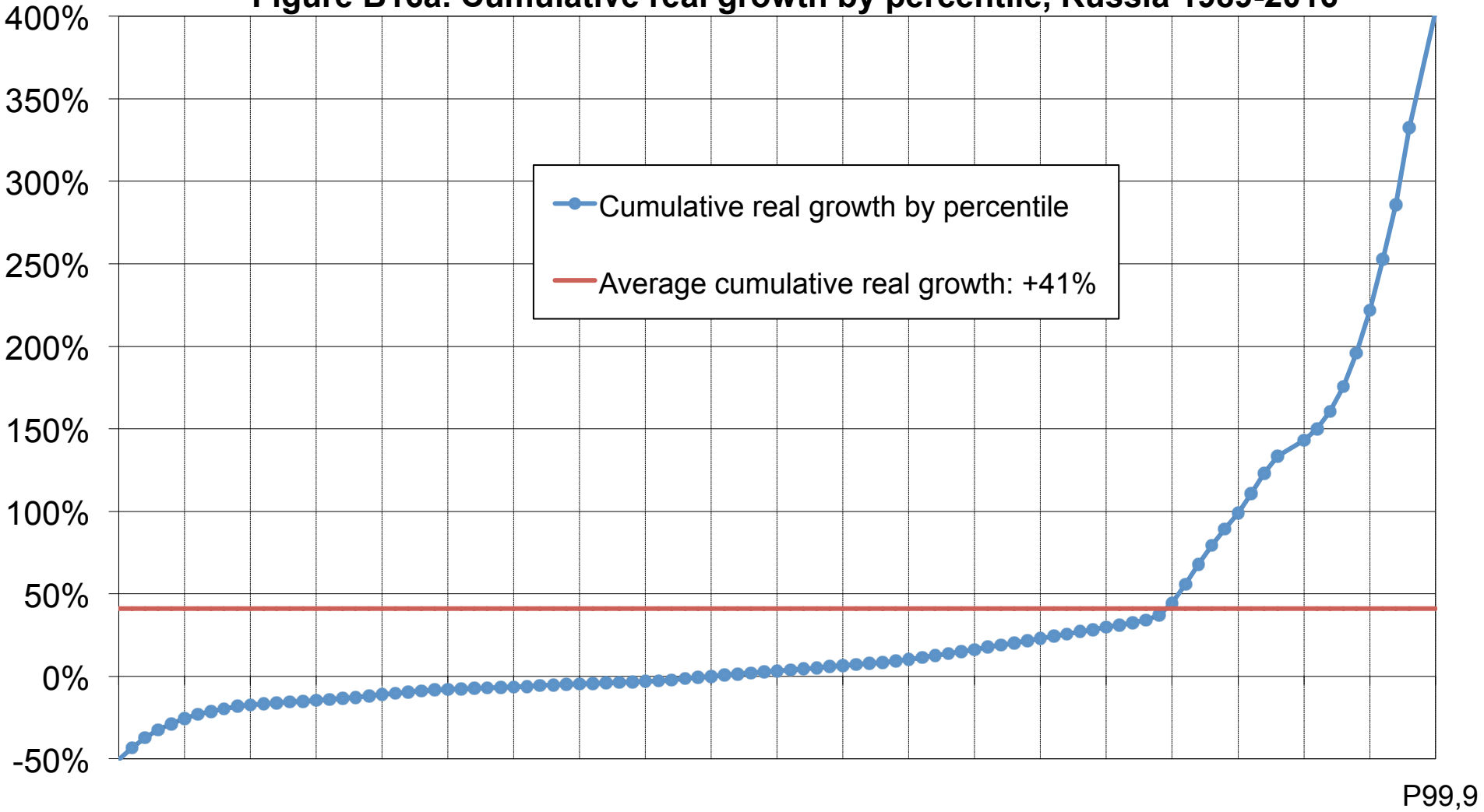
Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among equal-split adults (income of married couples divided by two). Corrected estimates combine survey, fiscal, wealth and national accounts data.

Figure B15b. Annual real growth rates by percentile, Russia 1956-1989



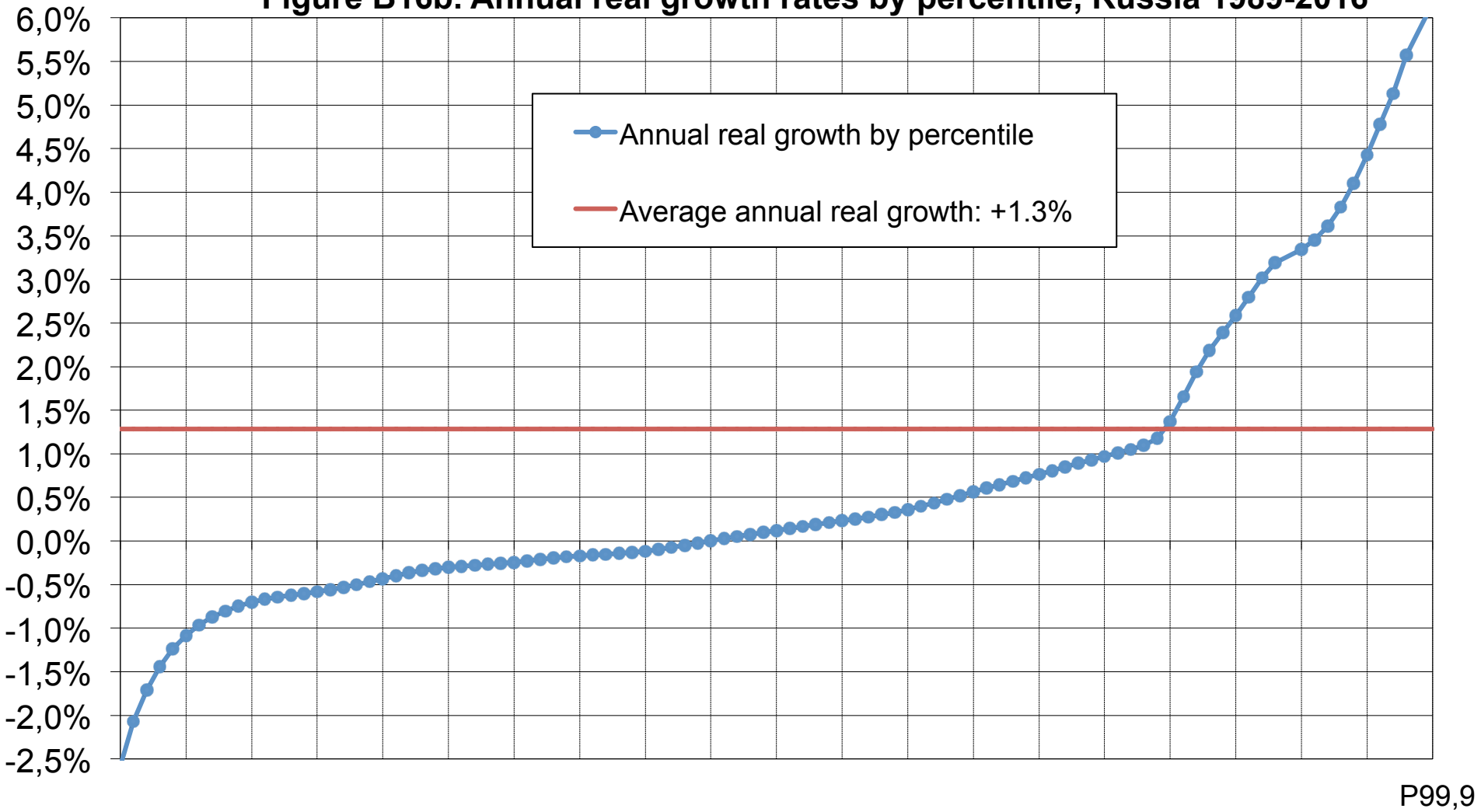
Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among equal-split adults (income of married couples divided by two). Corrected estimates combine survey, fiscal, wealth and national accounts data.

Figure B16a. Cumulative real growth by percentile, Russia 1989-2016



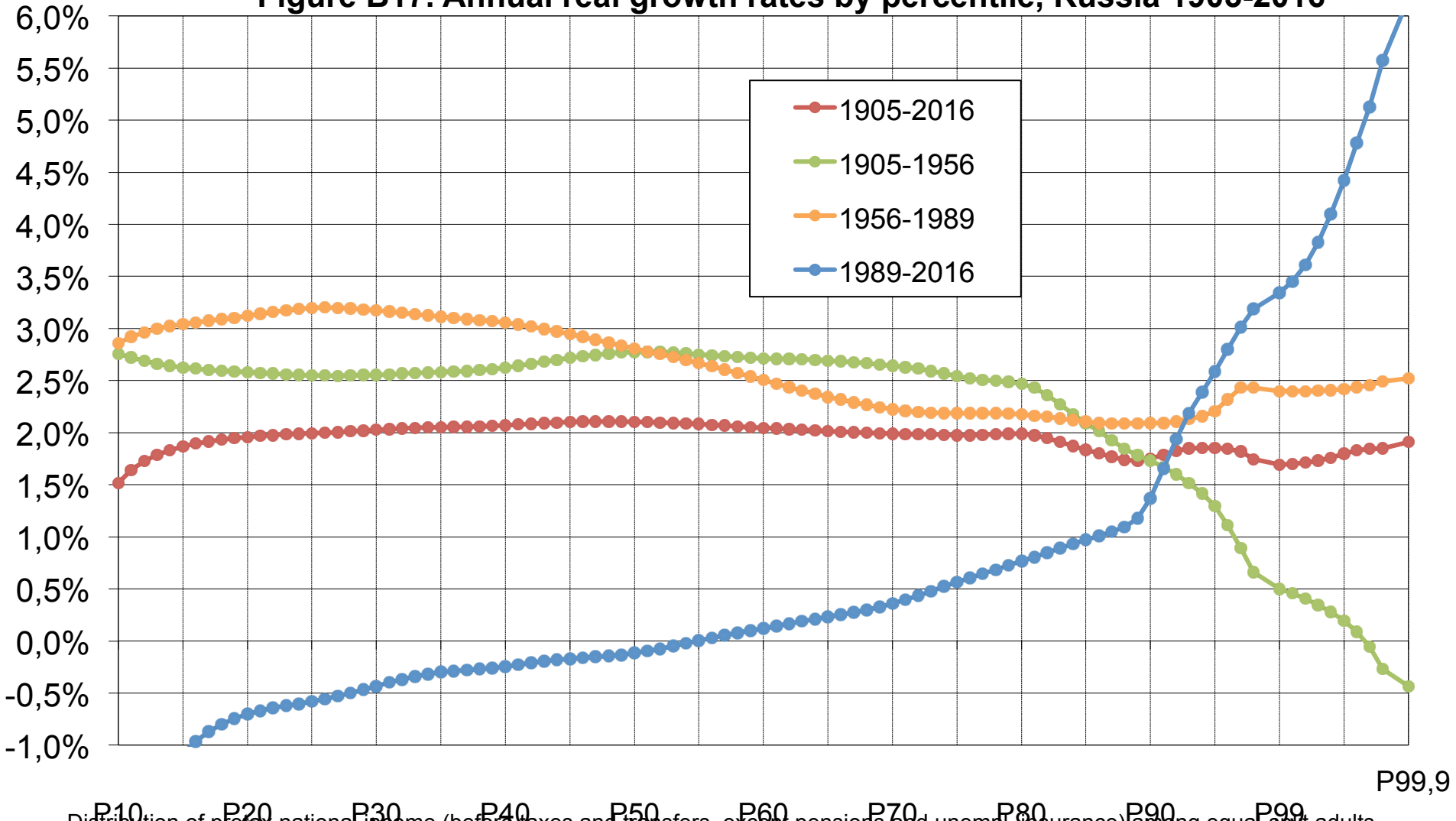
Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among equal-split adults (income of married couples divided by two). Corrected estimates combine survey, fiscal, wealth and national accounts data.

Figure B16b. Annual real growth rates by percentile, Russia 1989-2016



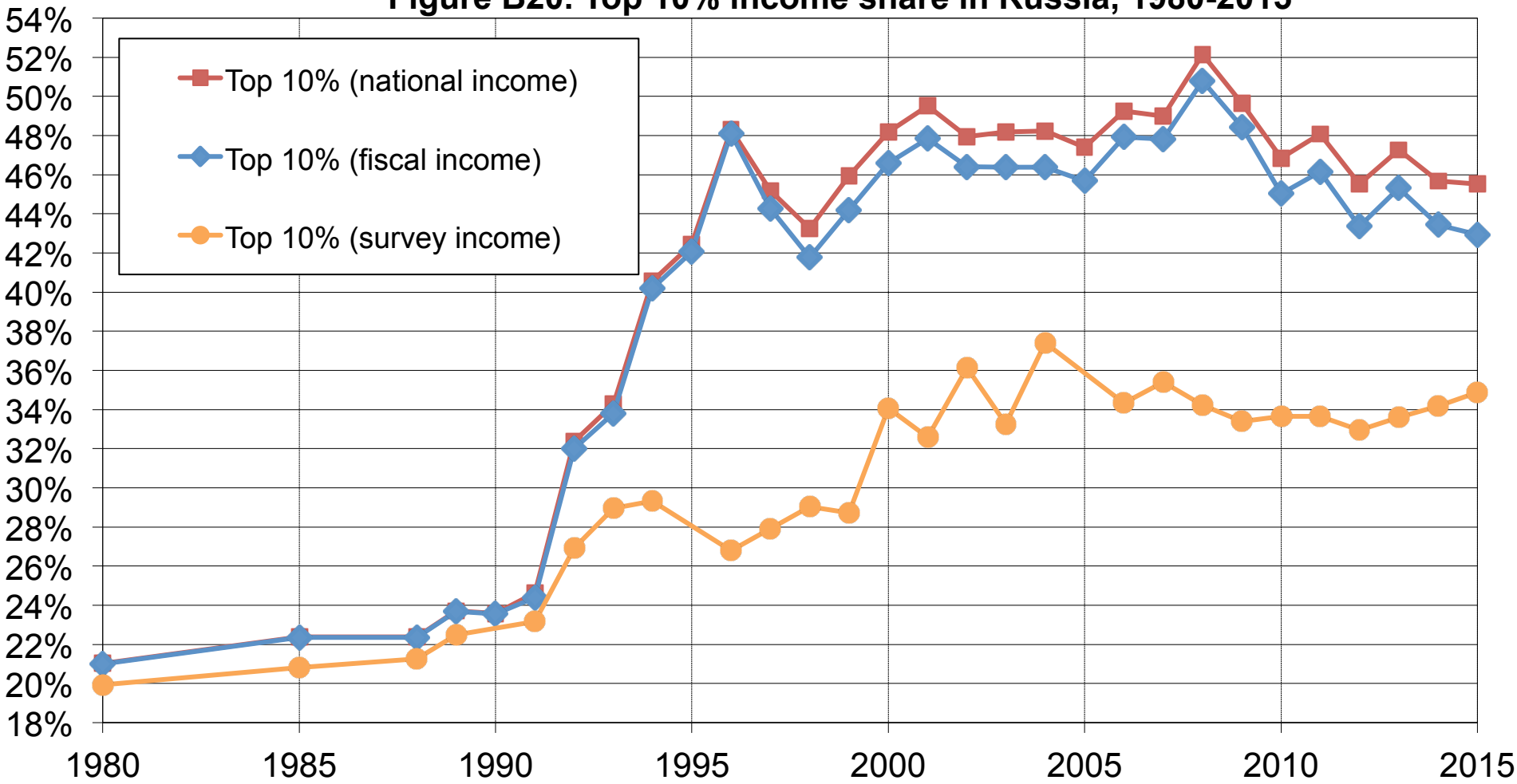
Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among equal-split adults (income of married couples divided by two). Corrected estimates combine survey, fiscal, wealth and national accounts data.

Figure B17. Annual real growth rates by percentile, Russia 1905-2016



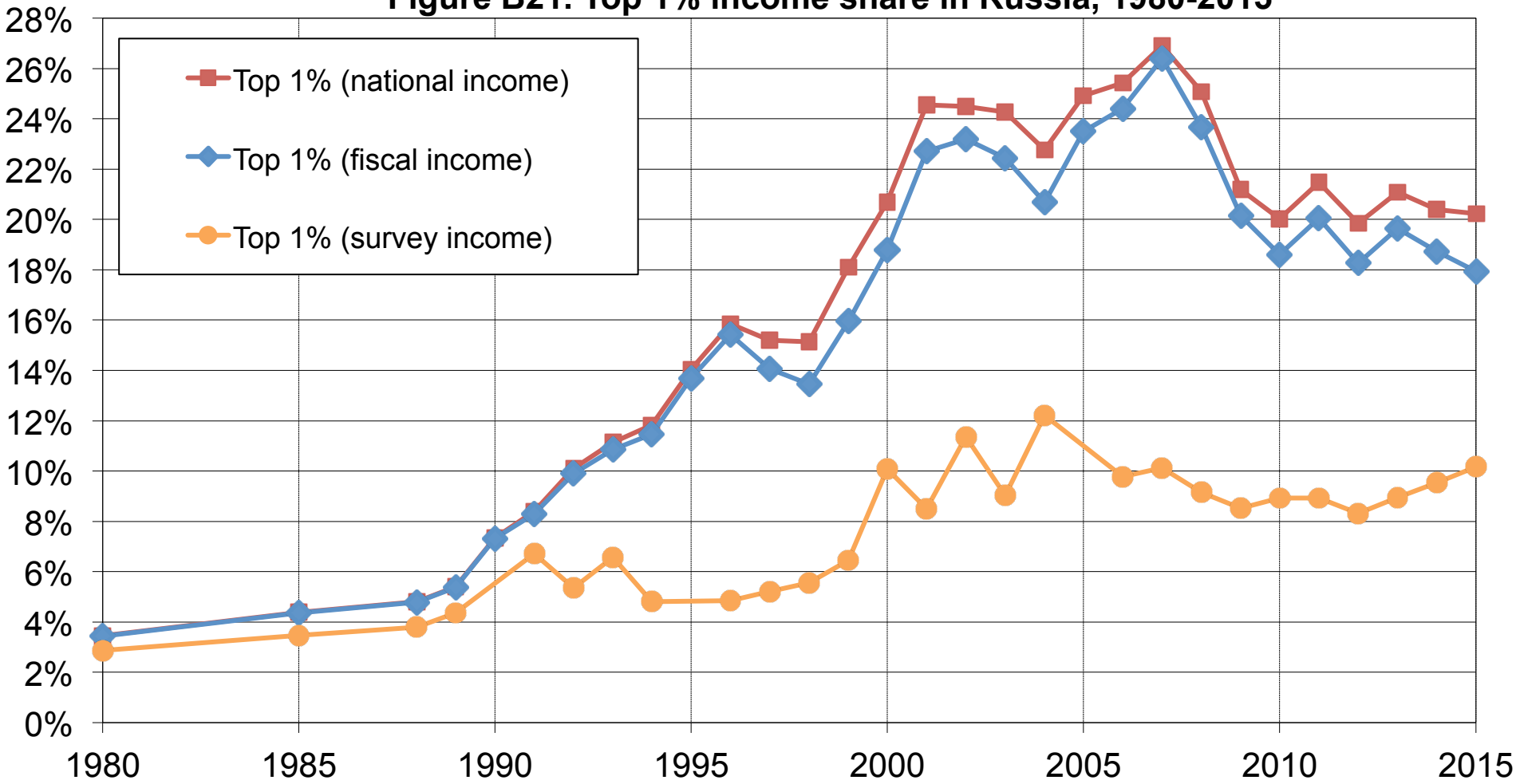
Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among equal-split adults (income of married couples divided by two). Corrected estimates combine survey, fiscal, wealth and national accounts data.

Figure B20. Top 10% income share in Russia, 1980-2015



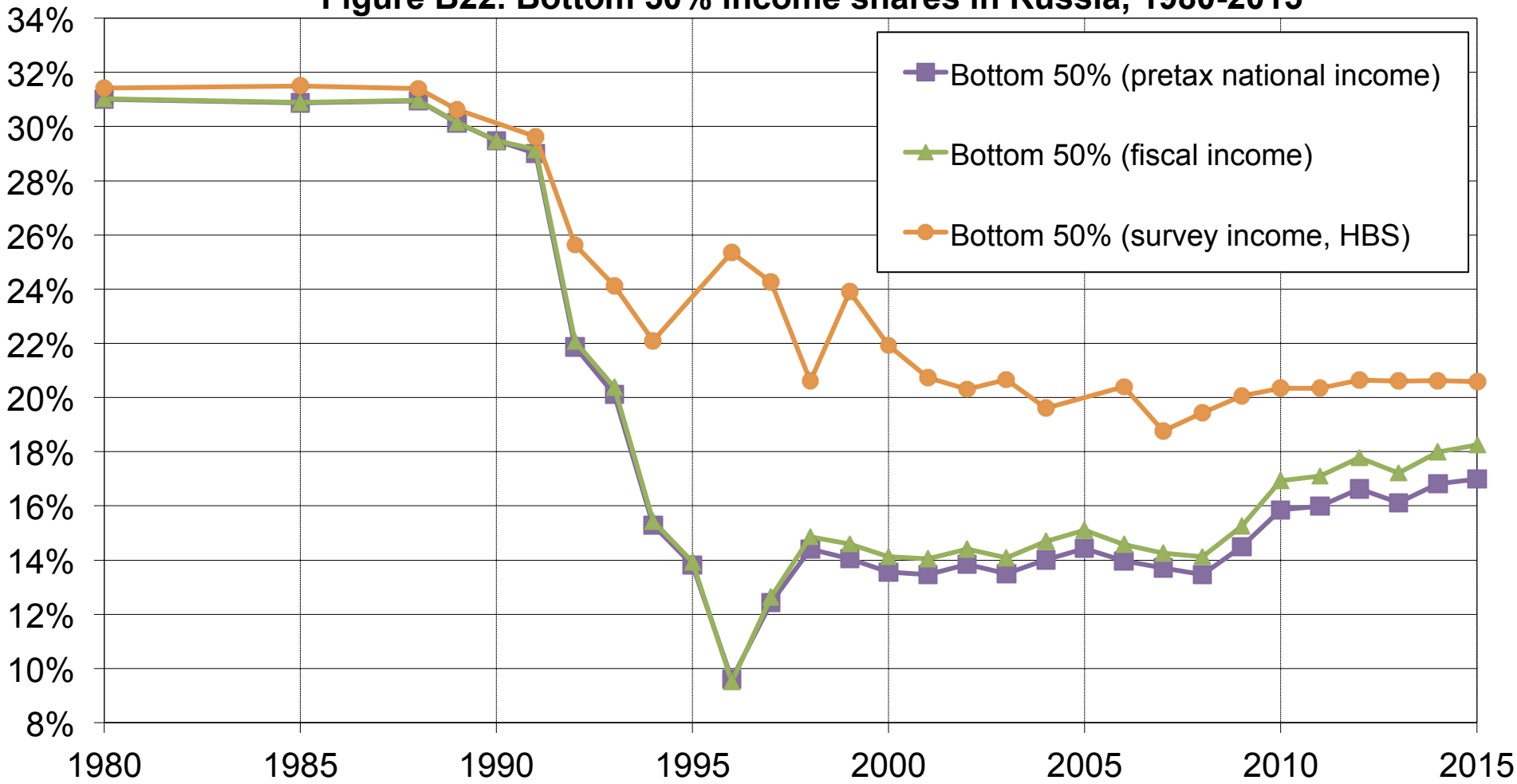
Distribution of income (before taxes and transfers, except pensions and unempl. insurance) among equals-plit adults (income of married couples divided by two). Pretax national income estimates combine survey, fiscal, wealth and national accounts data. Fiscal income estimates combine survey and income tax data (but do not use wealth data to allocate tax-exempt capital income). Survey income series solely use self-reported survey data (HBS).

Figure B21. Top 1% income share in Russia, 1980-2015



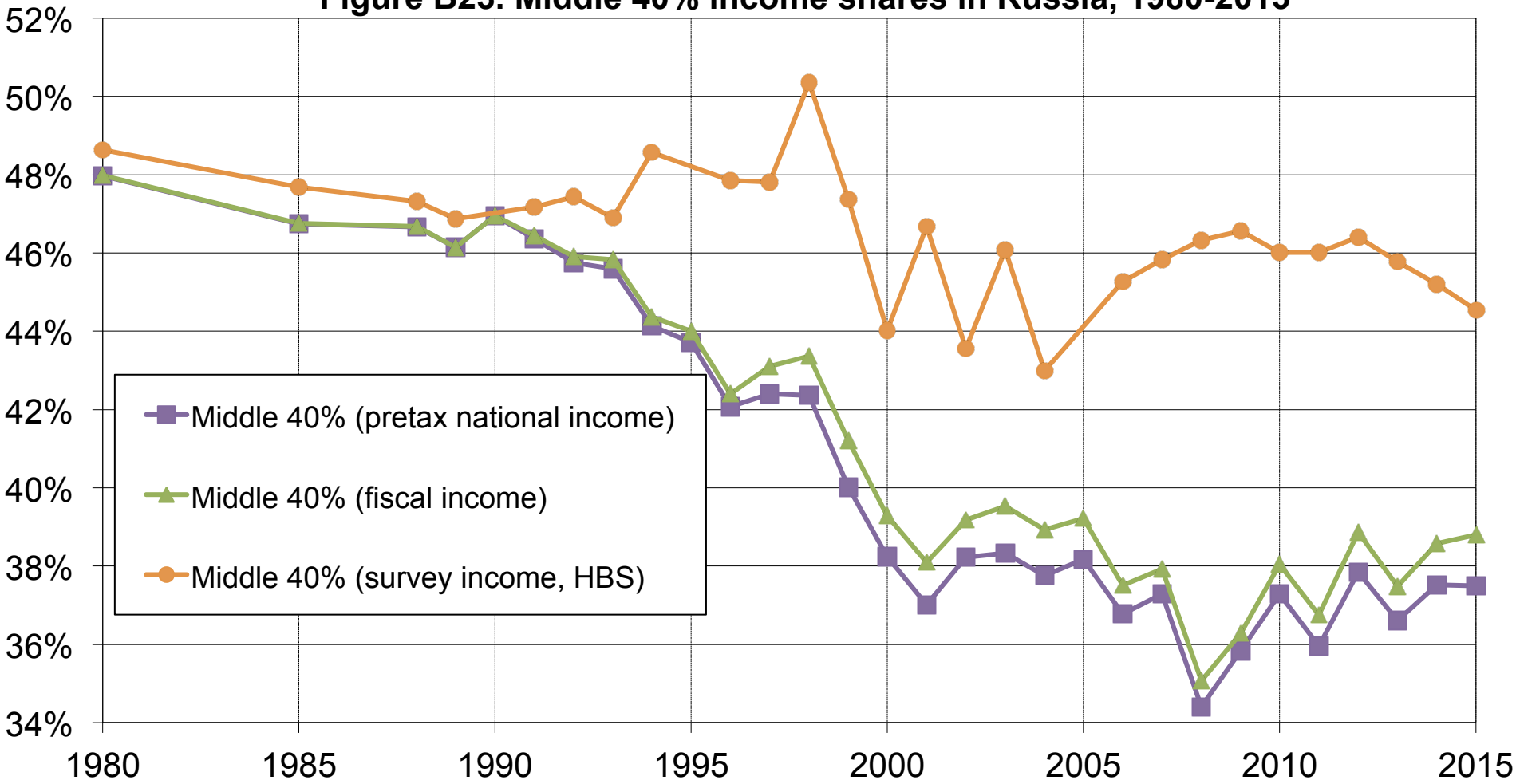
Distribution of income (before taxes and transfers, except pensions and unempl. insurance) among equals-plit adults (income of married couples divided by two). Pretax national income estimates combine survey, fiscal, wealth and national accounts data. Fiscal income estimates combine survey and income tax data (but do not use wealth data to allocate tax-exempt capital income). Survey income series solely use self-reported survey data (HBS).

Figure B22. Bottom 50% income shares in Russia, 1980-2015



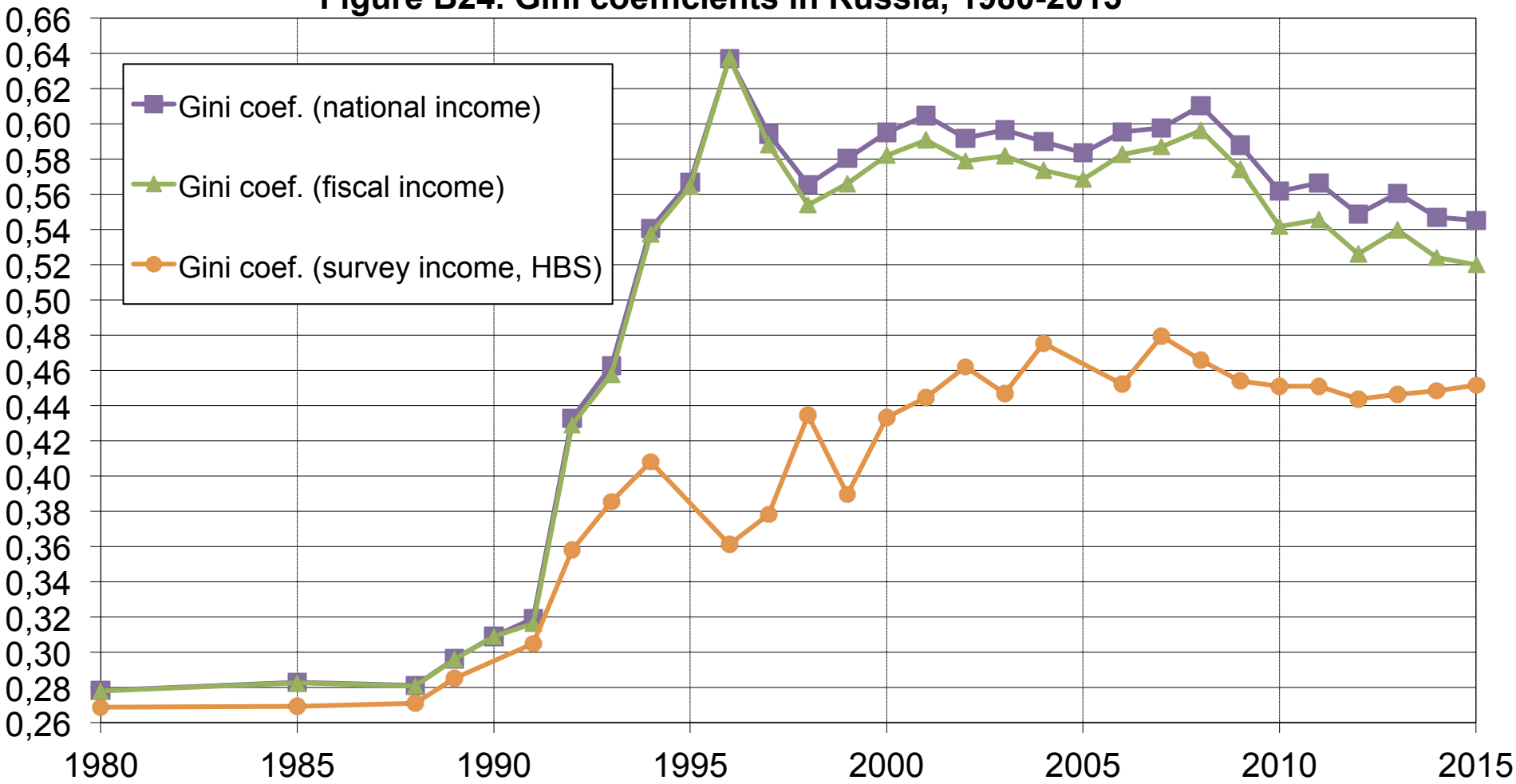
Distribution of income (before taxes and transfers, except pensions and unempl. insurance) among equals-plit adults (income of married couples divided by two). Pretax national income estimates combine survey, fiscal, wealth and national accounts data. Fiscal income estimates combine survey and income tax data (but do not use wealth data to allocate tax-exempt capital income). Survey income series solely use self-reported survey data (HBS).

Figure B23. Middle 40% income shares in Russia, 1980-2015



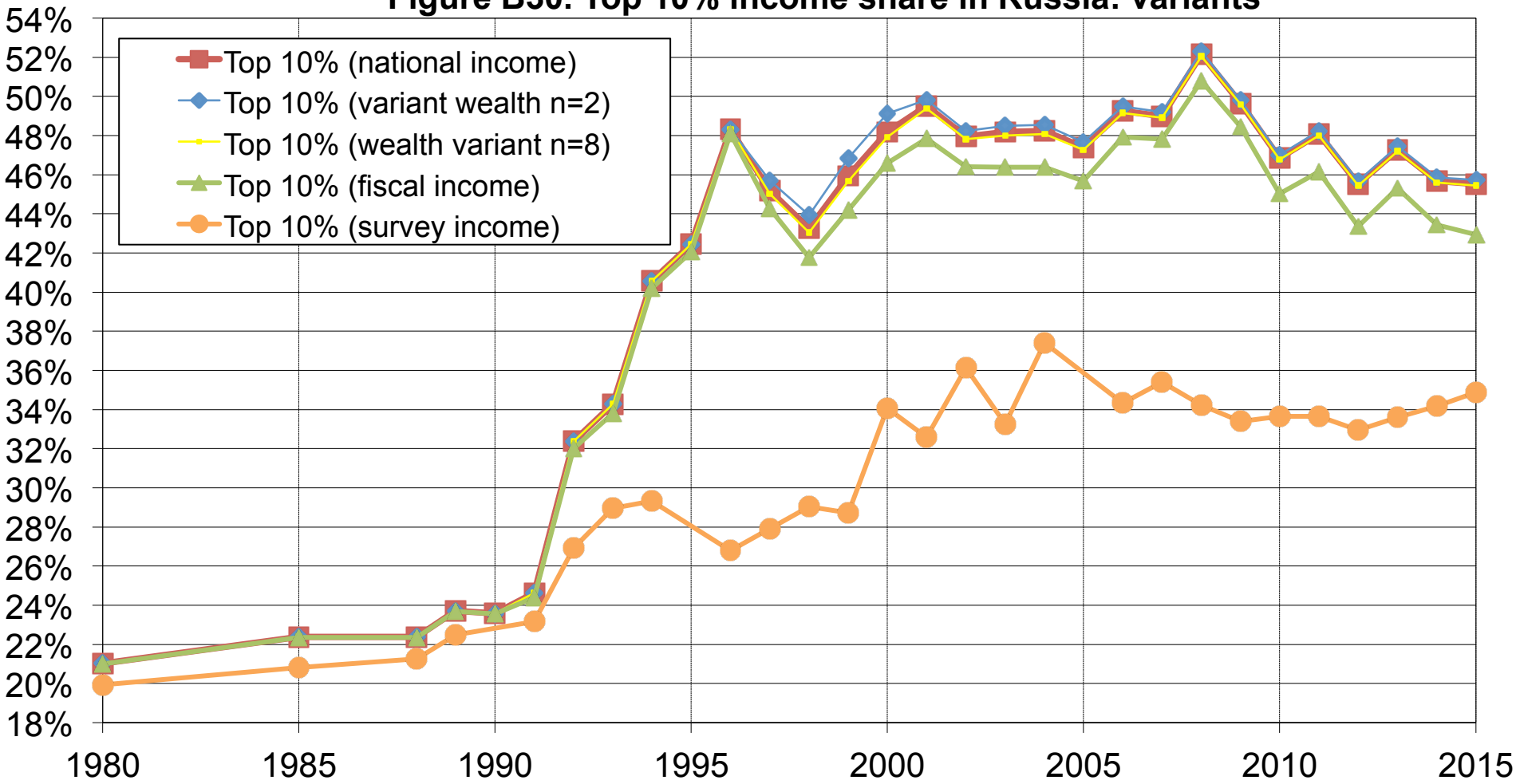
Distribution of income (before taxes and transfers, except pensions and unempl. insurance) among equals-plit adults (income of married couples divided by two). Pretax national income estimates combine survey, fiscal, wealth and national accounts data. Fiscal income estimates combine survey and income tax data (but do not use wealth data to allocate tax-exempt capital income). Survey income series solely use self-reported survey data (HBS).

Figure B24. Gini coefficients in Russia, 1980-2015



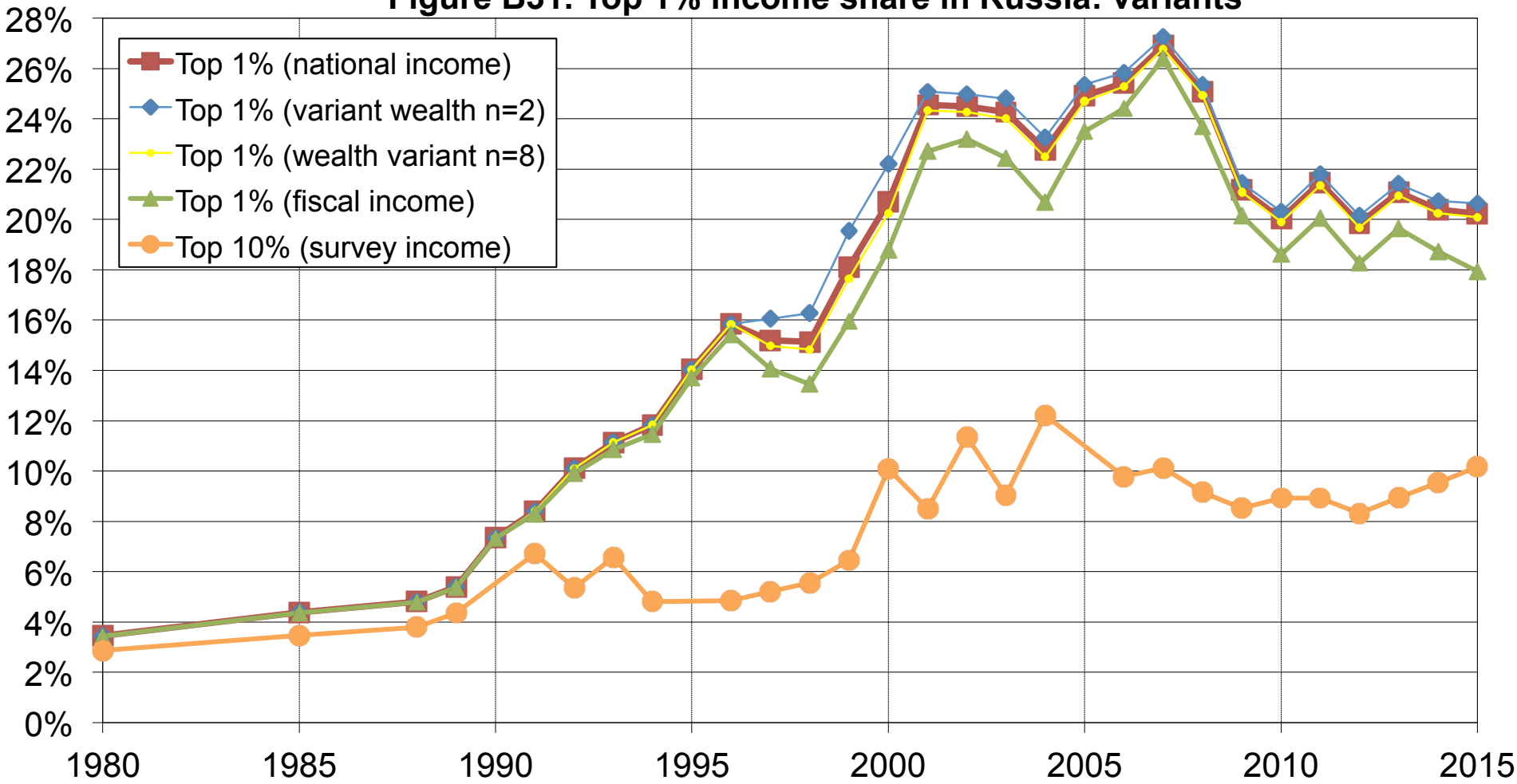
Distribution of income (before taxes and transfers, except pensions and unempl. insurance) among equals-plit adults (income of married couples divided by two). Pretax national income estimates combine survey, fiscal, wealth and national accounts data. Fiscal income estimates combine survey and income tax data (but do not use wealth data to allocate tax-exempt capital income). Survey income series solely use self-reported survey data (HBS).

Figure B30. Top 10% income share in Russia: variants



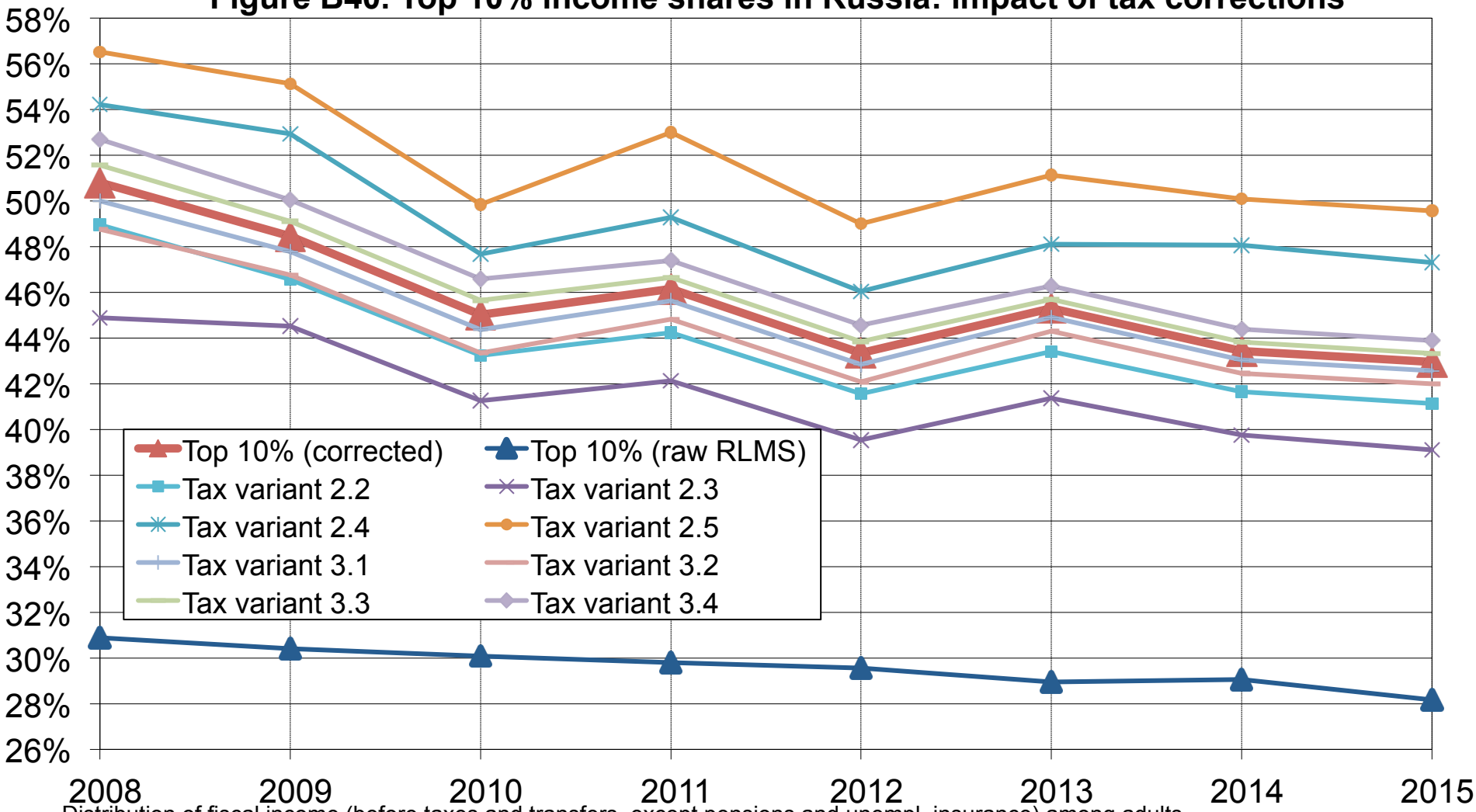
Distribution of income (before taxes and transfers, except pensions and unempl. insurance) among equals-plit adults (income of married couples divided by two). Pretax national income estimates combine survey, fiscal, wealth and national accounts data. Fiscal income estimates combine survey and income tax data (but do not use wealth data to allocate tax-exempt capital income). Survey income series solely use self-reported survey data (HBS).

Figure B31. Top 1% income share in Russia: variants



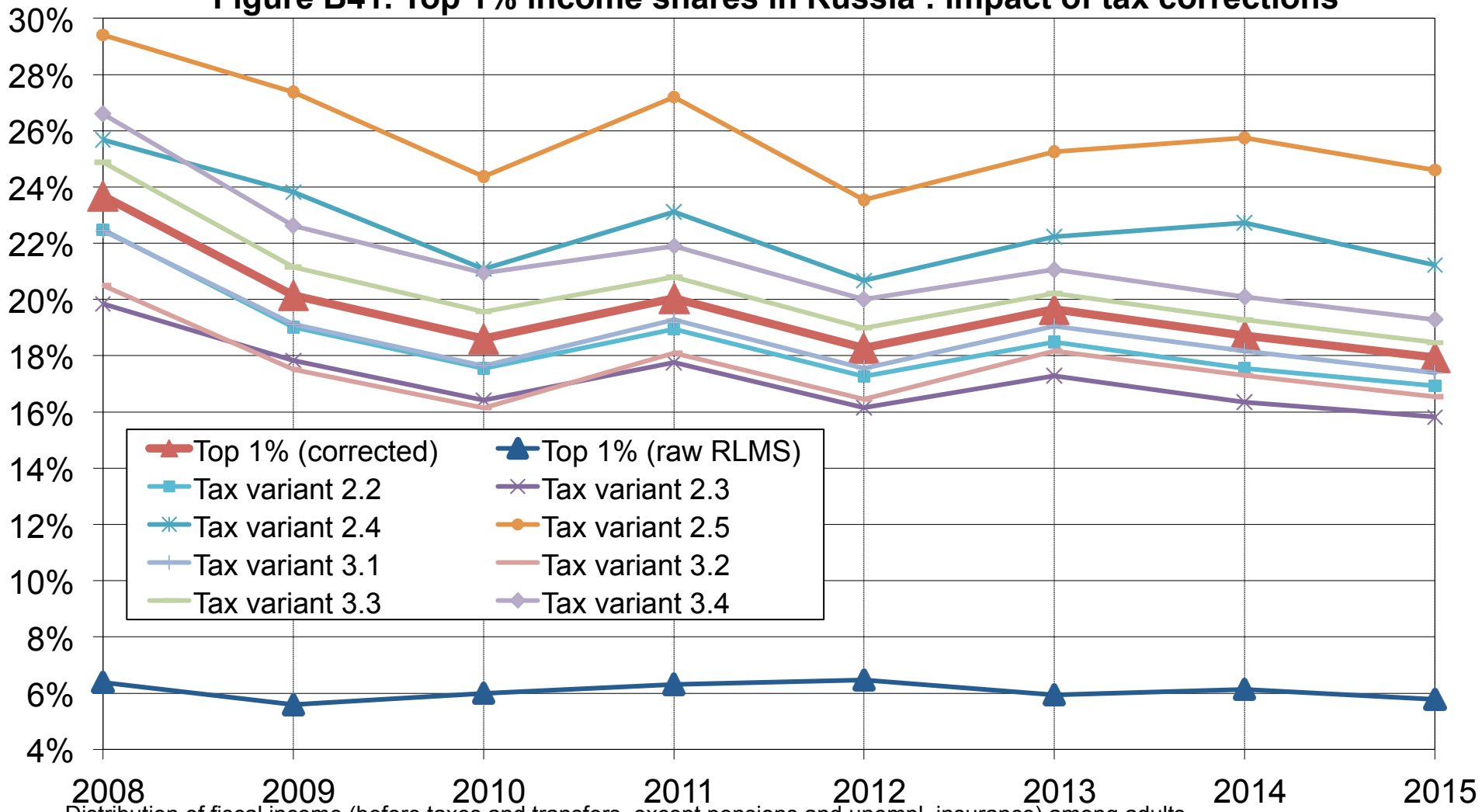
Distribution of income (before taxes and transfers, except pensions and unempl. insurance) among equals-plit adults (income of married couples divided by two). Pretax national income estimates combine survey, fiscal, wealth and national accounts data. Fiscal income estimates combine survey and income tax data (but do not use wealth data to allocate tax-exempt capital income). Survey income series solely use self-reported survey data (HBS).

Figure B40. Top 10% income shares in Russia: impact of tax corrections



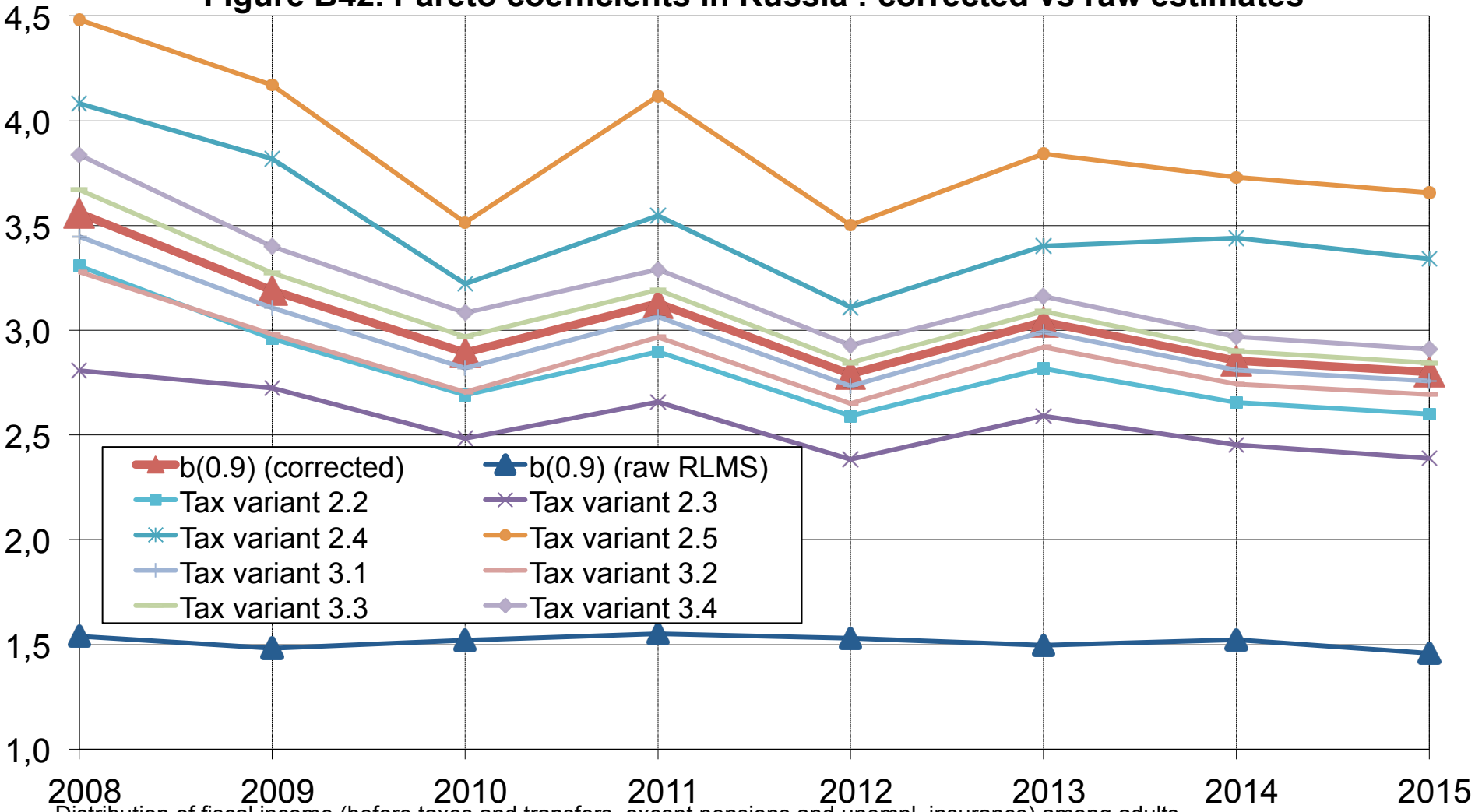
Distribution of fiscal income (before taxes and transfers, except pensions and unempl. insurance) among adults.
Fiscal income estimates combine RLMS survey data and income tax data. Raw estimates rely only on self-reported RLMS survey data.
Equal-split-adults series (income of married couples divided by two).

Figure B41. Top 1% income shares in Russia : impact of tax corrections



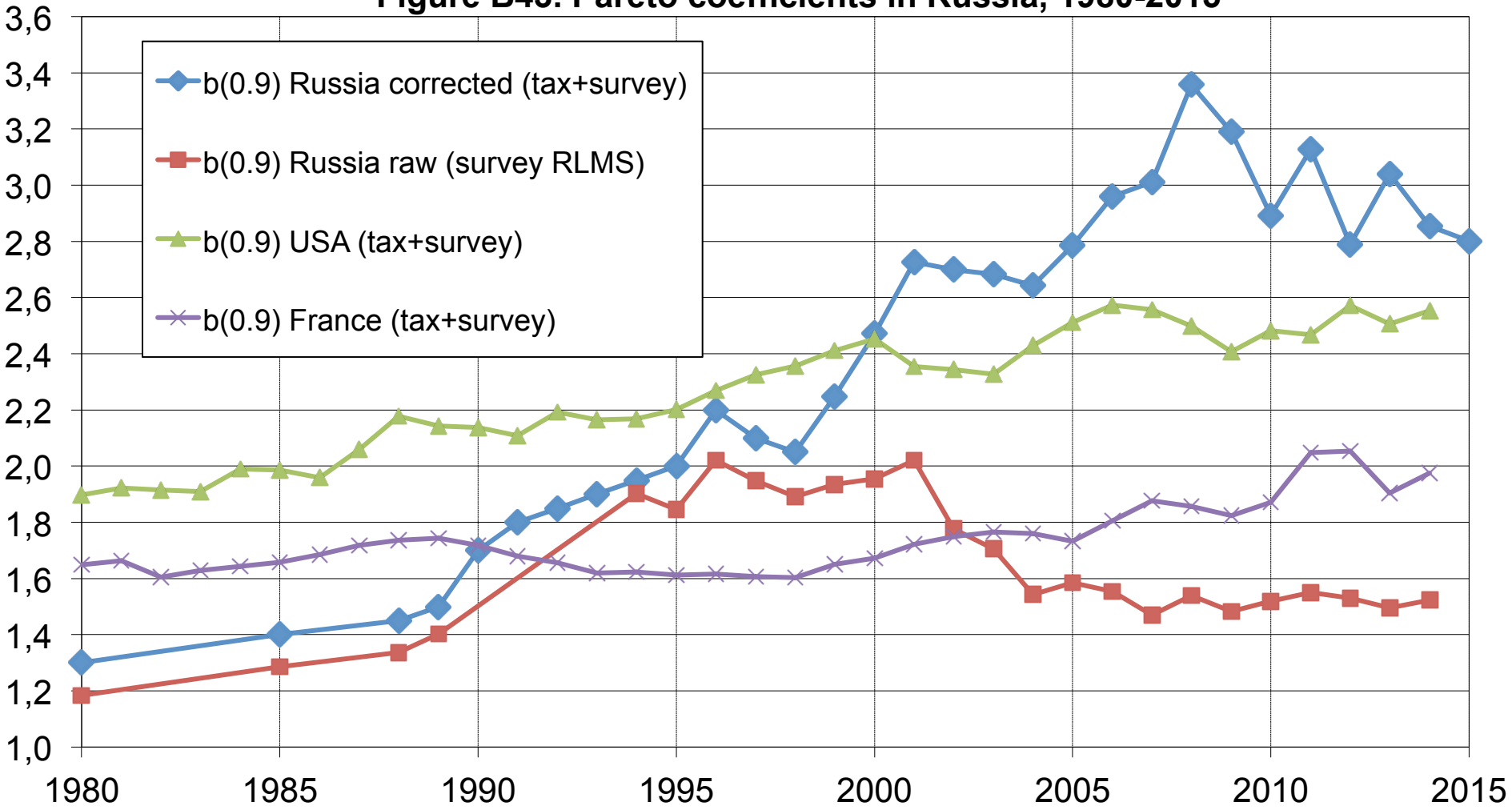
Distribution of fiscal income (before taxes and transfers, except pensions and unempl. insurance) among adults.
Fiscal income estimates combine RLMS survey data and income tax data. Raw estimates rely only on self-reported RLMS survey data.
Equal-split-adults series (income of married couples divided by two).

Figure B42. Pareto coefficients in Russia : corrected vs raw estimates



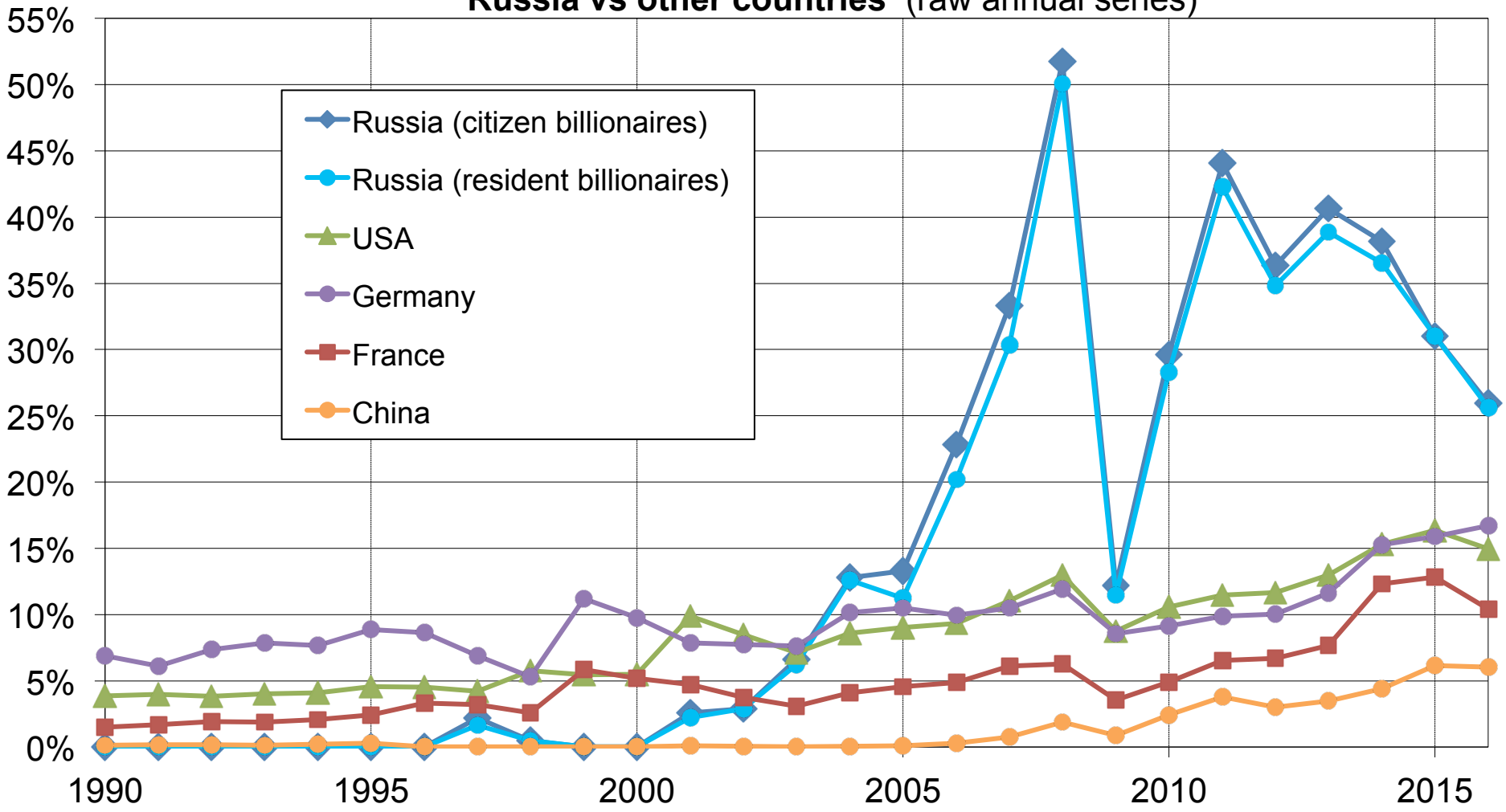
Distribution of fiscal income (before taxes and transfers, except pensions and unempl. insurance) among adults.
Fiscal income estimates combine RLMS survey data and income tax data. Raw estimates rely only on self-reported RLMS survey data.
Equal-split-adults series (income of married couples divided by two).

Figure B43. Pareto coefficients in Russia, 1980-2015



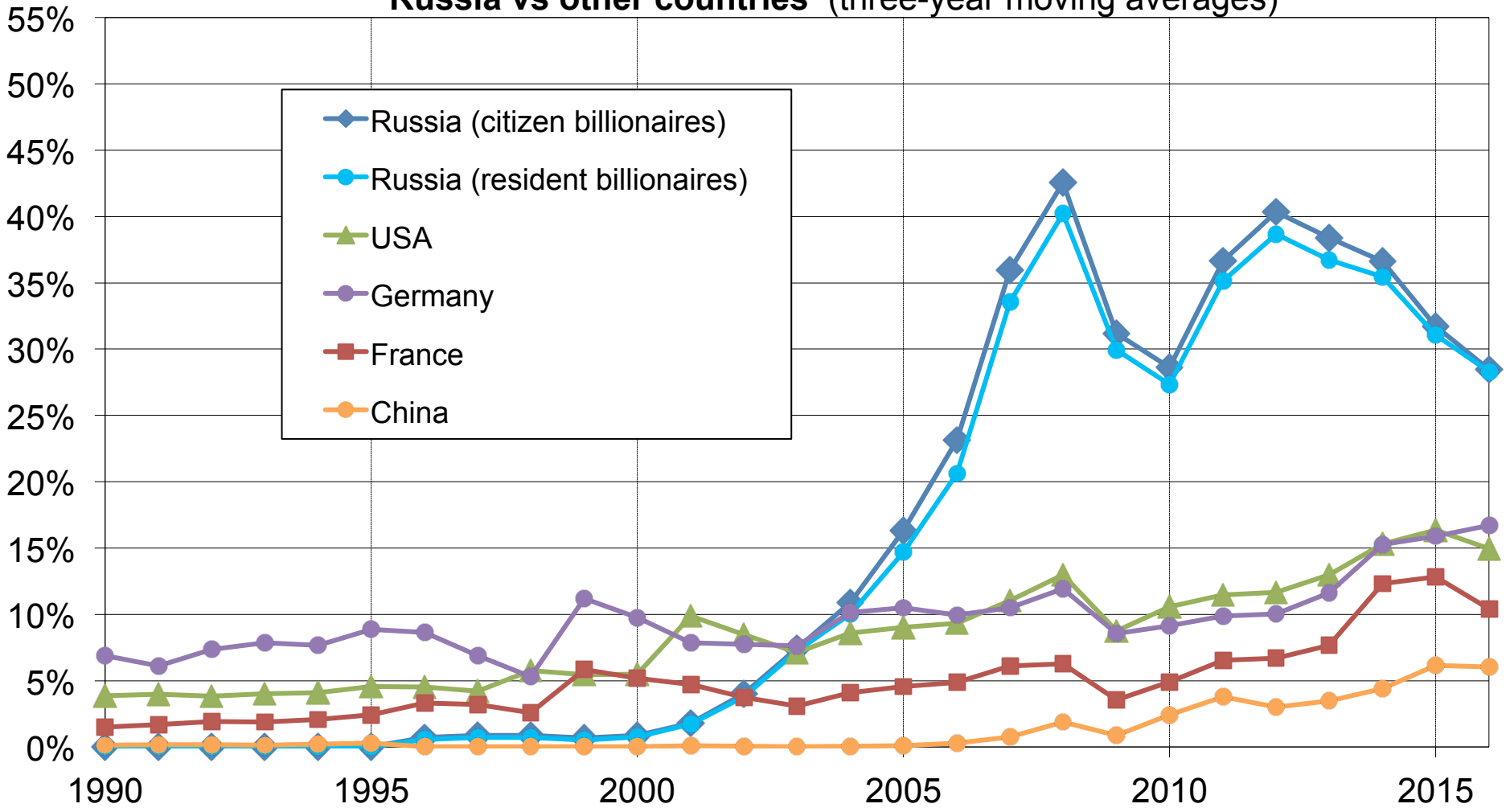
Distribution of fiscal income (before taxes and transfers, except pensions and unempl. insurance) among adults.
Fiscal income estimates combine survey, fiscal, wealth and national accounts data. Raw estimates rely only on self-reported survey data.
Equal-split-adults series (income of married couples divided by two).

Figure B50a. Total Forbes billionaire wealth (% national income): Russia vs other countries (raw annual series)



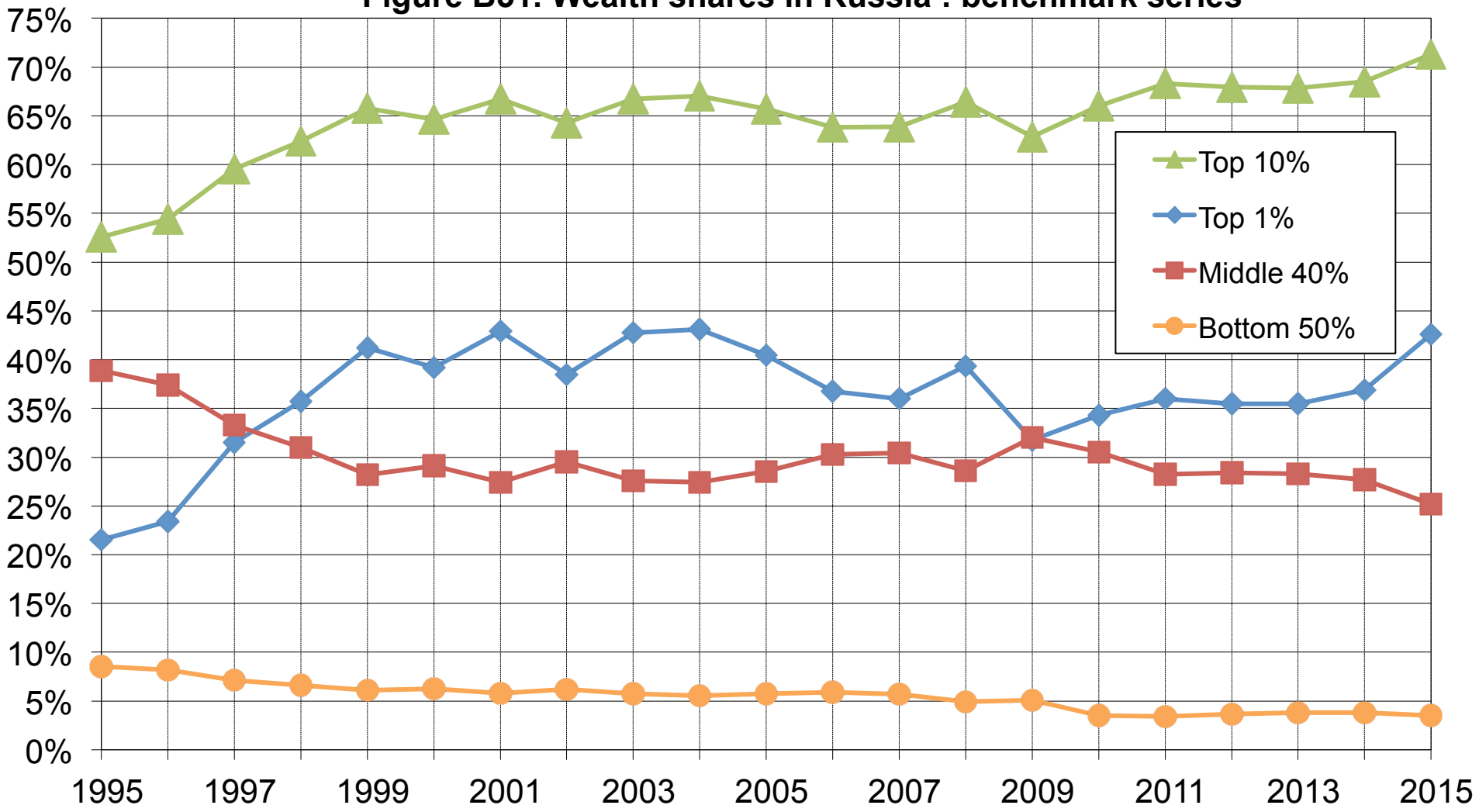
Total billionaire wealth (as recorded by Forbes global list of dollar billionaires) divided by national income (measured at market exchange rates). For other countries only citizen billionaires are reported here (numbers for resident billionaires are virtually identical).

Figure B50b. Total Forbes billionaire wealth (% national income): Russia vs other countries (three-year moving averages)



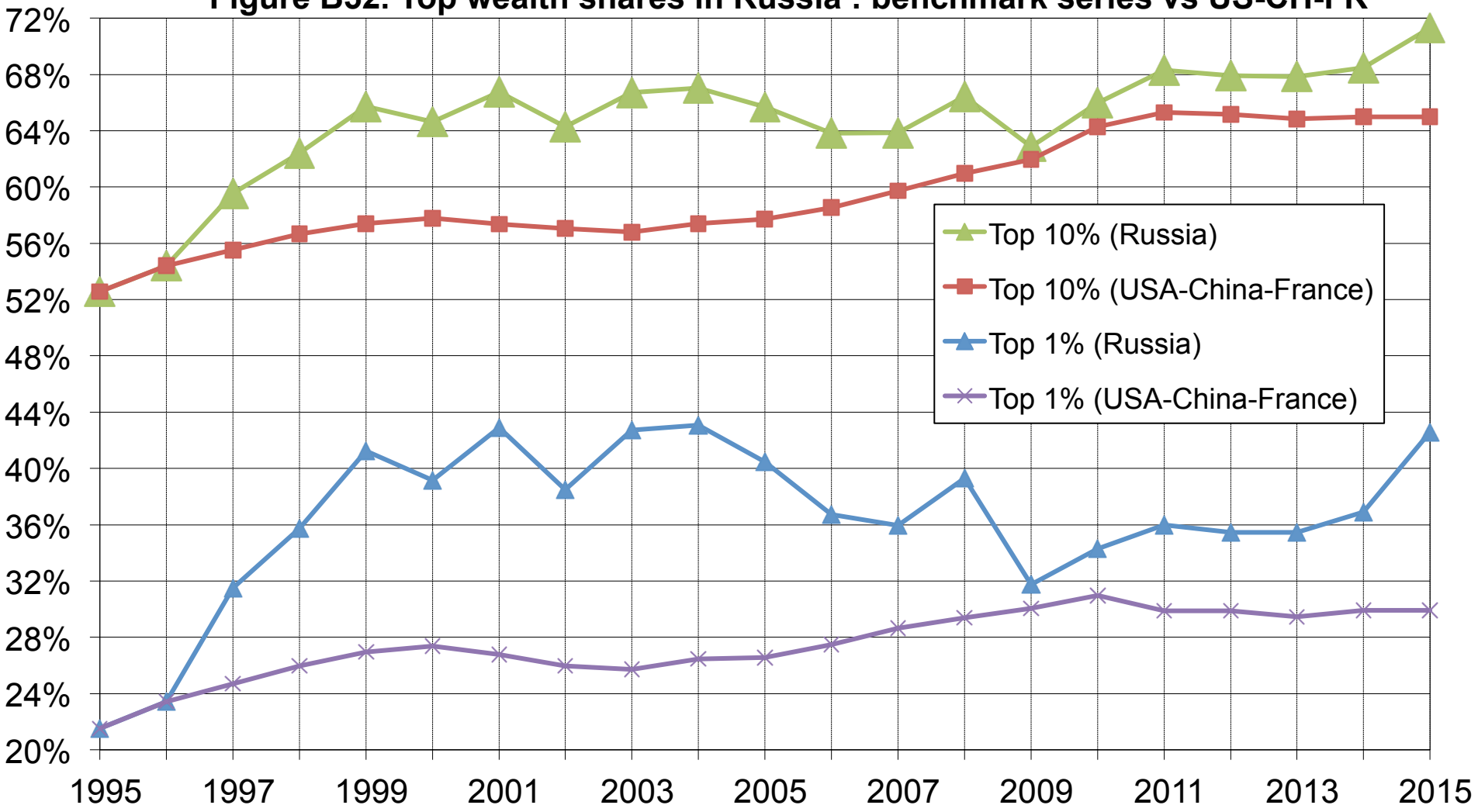
Total billionaire wealth (as recorded by Forbes global list of dollar billionaires) divided by national income (measured at market exchange rates). For other countries, we only report citizen billionaires (numbers for resident billionaires are virtually identical).

Figure B51. Wealth shares in Russia : benchmark series



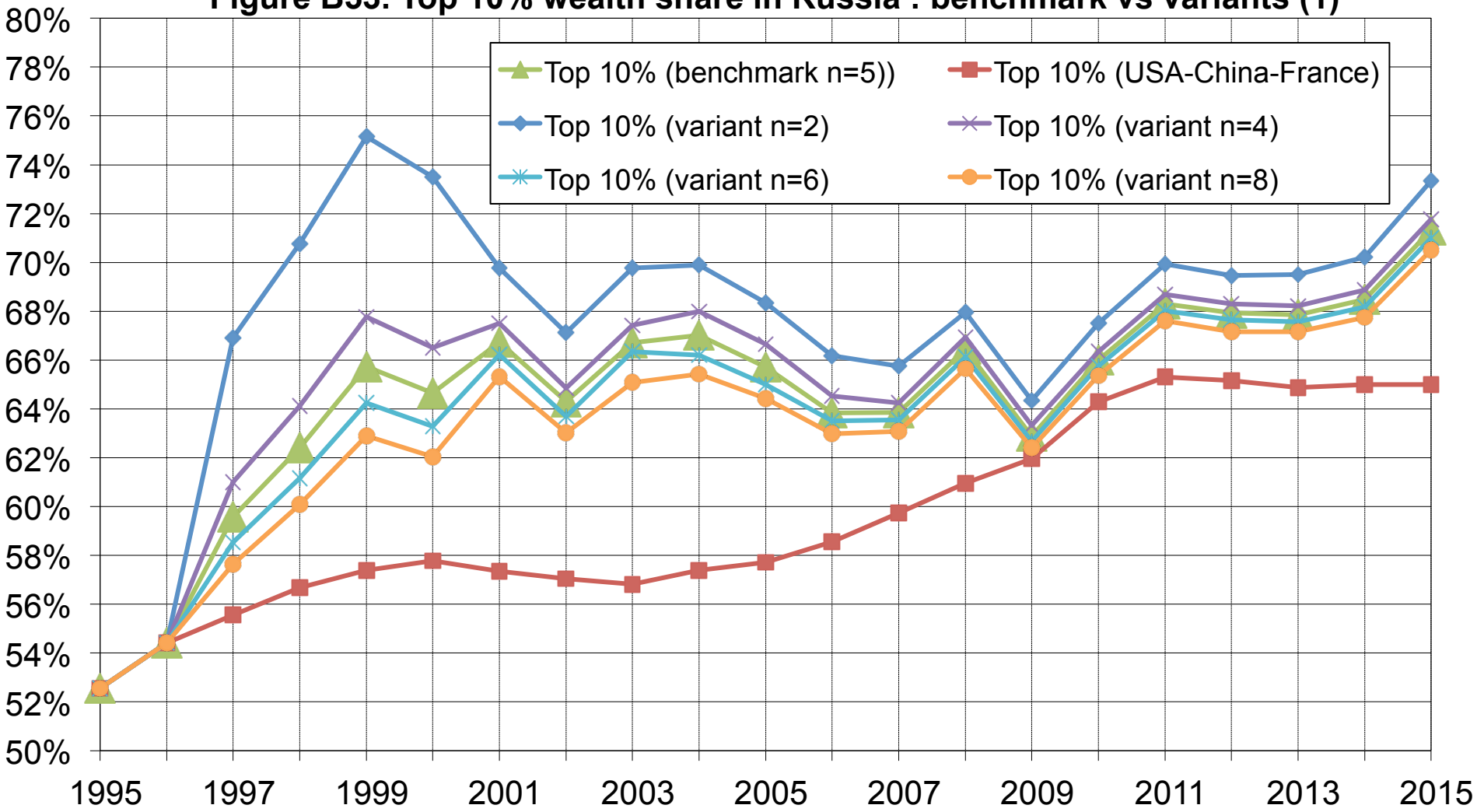
Distribution of personal wealth among adults. Estimates obtained by combining Forbes billionaire data for Russia, generalized Pareto interpolation techniques and average normalized wealth fistribution for USA-China-France. Benchmark series.

Figure B52. Top wealth shares in Russia : benchmark series vs US-CH-FR



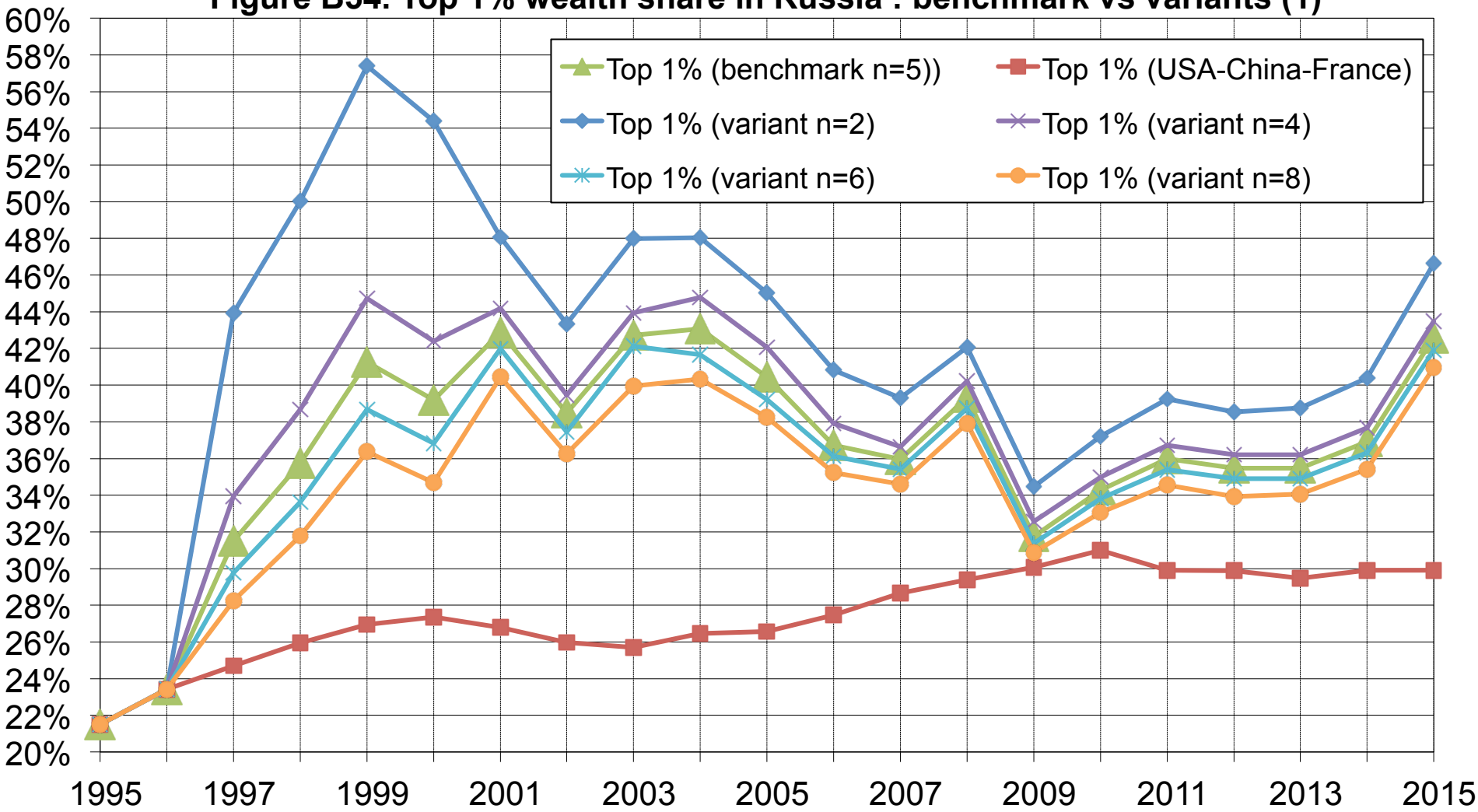
Distribution of personal wealth among adults. Estimates obtained by combining Forbes billionaire data for Russia, generalized Pareto interpolation techniques and average normalized wealth fistribution for USA-China-France. Benchmark series.

Figure B53. Top 10% wealth share in Russia : benchmark vs variants (1)



Variants based upon vaying numbers of adults per billionaire family: n=2,4,5,6,8. Corrections factors corr(p) linear between p=0.99 and billionaire wealth. Estimates 1997-2000 are highly volatile due to small number of billionaires.

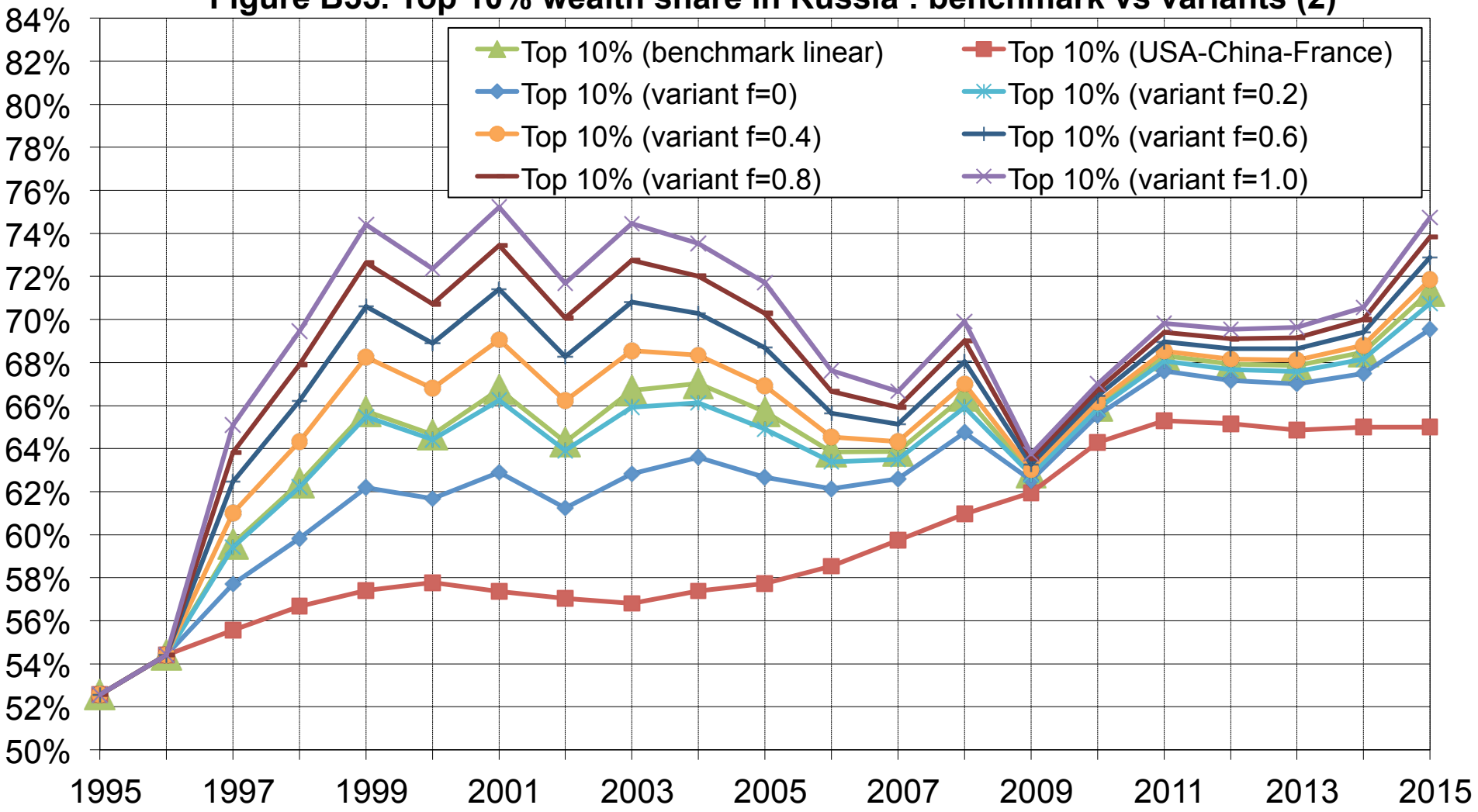
Figure B54. Top 1% wealth share in Russia : benchmark vs variants (1)



Variants based upon vaying numbers of adults per billionaire family: n=2,4,5,6,8. Corrections factors corr(p) linear between p=0.99 and billionaire wealth. Estimates 1997-2000 are highly volatile due to small number of billionaires.

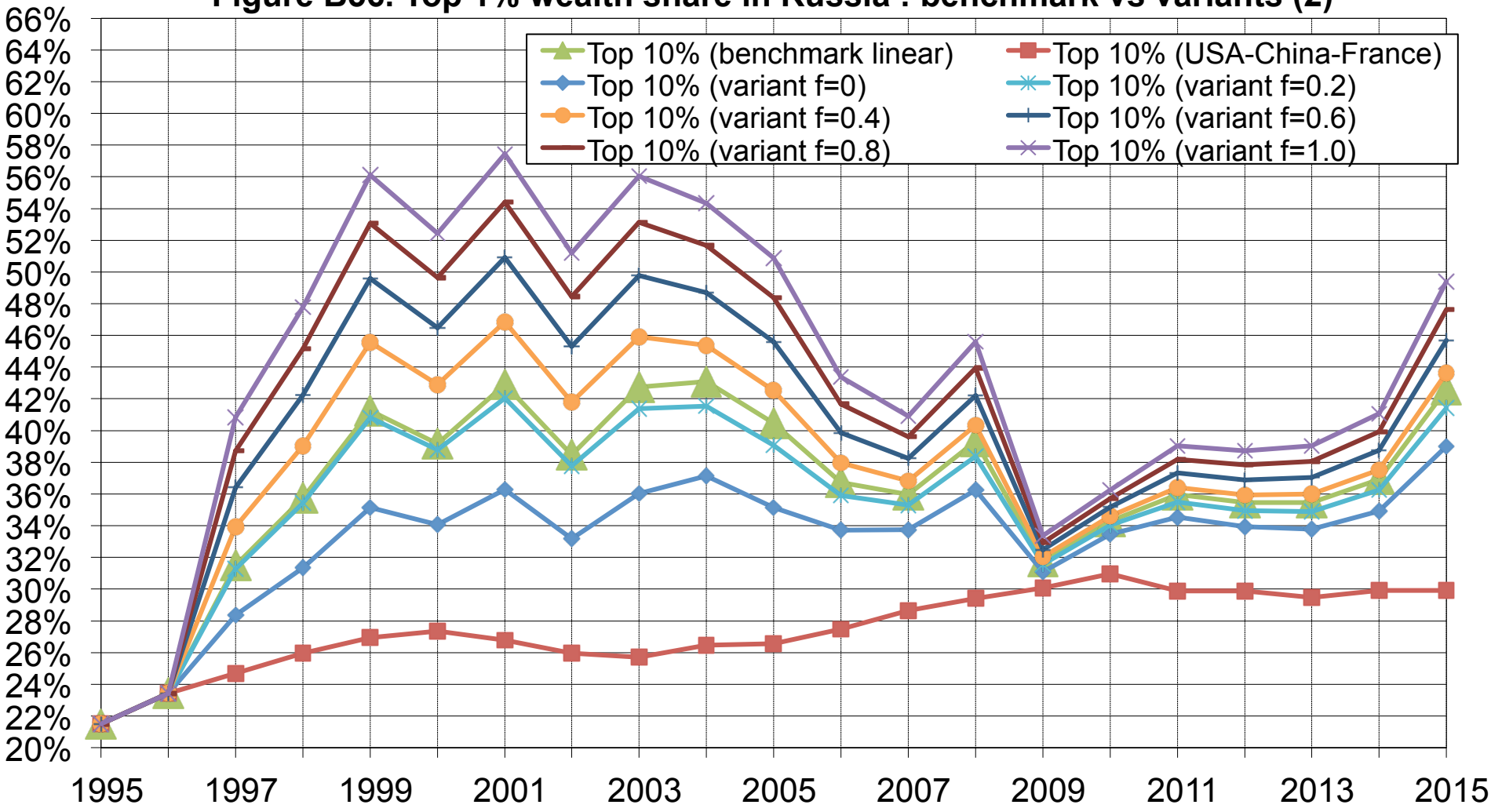
.

Figure B55. Top 10% wealth share in Russia : benchmark vs variants (2)



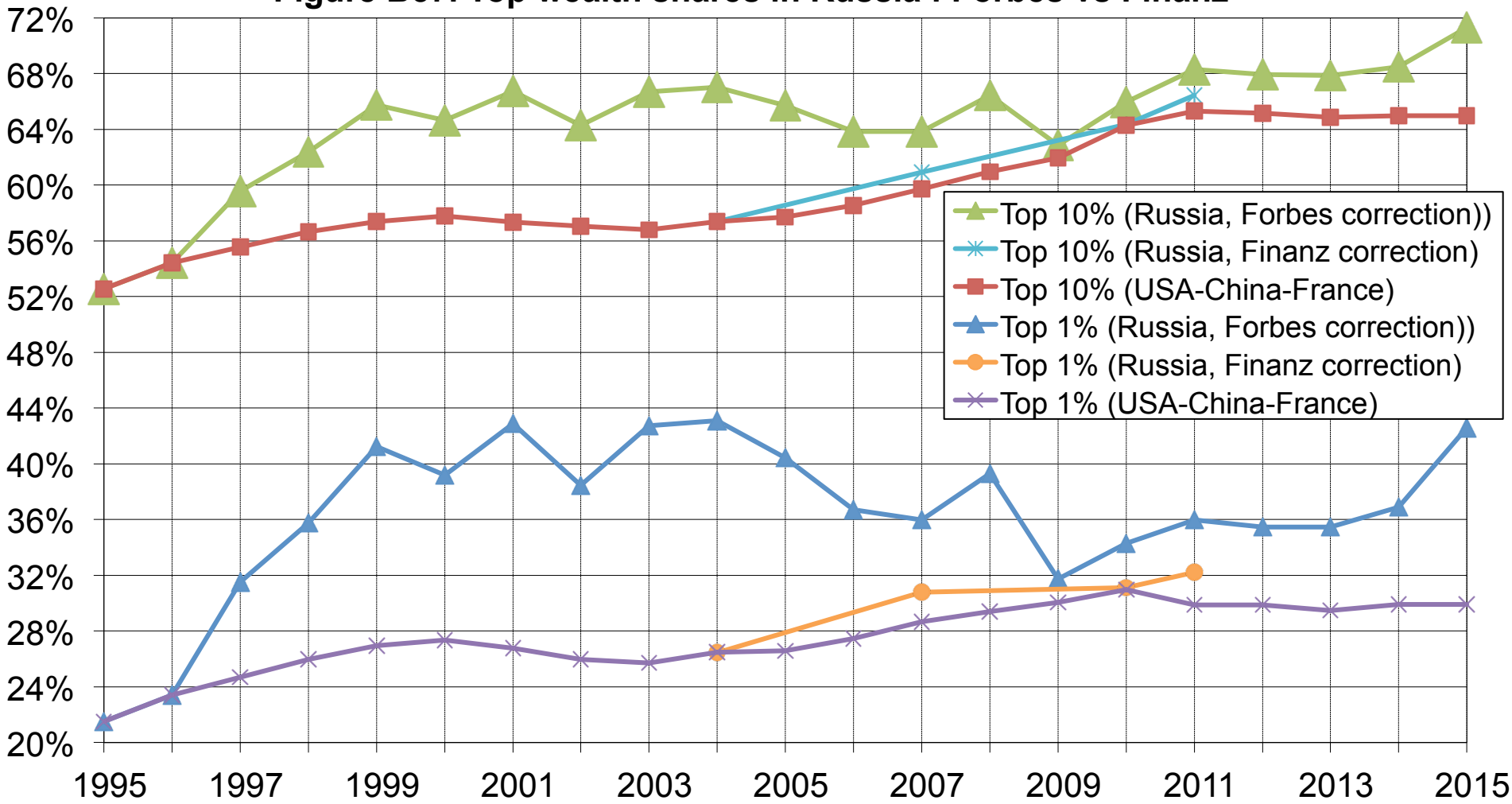
Variants based upon varying slopes of correction factors corr(p): linear between p=0.99 and billionaire level (benchmark) or piecewise linear with fraction f of total correction between p=0.99 and p=0.999. Number of adults per billionaire family n=5.

Figure B56. Top 1% wealth share in Russia : benchmark vs variants (2)



Variants based upon varying slopes of correction factors corr(p): linear between p=0.99 and billionaire level (benchmark) or piecewise linear with fraction f of total correction between p=0.99 and p=0.999. Number of adults per billionaire family n=5.

Figure B57. Top wealth shares in Russia : Forbes vs Finanz



Estimates obtained by combining Forbes and Finanz billionaire data for Russia, generalized Pareto interpolation techniques and average normalized wealth fistribution for USA-China-France. Benchmark series: number of adults n=5, linear corr(p).

Table 1: Income thresholds and income shares in Russia, 2016

Income group	Number of adults	Income threshold	Average income	Income share
Full Population	114.930.000	0 €	23.181 €	100,0%
Bottom 50%	57.465.000	0 €	7.877 €	17,0%
Middle 40%	45.972.000	13.959 €	21.728 €	37,5%
Top 10%	11.493.000	36.311 €	105.516 €	45,5%
incl. Top 1%	*1.149.300*	*133.107 €*	*469.105 €*	*20,2%*
incl. Top 0.1%	*114.930*	*638.423 €*	*2.494.185 €*	*10,8%*
incl. Top 0.01%	*11.493*	*3.715.478 €*	*12.131.771 €*	*5,2%*
incl. Top 0.001%	*1.149*	*18.769.565 €*	*58.575.685 €*	*2,5%*

Notes: This table reports statistics on the distribution of income in Russia in 2016 (expressed in PPP € 2016). The unit is the adult individual (20-year-old and over; income of married couples is splitted into two). In 2016, 1 euro = 74,5 rubles (market exchange rate) or 28,3 rubles (purchasing power parity). Income corresponds to pre-tax national income. Fractiles are defined relative to the total number of adult individuals in the population. Corrected estimates (combining survey, fiscal, wealth and national accounts data). Source: Appendix B.

Table 2: Income growth and inequality in Russia 1989-2016

Income group (distribution of per adult pre-tax national income)	Average annual real growth rate 1989-2016	Total cumulated real growth 1989-2016	Share in total macro growth 1989-2016
Full Population	**1,3%**	**41%**	**100%**
Bottom 50%	**-0,8%**	**-20%**	**-15%**
Middle 40%	**0,5%**	**15%**	**16%**
Top 10%	**3,8%**	**171%**	**99%**
incl. Top 1%	*6,4%*	*429%*	*56%*
incl. Top 0.1%	*9,5%*	*1054%*	*34%*
incl. Top 0.01%	*12,2%*	*2134%*	*17%*
incl. Top 0.001%	*14,9%*	*4122%*	*8%*

Distribution of pre-tax national income among equal-split adults. The unit is the adult individual (20-year-old and over; income of married couples is splitted into two). Fractiles are defined relative to the total number of adult individuals in the population. Corrected estimates (combining survey, fiscal, wealth and national accounts data).

Table 3: Income growth and inequality in Russia 1905-2016

Income group (distribution of per adult pre-tax national income)	Average annual real growth rates			
	1905-2016	1905-1956	1956-1989	1989-2016
Full Population	**1,9%**	**1,9%**	**2,5%**	**1,3%**
Bottom 50%	**1,9%**	**2,6%**	**3,2%**	**-0,8%**
Middle 40%	**2,0%**	**2,5%**	**2,3%**	**0,5%**
Top 10%	**1,9%**	**0,8%**	**2,3%**	**3,8%**
incl. Top 1%	*2,0%*	*-0,3%*	*2,5%*	*6,4%*
incl. Top 0.1%	*2,3%*	*-1,2%*	*2,7%*	*9,5%*
incl. Top 0.01%	*2,5%*	*-2,1%*	*3,0%*	*12,2%*
incl. Top 0.001%	*2,7%*	*-3,0%*	*3,3%*	*14,9%*

Distribution of pre-tax national income among equal-split adults. The unit is the adult individual (20-year-old and over; income of married couples is splitted into two). Fractiles are defined relative to the total number of adult individuals in the population. Corrected estimates (combining survey, fiscal, wealth and national accounts data).