2024 UPDATE FOR WEALTH INEQUALITY

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Estimation of Global Wealth Aggregates in WID.world: Methodology

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Overview

This methodological note presents the concepts, data sources and methods used to reconstruct the balance sheet (i.e. assets minus liabilities) of countries across the globe and that of their different sectors. It is an update of previous similar notes, see Bauluz and Brassac (2020), Bauluz, Blanchet, Martínez-Toledano, and Sodano (2021), and Bauluz, Blanchet, Brassac, et al. (2023). In section A, we define the various concepts of wealth and asset categories that we use. In Section B, we explain the different data sources and methods used to reconstruct the balance sheets. In Section C, we summarize the main changes between this update and the previous one documented in Bauluz, Blanchet, Brassac, et al. (2023).

We first rely on authors' estimates using official balance sheets and/or other official sources when available. When authors' estimates do not exist, we use when possible official balance sheets which are usually published by National Central Banks or National Statistical Offices. When official balance sheets are not available, we rely on other official sources.

Regarding alternative official sources, we rely extensively on the following statistics published by the International Monetary Fund (IMF): the Government Finance Statistics, which include the financial balance sheets of the government sector; the Global Debt Database, which provides information for financial liabilities; and the Public Sector Balance Sheet Database, which also includes the balance sheets of the government sector. We also make use of pension assets estimates from the OECD Global Pension Statistics.

Our estimates of foreign assets and liabilities stem from Nievas and Sodano (2024).

In the case of non-financial assets, we also rely on alternative official data sources whenever authors' estimates are not available. When data on non-financial assets are unavailable from IMF sources above-mentioned, we make use of Eurostat and IMF Investment and Capital Stock fixed assets data. For agricultural land, we use the data on hectares and prices of Eurostat and the information on land operations of FAO's World Agriculture Census for European countries and the estimates from the United Nations' Inclusive Wealth Report for the rest of countries when available. We capitalize the gross value added on agriculture from FAO for countries for which no statistics on agricultural land are available.

In what follows, we explain in detail the concepts, data sources and methods used to estimate Global Wealth Aggregates.

A   Wealth Concepts

This section defines the various concepts of wealth and assets categories that we use. Our wealth concepts are defined using the 2008 System of National Accounts (United-Nations, 2010). We only deviate from these concepts in the treatment of unfunded employers' pensions. This is the same treatment of wealth concepts adopted in the Distributional National Accounts Guidelines (Blanchet, Chancel, Flores, and Morgan, 2021) of the World Inequality Database, to which our project adheres.

For a given country, the SNA-2008 defines 6 basic institutional sectors: 5 resident sectors and the foreign sector. The five resident sectors are households (S.14), non-profit institutions serving households (S.15), non-financial corporations (S.11), financial corporations (S.12), and the general government (S.13). We re-group the five sectors into three: (i) the private sector (the sum of households and non-profit institutions serving households), (ii) the corporate sector (financial plus non-financial corporations), and (iii) the general government.

For a given resident sector i (i.e., private, corporate, or government sectors), wealth (or net worth) is the sum of non-financial assets plus financial assets, less liabilities: $W_i = A_i^{NF} + A_i^F - L_i$. At the country level, we follow the two definitions of national wealth used by Piketty and Zucman (2014). The first one, called the book value of wealth, basically follows the SNA standards by computing, for each resident sector i, their non-financial assets (A_i^{NF}), and adding the net foreign wealth (NFW).[1] Grouping

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[1] In the SNA, the rest of the world sector only holds financial positions, with non-financial assets holdings being accounted as financial. In ESA-2010, non-financial assets of non-residents are classified in AF.519.

households and non-profit institutions into the private sector and financial and non-financial corporations into the corporate sector, book-value of national wealth (W_N^B) can be expressed as follows: $W_N^B = A_P^{NF} + A_C^{NF} + A_G^{NF} + NFW$. The other definition of national wealth, named market-value of wealth (W_N^M), is the sum of private wealth (W_P) and public sector wealth (W_G): $W_N^M = W_P + W_G$.

The link between these two definitions can be traced to the corporate sector. To see this, start with a closed economy, where financial assets cancel out with liabilities, and national wealth equals the national stock of non-financial assets. Given that in an open economy net foreign wealth equals the sum of financial assets A_i^F minus liabilities L_i of resident sectors: $NFW = A_P^F - L_P + A_C^F - L_C + A_G^F - L_G$, then the book-value of national wealth equals the market-value definition plus the wealth of the corporate sector: $W_N^B = W_N^M + W_C$. In our paper we favor the market-value definition of national wealth, but we also present results for book-value national wealth.

As a rule, all financial assets and liabilities of resident sectors are unconsolidated.[2] For the rest of the world, series are consolidated.

Decomposition of the stock of wealth

In what follows, we explain the decomposition of wealth into the assets and liabilities of a given sector. We use as an example the household sector in France. The details of the computations are given in Table 1, where we also provide a number of decompositions into different classes of assets.

	Gross personal wealth	4689
AN, S14	Non-financial assets owned by households	1429
	Housing assets of households	*1174*
AN111, S14	*Dwellings owned by households*	*681*
AN21111, S14	*Land underlying dwellings owned by households*	*493*
	Business and other non-financial assets of households	*255*
AN2112, S14	*Agricultural land of households*	*23*
	Other domestic capital of households	*232*
AF, S14	Financial assets owned by households	3260
AF2+AF3+AF4+AF7+AF8, S14	*Currency, deposits, bonds and loans of households*	*1120*
AF5, S14	*Equity and investment fund shares of households*	*1749*
AF6, S14	*Life insurance and pension funds of households*	*391*
AF, S14	Minus: Liabilities of households	189
	Equals: Net personal wealth	**4500**

Adapted from the SNA-2008 "Sequence of accounts" (United-Nations, 2010) and the French Table of Integrated Economic Accounts (INSEE, 2018).

Table 1: Net Personal Wealth

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[2]The SNA-2008 guidelines indicate that "the accounting entries in the System are not consolidated. Therefore, the financial balance sheet of a resident sector or subsector is to be presented on a non-consolidated basis" United-Nations (2010).

Our basic decomposition includes four classes of assets and liabilities: housing assets, business assets (and other non-financial assets), financial assets, and liabilities. Housing assets are defined as the sum of the market value of dwellings and land underlying dwellings: in practice, it is generally easier to measure the sum (as in observed real estate transactions) than the two components separately. Business assets (and other non-financial assets) are the difference between total non-financial assets and housing assets.

Note that existing national balance sheets do not always provide separate estimates for the different uses of land. The most recent international system of national accounts (SNA-2008) does not provide a decomposition of land into different components. This is in contrast with the previous international guidelines (SNA-1993) which did provide a disaggregation of land. The adaptation of the SNA-2008 in Europe by the European Commission (ESA-2010) has, however, retained a basic decomposition of land into four categories: Land underlying buildings and structures (AN.2111), Land under cultivation (AN.2112), Recreational land and associated surface water (AN.2113), Other land and associated surface water (AN.2119). The latter two categories (AN.2113 and AN.2119) are generally very small and sometimes are not even estimated in official balance sheets.

Moreover, the SNA-2008 recommends following the disaggregation of land proposed by the System of Environmental-Economic Accounting (United-Nations (2014)) whenever national statistical offices want to decompose land. This land disaggregation is consistent with that of ESA-2010, but adds a more detailed decomposition of Land underlying buildings and structures (AN.2111) and Land under cultivation (Land under cultivation (AN.2112). The former is decomposed into Land underlying dwellings (AN.21111) and Land underlying other buildings and structures (AN.21112). The latter is decomposed into Agricultural land (AN.21121), Forestry land (AN.21122), and Surface water used for aquaculture (AN.21123). Many national statistical agencies follow this break down.

We aim at using the more detailed decomposition suggested by System of Environmental-Economic Accounting whenever possible. In particular, our objective is to capture housing (including its underlying land) and agricultural land, as these have been the two most important assets owned by households over their path of development (e.g., Piketty and Zucman, 2014). Moreover, we also break down 'Other domestic capital' into natural resources other than land and business assets. Natural resources such as mineral and energy reserves can be very substantial in certain countries, in particular in developing ones.

A special mention on how agricultural land is defined. The Eurostat-OECD manual on land estimation (Eurostat-OECD, 2015) defines agricultural land as "Land primarily used for agricultural purposes. The total of land under temporary or permanent crops, meadows

and pastures as well as land with temporary fallow; this category includes tilled and fallow land, and naturally grown permanent meadows and pastures used for grazing, animal feeding or agricultural purpose. Excludes land underlying farm dwellings, farm buildings or other corresponding structures". While statistical offices not always report data on the value of agricultural land, many compile statistics on agricultural land area, classifying this land into three basic types: arable land, permanent grassland, and permanent crops.[3] These statistics have a long history, both in rich and developing countries. The Food and Agriculture Organization has fostered their collection over more than half a century, within the framework of the decennial World Census of Agriculture (e.g., Deininger and Squire, 1998; Frankema, 2010). As we explain in the data sources and methods section (section B), in some countries, we will use these statistics to provide our own estimates of agricultural land values.

We split financial assets into three categories: currency, deposits, bonds and loans (the sum of AF1, AF2, AF3, AF4, AF7 and AF8), equity and investment fund shares (AF5), and life insurance and pension funds (AF6). For all sectors, we report total liabilities, except for corporations, where we distinguish between equity and non-equity liabilities.

Finally, we consider that one aspect of the current SNA's definition of financial assets is problematic: the range of pensions that are included within asset category AF6. While the SNA-1993 only included funded pension assets, the most recent SNA-2008 also includes unfunded employers' pensions. In our view, and that of the DINA project, the SNA-2008 treatment is not satisfactory, since unfunded pensions are promises of future transfers that are not backed by actual wealth. In the United States, Saez and Zucman (2016) remove unfunded pensions from wealth. In other countries, we have been unable to remove this component at the moment, but hope to make progress in the future. For some countries, we already know that unfunded pensions are either not part of official balance sheets (France and the UK) or have a very low value (Germany).

B   Data Sources and Methods

B.1   Authors' Estimates

The are some countries for which balance sheets were already reconstructed using official balance sheets and/or other official sources. Piketty and Zucman (2014) assemble the

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[3]In most countries, arable land and permanent grassland are the most important types of agricultural land, followed by permanent crops (Eurostat-OECD, 2015, pg. 126). Some countries do also include a forth category: kitchen gardens. This type of land is almost irrelevant when compared to other land categories and should be included within land underlying buildings and structures (AN.2111) for national accounts purposes (Eurostat-OECD, 2015, chapter 8). As we explain below, we have made use of statistics on agricultural land area to estimate agricultural land values, and have excluded kitchen garden, when possible.

balance sheets of Australia (1970-2010), Canada (1970-2010), France (1700-2010), Germany (1870-2010), Japan (1960-2010), Italy (1965-2010), the United Kingdom (1700-2010) and the United States (1770-2010). We update the series up to 2023 using official balance sheets or extrapolating when not available, and follow the previous updates of the series made by Bauluz (2019), Bauluz and Brassac (2020), Bauluz, Blanchet, Martínez-Toledano, and Sodano (2021) and Bauluz, Blanchet, Brassac, et al. (2023).

For the United States, we build upon the data sources and methodology from Piketty, Saez, and Zucman (2018)[4], to extend their series until 2023. Albers, Bartels, and Schularick (2022) revise and update the German series from 1895 to 2018. We further update these series up to 2023, following the same assumptions as the authors. Waldenström (2017) and Artola Blanco, Bauluz, and Martínez-Toledano (2021) respectively reconstruct the balance sheets of Sweden (1810-2014) and Spain (1900-2017) and have updated their series up to 2022/2023[5] and 2022[6]. We therefore also update Swedish data up to 2023 by making use of official balance sheets. Baselgia and Martínez (2020) build the balance sheet of Switzerland since 1900 and we rely on their series for the time frame and asset categories that are not available through official online data sources. In particular, we use their series of net private wealth (1900-1999), public non-financial assets (1990-2018), public financial assets, public financial liabilities and net public wealth (1990-1998). We update Swiss financial wealth series with official data up to 2023 and extrapolate the non-financial ones. We opt for the same procedure for Ireland (1995-2019) to extend up to 2023 the series produced by Daly and Morgan (2021). For the Netherlands, Toussaint, de Vicq, Moatsos, and van der Valk (2022) put together the balance sheets for the Netherlands (1853-2019), that we update up to 2023 using official balance sheets.

Novokmet, Piketty, and Zucman (2018), Kumar (2019), Chatterjee, Czajka, and Gethin (2020), and Mo, Wang, Yang, and Zhang (2024) respectively reconstruct the balance sheets of Russia (1905-2016), India (1860-2012), South Africa (1975-2018), and China (1979-2020)[7]. Except for China, we update these series up to 2023 for Russia, 2020 for India, and 2023 for South Africa using official balance sheets or extrapolating when not available. We also add together official financial balance sheets for Brazil (2005-2021), Chile (2003-2023), and Colombia (1997-2023) with data from Carranza, De Rosa, and Flores (2023) on private non-financial assets in Brazil (1999-2018; which we extend up to 2021 using the same methodology) and private wealth in Uruguay (2010-2016).

For India, in addition to the series of national wealth from Kumar (2019), we provide

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[4]Last updated in February 2022, see: `https://gabriel-zucman.eu/usdina/`.

[5]See: `https://www.dropbox.com/s/pnjgdw67k3r1nq2/SNWD.xlsx?dl=0`. 2023 for financial sectoral balance sheets, 2022 for non-financial ones.

[6]See: `https://sites.google.com/view/spainwealthdatabase/`.

[7]For China, Mo, Wang, Yang, and Zhang (2024) revise, improve and extend both backwards and onwards the previous national balance sheet produced by Piketty, Yang, and Zucman (2019).

data for the household sector covering the period 1991-2020. For financial assets and liabilities, we use OECD Financial Accounts for the years 2012-2020. We extend the series back to 1991 using the growth rate for the equivalent categories in the All-India Debt and Investment Survey (AIDIS), which counts two waves before the one of 2012: 1991 and 2002. For non-financial assets, we estimate the value of housing, agricultural land, and other non-financial assets from the AIDIS in 1991, 2002 and 2012. We extend the housing series forward to 2020 using the house price index collected by the BIS ('Residential property prices'), combined with a series of population growth (a proxy for new residential investment). For agricultural land and other non-financial assets post-2012, we assume that they have remained constant as a percentage of national income. Note that the same procedure is also followed to extend the Russian series of household non-financial assets since 2015, and we use average dwelling price series from BIS.

B.2   Financial Assets and Liabilities

To reconstruct the balance sheet of financial assets and liabilities, we rely when possible on official balance sheets, which are usually published by National Central Banks or National Statistical Offices. When official balance sheets are not available, we rely on other official sources. In what follows, we detail the availability of sources and the methods used for countries for which partial or complete data are available.

B.2.1   Official Financial Accounts

We have collected official financial balance sheets by institutional sector and asset type for the following countries: Albania (2014-2022), Austria (1996-2023), Belgium (1996-2023), Bulgaria (1996-2023), Croatia (1996-2023), Cyprus (1996-2023), Czech Republic (1993-2023), Denmark (1995-2023), Estonia (1996-2023), Finland (1996-2023), Greece (1996-2023), Hungary (1990-2023), Iceland (2004-2023), Israel (2011-2021), Latvia (1993-2023), Lithuania (1996-2023), Luxembourg (1996-2023), Malta (1996-2023), Mexico (2004-2022), New Zealand (2008-2022), North Macedonia (2014-2022), Norway (1996-2023), Poland (1996-2023), Portugal (1995-2023), Romania (1996-2023), Singapore (1996-2023), Slovakia (1996-2023), Slovenia (1996-2023), South Korea (2008-2023), Taiwan (2001-2022), and Turkey (2011-2023). The countries for which we rely on authors' estimates do also have official financial accounts for the recent period. It is the case of: Australia (1990-2023), Brazil (2005-2021), Canada (1991-2023), Chile (2003-2023), China (2000-2020), Colombia (1997-2023), France (1996-2023), Germany (1996-2023), Italy (1996-2023), India (2012-2020), Ireland (2002-2023), Japan (1995-2022), the Netherlands (1996-2023), Russia (2012-2023), South Africa (1976-2023), Spain (1971-2022), Sweden (1981-2023), Switzerland (2000-2023), the United Kingdom (1988-2023), and the United States (1947-2023).

B.2.2 International Monetary Fund Statistics

For countries for which official financial balance sheets are not available, we need to rely on other sources. The International Monetary Fund (IMF) publishes rich financial statistics for a much larger set of countries than those available in official financial balance sheets. In particular, we rely on three main data sources: the *Government Finance Statistics*, which include the financial balance sheets of the government sector, the *Global Debt Database*, which provides information for financial liabilities of the general and / or central government, and the *Public Sector Balance Sheet Database*, which also includes the balance sheets of the government sector.

Government Finance Statistics (GFS)

The Government Finance Statistics (GFS) database contains detailed government data on revenues, expenditures, transactions in financial assets and liabilities, and balance sheet data for all reporting countries in the framework of the Government Finance Statistics Manual 2014 (GFSM 2014). The database includes data for the general government sector and its subsectors (i.e., central government (budgetary/extra-budgetary central government and social security funds), local government and state government). GFS data are compiled by country authorities and reported to the IMF Statistics Department annually.

We rely on these statistics for countries for which official data balance sheets are not available. We prefer this database over the *Monetary and Financial Statistics* (MFS) database for the government sector, as it contains information for the full balance sheet by financial instrument.

The countries for which information for the general government is available and we rely on are the following: Belarus (Assets: 2014-2019, Liabilities: 2005-2019), El Salvador (2005-2019), Indonesia (2008-2019), Kazakhstan (Assets: 2013-2019, Liabilities: 2010-2019), Kyrgyzstan (2014-2018), Moldova (Assets: 2005-2019, Liabilities: 2002-2019), Mongolia (2014-2018), Morocco (Liabilities: 2006-2011), Seychelles (2008-2015), Thailand (2012-2019), Uganda (Assets: 2004-2019, Liabilities: 1998-2019), Ukraine (2008-2019), United Arab Emirates (Assets: 2013) and Uruguay (2001-2019).

The countries for which information only for the budgetary central government is available and we rely on are the following: Anguilla (Liabilities: 2005-2014), Armenia (Assets: 2019, Liabilities: 2003-2019), Bahamas (Liabilities: 1990-2000; 2006-2019), Barbados (Asstes: 2005-2015, Liabilities: 2004-2015), Bolivia (Assets: 2003-2007, Liabilities: 1998-2007), Bosnia and Herzegovina (2011-2019), Burkina Faso (2018-2019), Costa Rica (Assets: 2008-2019, Liabilities: 1998-2001, 2008-2018), Dominican Republic (2006, 2018-2019), Ethiopia (2013-2019), Iraq (2015-2019), Jamaica (Liabilities: 1990-2019), Jordan (Assets: 2008-2019,

Liabilities: 1995-2019), Montserrat (Liabilities: 2000-2014), Mozambique (2016-2019), Oman (Assets: 2010-2013, Liabilities: 2003-2013), Republic of Congo (2009-2010) and Serbia (2007-2012).

Finally, the countries for which only information for the state government is available and we rely on are Micronesia (2008-2019) and Peru (Assets: 2006-2019, Liabilities: 2009-2019).

Global Debt Database

The Global Debt Database (GDD) comprises total gross debt of the private and public nonfinancial sector for a large set of advanced, emerging and low-income countries. The GDD is more limited in scope for our purpose than GFS, as it does not contain any information on assets and it only includes partial information for liabilities (i.e., loans and debt securities).[8] Hence, we rely on it for countries for which GFS data is inexistent or incomplete for the government sector only.

The countries for which information on debt of the general government is available and we rely on are the following: Cambodia (1995-2022), Egypt (1960-1962, 1970-2022), Georgia (1995-2022), Honduras (1960-2022), Kosovo (2009-2022), Kyrgyzstan (1994-2022), Mauritius (1970-2022), Nicaragua (1997-2022), Nigeria (1968-2022), Panama (1960-2022), Philippines (1960-2022), Saint Vincent and the Grenadines (1970-2022), Saint Kitts and Nevis (1984-2022), Tajikistan (1998-2022), Tanzania (1970-2022), Thailand (1960-2022), United Arab Emirates (1973-2022), Uzbekistan (1998-2022), Venezuela (1960-2022), Vietnam (1991-2022), Yemen (1990-2022).

The countries for which information on debt of the general government is not available, but instead debt of the central government is available and we rely on are the following: Afghanistan (2002-2020), Algeria (1970-2022), Angola (1995-2022), Antigua and Barbuda (1990-2022), Argentina (1960-2022), Azerbaijan (1994-2022), Bangladesh (1973-2022), Bahrain (1974-2022), Belize (1976-2022), Benin (1970-2022), Botswana (1972-2022), Brunei Darussalam (2001-2022), Burundi (1964-2022), Cabo Verde (1981-2022), Cameroon (1970-2022), Central African Republic (1970-2022), Chad (1970-2022), Comoros (1984-2022), Cote d'Ivoire (1970-2022), Democratic Republic of Congo (1970-2022), Djibouti (1995-2022), Dominica (1975-2022), Ecuador (1990-2018), Equatorial Guinea (1980-2022), Eritrea (1995-2022), Fiji (1970-2022), Gabon (1970-2022), Gambia (1973-2022), Ghana (1962-2022), Grenada (1970-2022), Guatemala (1960-2022), Guinea-Bissau (1986-2022), Guyana (1963-2022), Haiti (1970-2022), Hong Kong (2001-2021), Iran (1970-2022), Kenya (1963-2022), Kuwait (1987-2022), Laos (1976-2022), Lebanon (1970-2020), Lesotho (1970-2022), Liberia (1973-1983, 2000-2022), Libya (1973-2017), Madagascar (1970-2022), Maldives (1976-2022), Mali (1970-2022), Mauritania (1970-2022), Myanmar (1970-2022), Namibia

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[8]For more details on the methodology and definitions, please see Mbaye, Badia, and Chae (2018).

(1989-2022), Nepal (1970-2022), Niger (1970-2022), Pakistan (1960-2022), Papua New Guinea (1970-2022), Paraguay (1970-2022), Qatar (1990-2022), Rwanda (1970-2022), Samoa (1970-2022), Sao Tomé and Principe (1977-2022), Senegal (1970-2022), Sierra Leone (1970-2022), Solomon Islands (1978-2022), South Sudan (2012-2022), Sri Lanka (1960-2022), Saint Lucia (1981-2022), Sudan (1992-2022), Suriname (1971-2022), Swaziland (1970-2022), Syria (1970-2010), Timor-Leste (2012-2022), Togo (1970-2022), Tonga (1985-2022), Trinidad and Tobago (1963-2022), Tunisia (1970-2022), Vanuatu (1981-2022), Zambia (1970-2021), Zimbabwe (1964-2022).

Public Sector Balance Sheet (PSBS)

The Public Sector Balance Sheet (PSBS) Database is an alternative source on public wealth statistics by financial instrument, which was developed in the context of the October 2018 Fiscal Monitor. The dataset is compiled using the conceptual framework of the IMF's Government Finance Statistics Manual 2014 (GFSM 2014), so that it is also fully consistent with SNA. The two government sectors covered are the general and the central government. The set of countries covered is smaller and the time frame shorter, so that we only rely on these statistics when not available in GFS.

The only two countries for which information on public wealth in available in PSBS and we rely on are thus Bhutan (2000-2016) and Georgia (2012-2016).

B.2.3 OECD Pension Wealth

In addition to estimates of pension assets available from official balance sheets, we rely on the OECD Global Pension Statistics (see OECD, 2023). The database compiles estimates of pensions for more than 90 countries over the period 2001-2021. The definition, concept, and valuation of pension assets used by OECD follows SNA-2008 standards. The countries for which we use OECD data are the following: Angola (2014-2021), Argentina (2002-2007), Armenia (2014-2021), Bolivia (2002-2010), Botswana (2013, 2017-2020), Costa Rica (2001-2021), Dominican Republic (2005-2020), Egypt (2008, 2013-2021), El Salvador (2002-2021), Georgia (2019-2021), Ghana (2014-2021), Guyana (2008-2021), Hong Kong (2001-2021), Indonesia (2001-2021), Isle of Man (2016-2021), Jamaica (2004, 2006-2021), Kazakhstan (2001-2005, 2018-2021), Kenya (2001-2021), Kosovo (2012-2021), Lesotho (2011-2012), Liechtenstein (2007-2021), Macao (2019-2021), Malawi (2013-2021), Malaysia (2012-2021), Maldives (2010-2021), Mauritius (2012-2013, 2015-2017, 2019-2021), Morocco (2018, 2021), Mozambique (2015-2021), Namibia (2010-2014, 2016-2021), Nigeria (2007-2021), Pakistan (2007-2021), Panama (2008, 2010-2011, 2013-2021), Papua New Guinea (2013, 2017-2018), Peru (2001-2021), Serbia (2006-2021), Suriname (2002-2006, 2016-2021), Tanzania (2013-2017), Thailand (2001-2021), Trinidad and Tobago (2006-2012, 2019-2020), Uganda (2014-2021), Ukraine (2003, 2008, 2010-2011, 2017-2020), Uruguay

(2009-2019), Zambia (2001-2021), and Zimbabwe (2019-2021).

B.2.4 Foreign Assets and Liabilities

Our foreign wealth series come from Nievas and Sodano (2024), in turn built upon Lane and Milesi-Ferretti (2018)'s Balance of Payments-based "External Wealth of Nations". We refer interested readers to Appendix "A.1 Data coverage" in Nievas and Sodano (2024) for foreign wealth data availability and Nievas and Piketty (2024) for further methodological details about how the authors reach zero net foreign wealth at the world-level.

B.3 Fixed Assets

The three IMF databases cited above (GFS, GDD, PSBS) provide us with data on governments' net financial wealth for many countries across the globe. But whenever data on non-financial assets are not available from these sources or authors' estimates, we extrapolate them from Eurostat data on fixed assets or the IMF Investment and Capital Stock Dataset (ICSD). In particular, we draw from the latter public capital stock series, built following the Perpetual Inventory Method (PIM; see Amaglobeli, Matsumoto, and Xiao, 2021; Kamps, 2006; Gupta, Kangur, Papageorgiou, and Wane, 2014). We therefore do not take the data as such but rather make use of them as the basis for our estimations.

B.3.1 Eurostat Fixed Assets

Countries for which government non-financial assets are derived from Eurostat data on fixed assets are: Austria (1995–2022), Belgium (1995–2023), Bulgaria (2000–2021), Cyprus (2012–2021), Estonia (1995–2021), Greece (2010–2021), Croatia (1995–2021), Hungary (1995–2021), Lithuania (2000–2021), Luxembourg (1995–2021), Latvia (1995–2021), Malta (1995–2022), Poland (2012–2021), Portugal (2000–2021), and Romania (2003–2019).

B.3.2 IMF Investment and Capital Stock Dataset

Countries for which government non-financial assets are computed from the IMF Investment and Capital Stock Dataset (ICSD) are: United Arab Emirates (1970–2019), Afghanistan (1970–2019), Antigua and Barbuda (1970–2019), Albania (1970–2019), Armenia (1990–2019), Angola (1970–2019), Argentina (1960–2019), Austria (1960–1994), Azerbaijan (1990–2019), Bosnia and Herzegovina (1990–2019), Barbados (1960–2019), Bangladesh (1960–2019), Belgium (1960–1994), Burkina Faso (1960–2019), Bulgaria (1970–1999), Bahrain (1970–2019), Burundi (1960–2019), Benin (1960–2019), Brunei Darussalam (1970–2019), Bolivia (1960–2019), Brazil (1960–2019), Bahamas (1970–2019), Bhutan (1970-1999, 2017–2019), Botswana (1960–2019), Belarus (1990–2014), Belize (1970–2019), Canada (1960–1970), Democratic Republic of the Congo (1960–2019), Cen-

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tral African Republic (1960–2019), Republic of the Congo (1960–2019), Switzerland (1960–1990), Ivory Coast (1960–2019), Chile (1960–2019), Cameroon (1960–2019), China (1960–1978), Colombia (1960–2019), Costa Rica (1960–2008), Cape Verde (1960–2019), Cyprus (1960–2011), Czech Republic (1990–1992), Djibouti (1970–2019), Denmark (1960–1994), Dominica (1970–2019), Dominican Republic (1960–2019), Algeria (1960–2019), Ecuador (1960–2019), Estonia (1990–1994), Egypt (1960–2019), Eritrea (1990–2019), Ethiopia (1960–2019), Finland (1960–1994), Fiji (1960–2019), Gabon (1960–2019), Grenada (1970–2019), Georgia (1990–2011, 2017-2019), Ghana (1960–2019), Gambia (1960–2019), Guinea (1960–2019), Equatorial Guinea (1960–2019), Greece (1960–2009), Guatemala (1960–2019), Guinea-Bissau (1960–2019), Guyana (1970–2019), Hong Kong (1960–2019), Honduras (1960–2019), Croatia (1990–1994), Haiti (1960–2019), Hungary (1970–1994), Indonesia (1960–2008), Ireland (1960–1995), Israel (1960–2019), India (1960–2019), Iraq (1970–2019), Iran (1960–2019), Iceland (1960–2019), Jordan (1960–2019), Japan (1960–1969), Kenya (1960–2019), Cambodia (1970–2019), Comoros (1960–2019), Saint Kitts and Nevis (1970–2019), South Korea (1960–1995), Kuwait (1970–2019), Kazakhstan (1990–2018), Laos (1970–2017), Lebanon (1970–2019), Saint Lucia (1970–2019), Sri Lanka (1960–2019), Liberia (1964–2019), Lesotho (1960–2019), Lithuania (1990–1999), Luxembourg (1960–1994), Latvia (1990–1994), Libya (1970–2009), Morocco (1960–2019), Moldova (1990–2004), Montenegro (1990–2019), Madagascar (1960–2019), North Macedonia (1990–2018), Mali (1960–2019), Myanmar (1962–2019), Mongolia (1970–2019), Mauritania (1960–2019), Malta (1960–1994), Mauritius (1960–2019), Maldives (1970–2019), Malawi (1960–2019), Mexico (1960–2003), Malaysia (1960–2019), Mozambique (1960–2019), Namibia (1960–2019), Niger (1960–2019), Nigeria (1960–2019), Nicaragua (1960–2019), Netherlands (1960–1994), Norway (1960–1977), Nepal (1960–2019), New Zealand (1960–2006), Oman (1970–2019), Panama (1960–2019), Peru (1960–2019), Papua New Guinea (1960–1994), Philippines (1960–2019), Pakistan (1960–2019), Poland (1970–2011), Portugal (1960–1999), Paraguay (1960–2019), Romania (1960–2002), Serbia (1990–2019), Rwanda (1960–2019), Saudi Arabia (1970–2019), Seychelles (1960–2019), Sudan (1970–2011), Singapore (1960–2019), Slovenia (1990–1999), Slovakia (1990–1999), Sierra Leone (1961–2019), Senegal (1960–2019), Suriname (1970–2011), Sao Tome and Principe (1970–2019), El Salvador (1960–2003), Syria (1960–2011), Swaziland (1970–2019), Chad (1960–2019), Togo (1960–2019), Thailand (1960–2019), Tajikistan (1990–2019), Tunisia (1960–2019), Turkey (1960–2019), Taiwan (1960–2005), Tanzania (1960–2019), Ukraine (1990–2008), Uganda (1960–2019), Uruguay (1960–2001), Uzbekistan (1990–2019), Saint Vincent and the Grenadines (1970–2019), Venezuela (1960–2019), Vietnam (1970–2019), Yemen (1989–2019), South Africa (1960–2019), Zambia (1960–2019), and Zimbabwe (1960–2009).

B.4 Agricultural Land

Authors' Estimates

For some countries, we rely on country-specific studies that include estimates of agricultural land and that are published in the World Inequality Database: Chile (Carranza, De Rosa, and Flores, 2023), China (Mo, Wang, Yang, and Zhang, 2024), Denmark (Katrine Jakobsen, Kristian Jakobsen, Kleven, and Zucman, 2020), India (Kumar, 2019), Ireland (Daly and Morgan, 2021), Norway (Alstadsæter, Johannesen, and Zucman, 2019), Russia (Novokmet, Piketty, and Zucman, 2018), Spain (Artola Blanco, Bauluz, and Martínez-Toledano, 2021), Sweden (Waldenström, 2017), the UK (Piketty and Zucman, 2014; Bauluz, 2019), Uruguay (Carranza, De Rosa, and Flores, 2023), and the US (Piketty and Zucman, 2014; Bauluz, 2019).

Moreover, we have extended the original series for Denmark and Norway up to 2023 by making use of the same assumptions as the authors. That is, we compute agricultural land as 10 times the value of cultivated biological resources. We follow the same procedure for Finland. In Russia, a country for which data were available until 2015, we assume that agricultural land has remained constant as a percentage of national income during the period 2016-2023. For India, we estimate agricultural land owned by households in 2012 using the All-India Debt and Investment Survey (AIDIS). This is the same data source used by Kumar (2019) to estimate national wealth in India. As documented by Kumar (2019), close to all agricultural land in India is owned by the household sector. We extend these estimates for the period 2013-2020, assuming that agricultural land has remained constant as a percentage of national income at its 2012 level.

Global Land Inequality Project

Bauluz, Govind, and Novokmet (2020) estimate agricultural land and its distribution for a set of developing countries based on combining survey data and agricultural censuses. For the countries covered in their study, we use their agricultural land values estimates. Missing years are extrapolated using the growth rate of Gross Value Added in Agriculture (from FAO Statistics). Note that this project also analyzes China and India. Their estimates are consistent with those from Piketty, Yang, and Zucman (2019) and the ones we have produced based on the AIDIS survey for India.

The countries for which we rely on the Global Land Inequality Project are the following: Bangladesh (1990-2019), Ethiopia (1990-2019), Indonesia (1990-2019), Malawi (1990-2019), Nicaragua (1990-2019), Nigeria (1990-2019), Pakistan (1990-2019), Vietnam (1990-2019).

Official Non-financial Accounts

Agricultural land is only reported in official balance sheets for a few countries. In some countries, no distinction is made between Land under cultivation (AN.2112) and its three

subcomponents: Agricultural land (AN.21121), Forestry land (AN.21122), and Surface water used for aquaculture (AN.21123). In those cases, we approximate agricultural land using land under cultivation. In other cases, we approximate agricultural land as a residual from total land (AN.211) net of built land (Land underlying buildings and structures (AN.2111).

The countries for which official non-financial accounts are available are the following: Australia (1989-2023) (total land minus land underlying dwellings), Belgium (1996-2023), Canada (1990-2023), Czech Republic (1993-2023)[9], Mexico (2004-2022)[10], the Netherlands (1995-2023) (land under cultivation), France (1978-2023) (land under cultivation), Germany (1999-2023) (total land minus land underlying buildings and structures), Italy (2002-2023) (land under cultivation), Japan (1994-2022) (land under cultivation excluding forests), Slovenia (1996-2023) (land under cultivation), and South Korea (1996-2023). For details on the construction of the series for Canada, France, Germany, Italy, and Japan, see Bauluz (2019), and Bauluz and Brassac (2020).

Eurostat and FAO

In a set of European countries, we are able to estimate the value of agricultural land multiplying agricultural land area (in hectares) by land prices per hectare. We gather the data on hectares and prices from Eurostat and, in few cases, from national statistical offices.

We proceed in two steps. First, we estimate the total value of agricultural land. Second, we decompose this land across institutional sectors.

Regarding the first step. The ideal scenario would be to multiply hectares of arable land, permanent grassland, and permanent crops (the three types of agricultural land) with prices on each land type. However, prices on permanent crops are not available, reason why we approximate the price of permanent crop land using the average price of arable land and permanent grassland, as recommended by Eurostat-OECD (2015, section 8.19).[11] We follow this procedure in the following countries: Bulgaria (2004-2023), Croatia (2008-2023), Estonia (2004-2023), Greece (1996-2023), Hungary (2001-2023), Lithuania (2004-2023), Luxembourg (1996-2023), Poland (2004-2023), Romania (2004-2023) and Slovakia (2001-2023).

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[9]In Czech Republic, we remove public natural resources (excluding land), as the latter appears to be implausibly high in comparisons with other countries.

[10]In Mexico, in comparison with previously available data, public mineral, energy and water resources experienced dramatic upwards revaluations which are unrealistic. We therefore rely on data from our 2021 update (see Bauluz, Blanchet, Martínez-Toledano, and Sodano, 2021), which we extrapolate up to 2022. Further work to understand the value of natural capital in Mexico would be desirable.

[11]Note that the area covered by permanent crops tends to be fairly small, as explained by Eurostat-OECD (2015, pg. 126): "in most countries permanent grassland and arable land are by far the most important types of agricultural land; their definitions are mentioned below. Areas devoted to permanent crops are usually less important, in some countries even negligible".

In some cases, we only have price information for total agricultural land area[12], and we multiply average price of total agricultural land by the sum of arable land, permanent grassland, and permanent crops (e.g. Malta 2004-2023). We follow the same approach when both prices and land area are only available for total agricultural land, without distinguishing the share of agricultural land by types of use (e.g. Latvia 2004-2023).

In a second step, we allocate the share of total agricultural land that is owned by different institutional sectors. For Estonia, Hungary and Lithuania, we use data on the area of agricultural land that is owned by different sectors from countries' statistical departments. For the remaining countries, we rely on FAO's World Agriculture Census (e.g. Deininger and Squire, 1998). FAO censuses report the amount of land *operated* by individual and juridical persons, respectively. Note that this information does not refer to the sector that *owns* the land. We use this information on land operated as a proxy for the sector owning the land, and allocate individually-held land to households and the remaining land to corporations. If better data on the decomposition of agricultural land across sectors become available, we will adjust our estimates accordingly.

UN Inclusive Wealth Report

For countries for which we do not have estimates from official balance sheets, the Global Land Inequality project, WID's authors, or from us built using Eurostat and FAO's data, we rely on estimates of agricultural land from United Nation's Inclusive Wealth Report (Programme, 2015), whenever available. This report estimates agricultural land in 1990, 1995, 2000, 2005, 2010, and 2014 for a large number of countries. UN's estimates are obtained using Net Present Value, a method recommended by OECD to estimate natural resources.[13] As we show in the next subsection (see below), the correlation between UN's estimates of agricultural land values and Gross Value Added in agriculture from FAO is relatively high (see also figure 1). To split a country's total land value across institutional sectors, we use census data from FAO, which generally decomposes agricultural land area across sectors. One caveat of this procedure is that this decomposition refers to the sector operating the land and not to the sector owning the land. Nonetheless, FAO also reports the share of total agricultural land that is both owned and operated by the same individual or company. In developing countries, this share is on average above 80%. Hence, we use the sectoral decomposition of land operators as a proxy for landowners.

The countries for which we rely on data from the UN Inclusive Wealth Report are the following: Afghanistan (1990-2019), Austria (1990-2019), Belize (1990-2019), Bolivia

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[12]Total agricultural land area is referred to in Eurostat as Utilized Agricultural Land, and is the sum of sum of arable land, permanent grassland, permanent crops, and kitchen gardens.

[13]"Often, market prices do not exist for natural resources and the net present value of future benefits accruing from holding or using the asset constitutes the next best solution towards putting a balance sheet value to the asset" (OECD, 2009, pg. 166).

(1990-2019), Botswana (1990-2014), Brazil (1990-2014), Burundi (1990-2014), Cambodia (1990-2014), Cameroon (1990-2014), Colombia (1990-2014), Congo (1990-2014), Costa Rica (1990-2014), Cote d'Ivoire (1990-2014), Dominican Republic (1990-2014), Ecuador (1990-2014), Egypt (1990-2014), El Salvador (1990-2014), Fiji (1990-2014), Ghana (1990-2014), Guyana (1990-2014), Honduras (1990-2014), Iceland (1990-2014), Iran (1990-2014), Iraq (1990-2014), Israel (1990-2014), Jamaica (1990-2014), Jordan (1990-2014), Kenya (1990-2014), Laos (1990-2014), Malaysia (1990-2014), Mali (1990-2014), Mongolia (1990-2014), Morocco (1990-2014), Mozambique (1990-2014), Nepal (1990-2014), New Zealand (1990-2014), Niger (1990-2014), Panama (1990-2014), Paraguay (1990-2014), Peru (1990-2014), Philippines (1990-2014), Portugal (1990-2014), Rwanda (1990-2014), Saudi Arabia (1990-2014), Senegal (1990-2014), South Africa (1990-2014), Sri Lanka (1990-2014), Switzerland (1990-2014), Tanzania (1990-2014), Thailand (1990-2014), Togo (1990-2014), Trinidad and Tobago (1990-2014), Tunisia (1990-2014), Turkey (1990-2014), Venezuela (1990-2014), Yemen (1990-2014), and Zambia (1990-2014).

Capitalization of Gross Value Added in Agriculture

Finally, we make use of statistics on Gross Value Added on agriculture to impute agricultural land. FAO's data on GVA in agriculture are available on an annual basis for most countries in the world, and go back to the 1970s. We predict the (log) ratio of agricultural land to GDP using the (log) ratio of GVA in agricultural land to GDP. Figure 1 plots the correlation between the two variables for all countries and years for which we observe the two. The red dots are observations from UN's Inclusive Wealth Report, while the blue dots are observations from official balance sheets, the Global Land Inequality project, or our own estimates using Eurostat/FAO's data on area and prices of agricultural land (see subsections above). The correlation between the two is relatively high (r-squared of 0.45). We use it to impute all countries for which we do not have agricultural land values but observe Gross Value Added in agriculture. To split a country's total land value across institutional sectors we follow the same approach than with the UN's estimates from the Inclusive Wealth Report (see above).

The countries for which we estimate the value of agricultural land using Gross Value Added in agriculture are the following: Albania (1990-2023), Angola (1996-2023), Anguilla (1990-2023), Antigua and Barbuda (1990-2023), Argentina (1990-2023), Armenia (1990-2023), Azerbaijan (1994-2023), Bahamas (1990-2023), Bahrain (1990-2023), Barbados (1990-2023), Belarus (1995-2023), Benin (1990-2023), Bermuda (1990-2023), Bhutan (1990-2023), Bosnia and Herzegovina (1993-2023), Brunei Darussalam (1990-2023), Burkina Faso (1990-2023), Cabo Verde (1990-2023), Central African Republic (1990-2023), Chad (1990-2023), Comoros (1990-2023), Democratic Republic of Congo (1994-2023), Djibouti (1990-2023), Dominica (1990-2023), Equatorial Guinea (1990-2023), Eritrea (1990-2023), Gabon (1990-2023), Gambia (1990-2023), Georgia (1994-2023), Grenada (1990-2023), Guatemala

Figure 1: **Correlation between the (log) ratio of agricultural land to GDP using the (log) ratio of GVA in agricultural land to GDP**

R-squared=0.4722
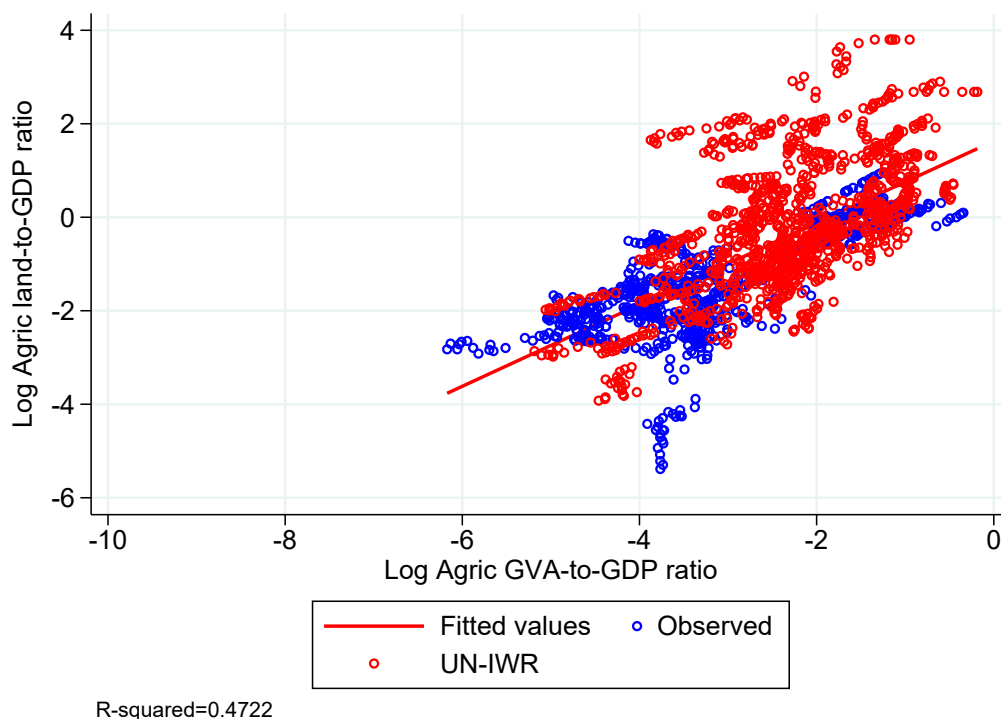
Notes: This figures shows the correlation between the the (log) ratio of agricultural land to GDP and the (log) ratio of GVA in agricultural land to GDP. Agricultural land values are either from (i) official balance sheets, WIL's authors estimates, the Global Land Inequality project, and our own estimates using Eurostat/FAO data (blue dots) or from (ii) UN's Inclusive Wealth Report (red dots). Data on Gross Value Added on Agriculture is from FAO's statistics (FAOSTAT). We pool all available years since 1990 for which we observe both agricultural land values and GVA in agriculture.

(1990-2023), Guinea-Bissau (1990-2023), Haiti (1990-2023), Kazakhstan (1994-2023), Kuwait (1990-2023), Kyrgyzstan (1993-2023), Lebanon (1990-2023), Lesotho (1990-2023), Libya (1990-2023), Madagascar (1990-2023), Maldives (1990-2023), Mauritania (1990-2023), Micronesia (1990-2023), Moldova (1993-2023), Montserrat (1990-2023), Myanmar (1990-2023), Oman (1990-2023), Papua New Guinea (1990-2023), Saint Kitts and Nevis (1990-2023), Saint Lucia (1990-2023), Saint Vincent and the Grenadines (1990-2023), Samoa (1990-2023), Sao Tomé and Principe (1990-2023), Serbia (1993-2023), Seychelles (1990-2023), Sierra Leone (1990-2023), Solomon Islands (1990-2023), Suriname (1995-2023), Swaziland (1990-2023), Syria (1990-2023), Tajikistan (1995-2023), Tonga (1990-2023), Uganda (1990-2023), Ukraine (1993-2023), United Arab Emirates (1990-2023), Uzbekistan (1993-2023), Vanuatu (1990-2023), and Zimbabwe (1990-2023).

C   December 2024 Update

In December 2024, we have updated global wealth aggregates up to the most recent years for which data are available, that is usually 2023 or 2022.

In comparison with the previous 2021 and 2023 updates, respectively documented in Bauluz, Blanchet, Martínez-Toledano, and Sodano (2021) and Bauluz, Blanchet, Brassac, et al. (2023), there are a few changes with regards to data sources in section B: we no longer rely on IMF Monetary and Financial Statistics (MFS) and Locational Banking Statistics (BIS). But we still make use of IMF Government Finance Statistics (GFS), Global Debt Database (GDD) and Public Sector Balance Sheet (PSBS). Net foreign assets series stem from Nievas and Sodano (2024). We also now rely on Eurostat and IMF ICSD fixed assets data for government non-financial assets whenever data from authors' estimates or official sources are missing. Concepts as detailed in section A remain the same as in Bauluz, Blanchet, Martínez-Toledano, and Sodano, 2021 and Bauluz, Blanchet, Brassac, et al., 2023.

Our country coverage is roughly the same as last year, except that we now estimate private net wealth for Hungary for the period 1996-2023, built upon data drawn from the Hungarian Central Statistical Office and Eurostat.

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