Who Benefits from Public Services? Novel Evidence and Implications for Inequality Measurement

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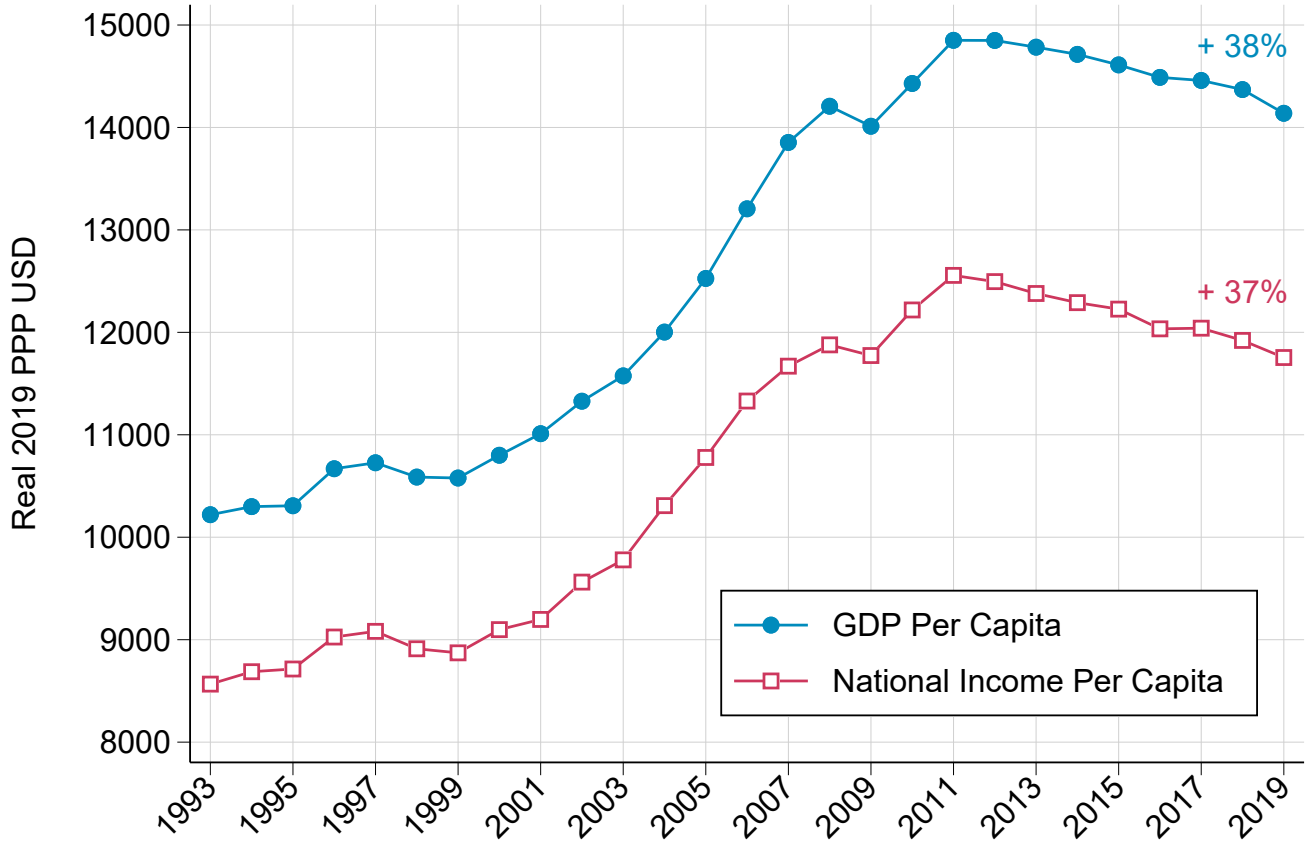
ONLINE APPENDIX

This appendix supplements my article "Who Benefits from Public Services? Novel Evidence and Implications for Inequality Measurement." It contains supplementary figures and tables.

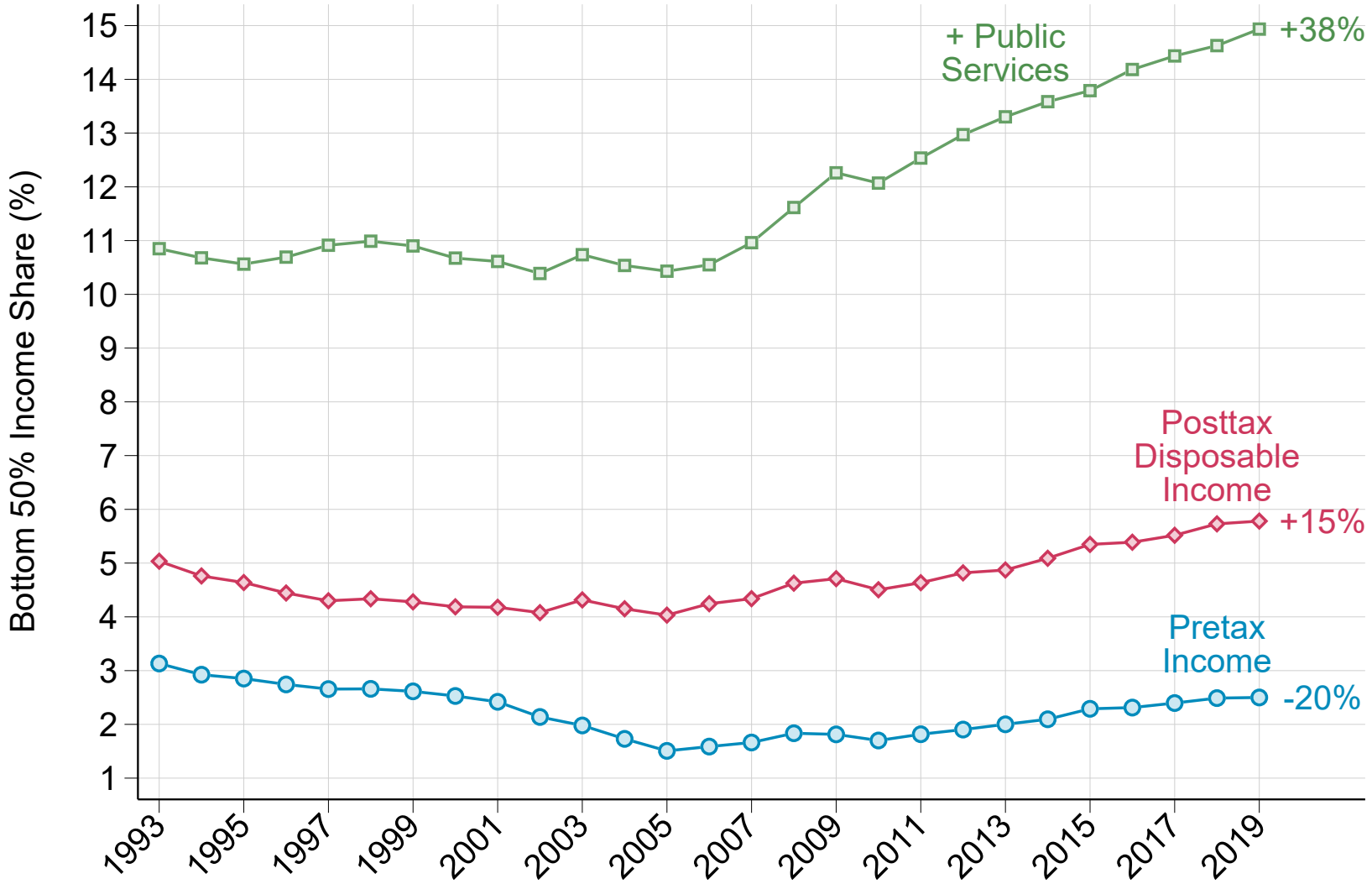
A. Additional Key Results

Figure A1 – GDP and National Income Per Capita in South Africa, 1993-2019



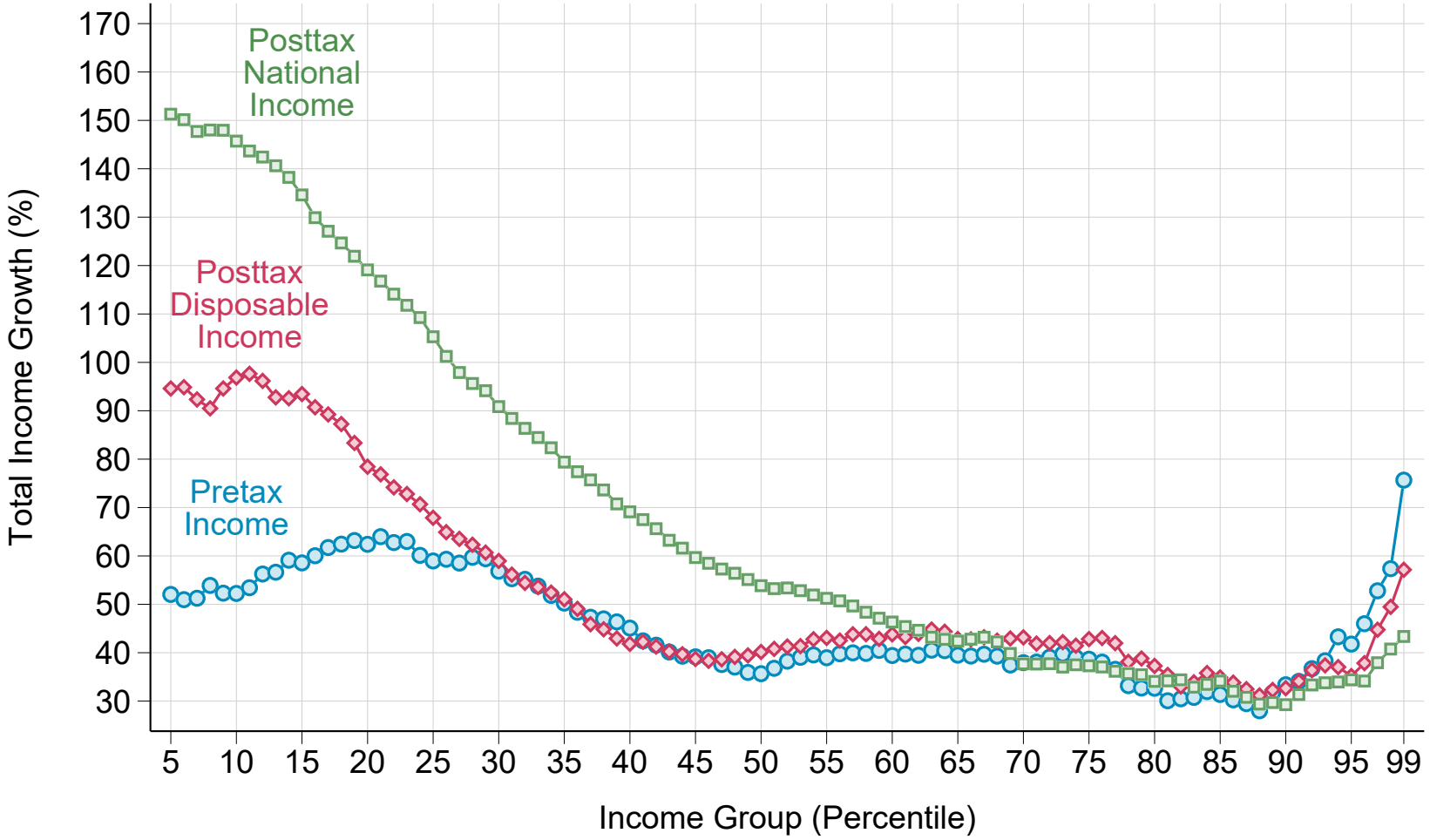
Notes. Author's elaboration using data from the South African Reserve Bank. Growth figures correspond to total real growth rates between 1993 and 2019.

Figure A2 – Public Services and Inequality: Bottom 50% Income Share, 1993-2019



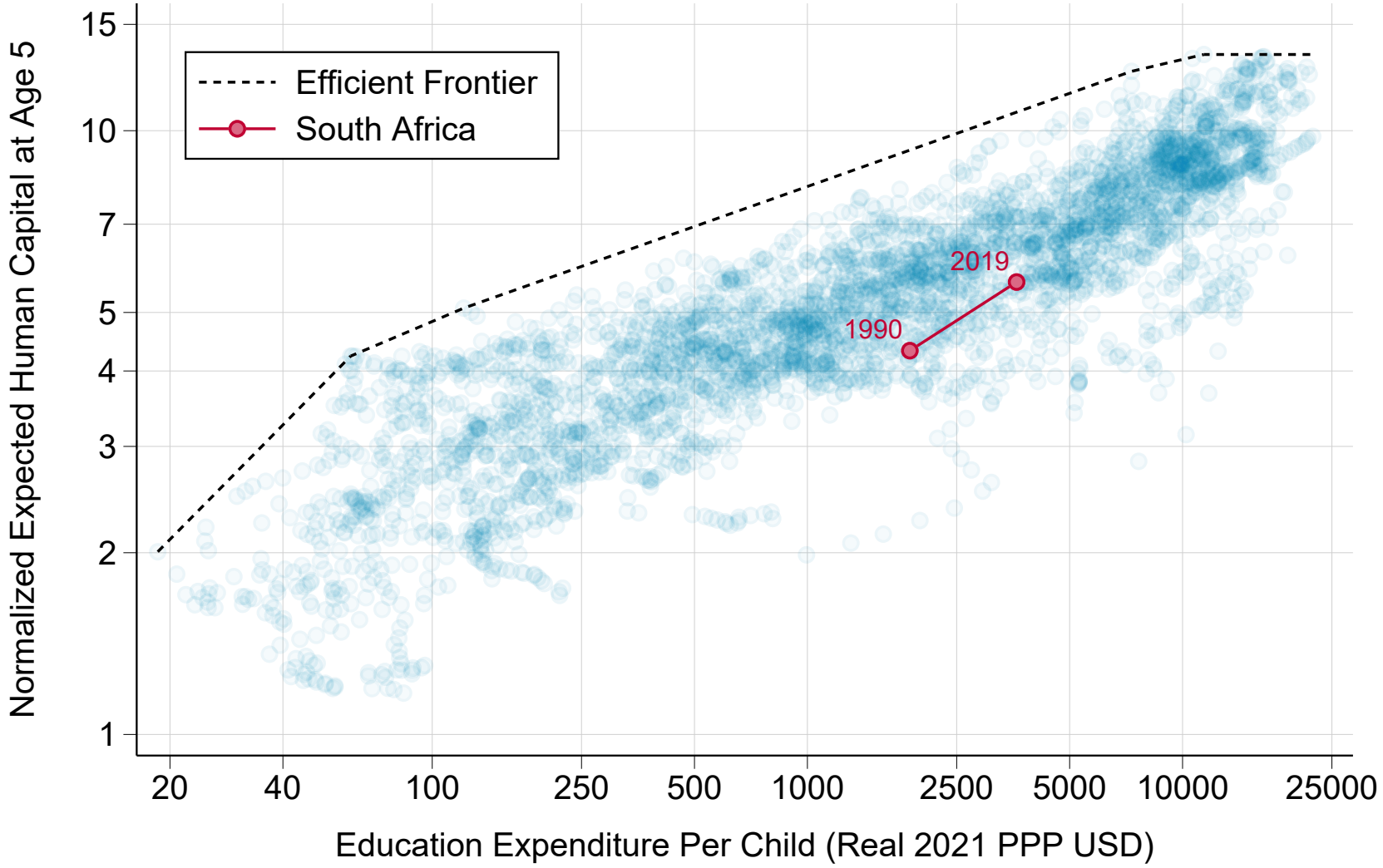
Notes. The figure represents the share of income received by the bottom 50% from 1993 to 2019 for different income concepts. Pretax income equals capital and labor income, minus social contributions, plus pension and unemployment benefits. Posttax disposable income equals pretax income, minus direct taxes, plus cash transfers. The upper line adds the consumption of public services to posttax disposable income. Income is split equally between all household members.

Figure A3 – Public Services and the Distribution of Economic Growth, 1993-2019 (Pretax Versus Posttax)



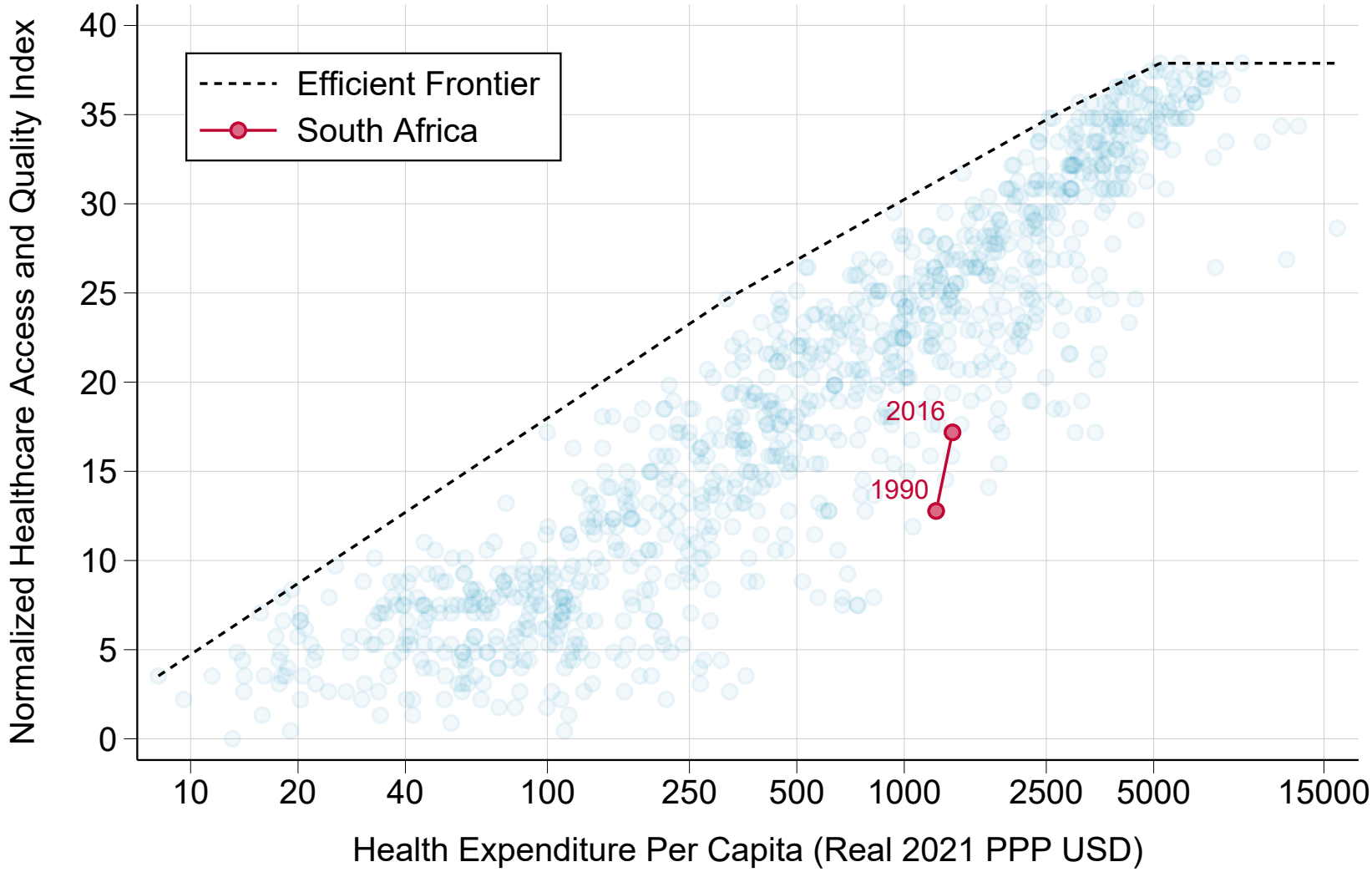
Notes. The figure displays the total real income growth rate for each percentile of the distribution from 1993 to 2019 for different income concepts. Pretax income equals capital and labor income, minus social contributions, plus pension and unemployment benefits. Posttax disposable income equals pretax income, minus direct taxes, plus cash transfers. Posttax national income deducts all taxes and adds all government transfers. Income is split equally between all household members. Excludes individuals with incomes lower than 1% of the median income in a given year.

Figure A4 – Accounting for Public Sector Productivity: Education Spending Versus Expected Human Capital at Age 5



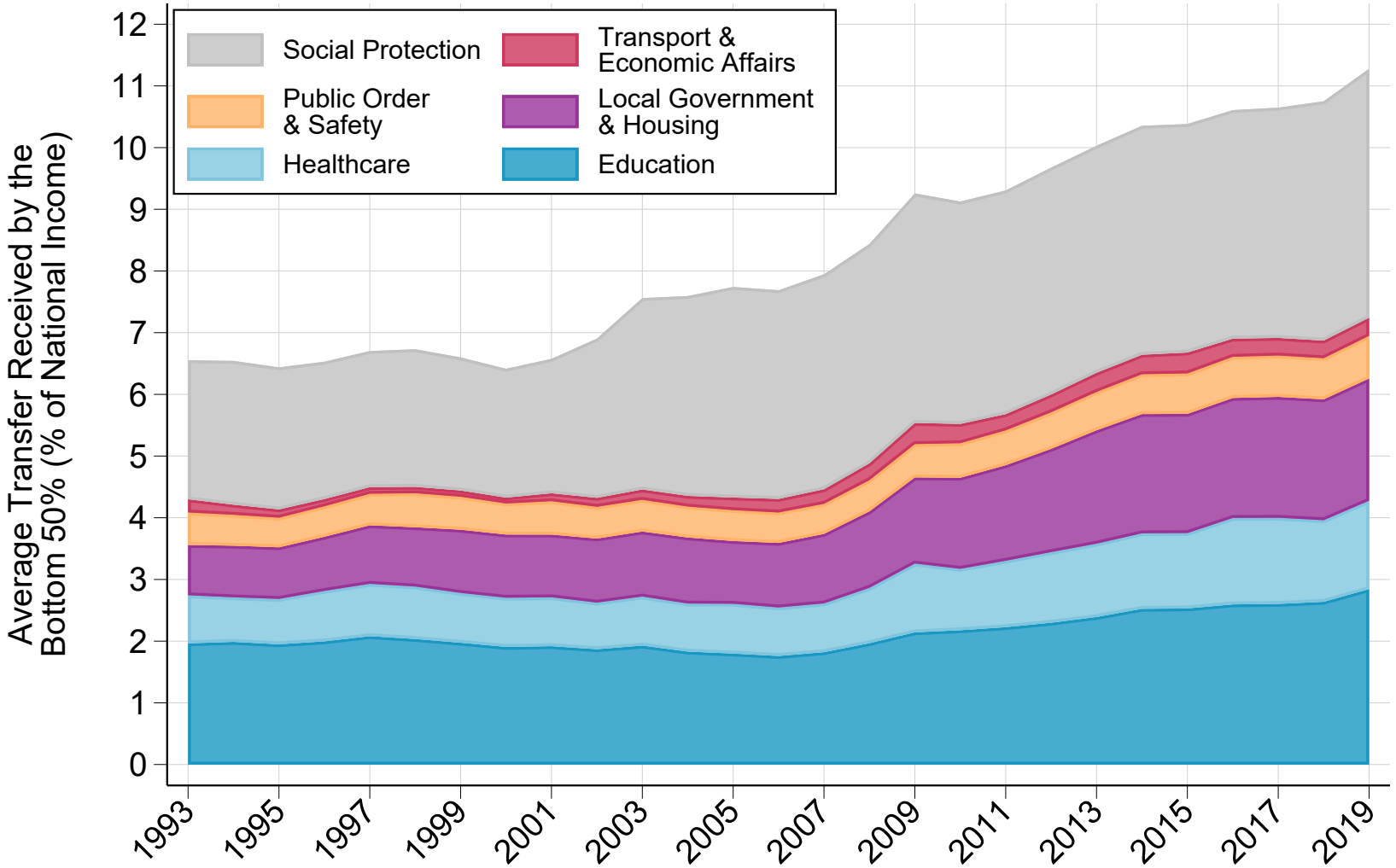
Notes. Figure adapted from Gethin (2024). The figure plots the relationship between education expenditure per child and expected human capital at age 5. Each data point is a country-year. The upper dashed line represents the efficient frontier, defined as a piecewise linear estimate of the maximum achievable output at each level of expenditure. The trajectory of South Africa from 1990 to 2019 is highlighted in red.

Figure A5 – Accounting for Public Sector Productivity: Healthcare Spending Versus Quality of Healthcare



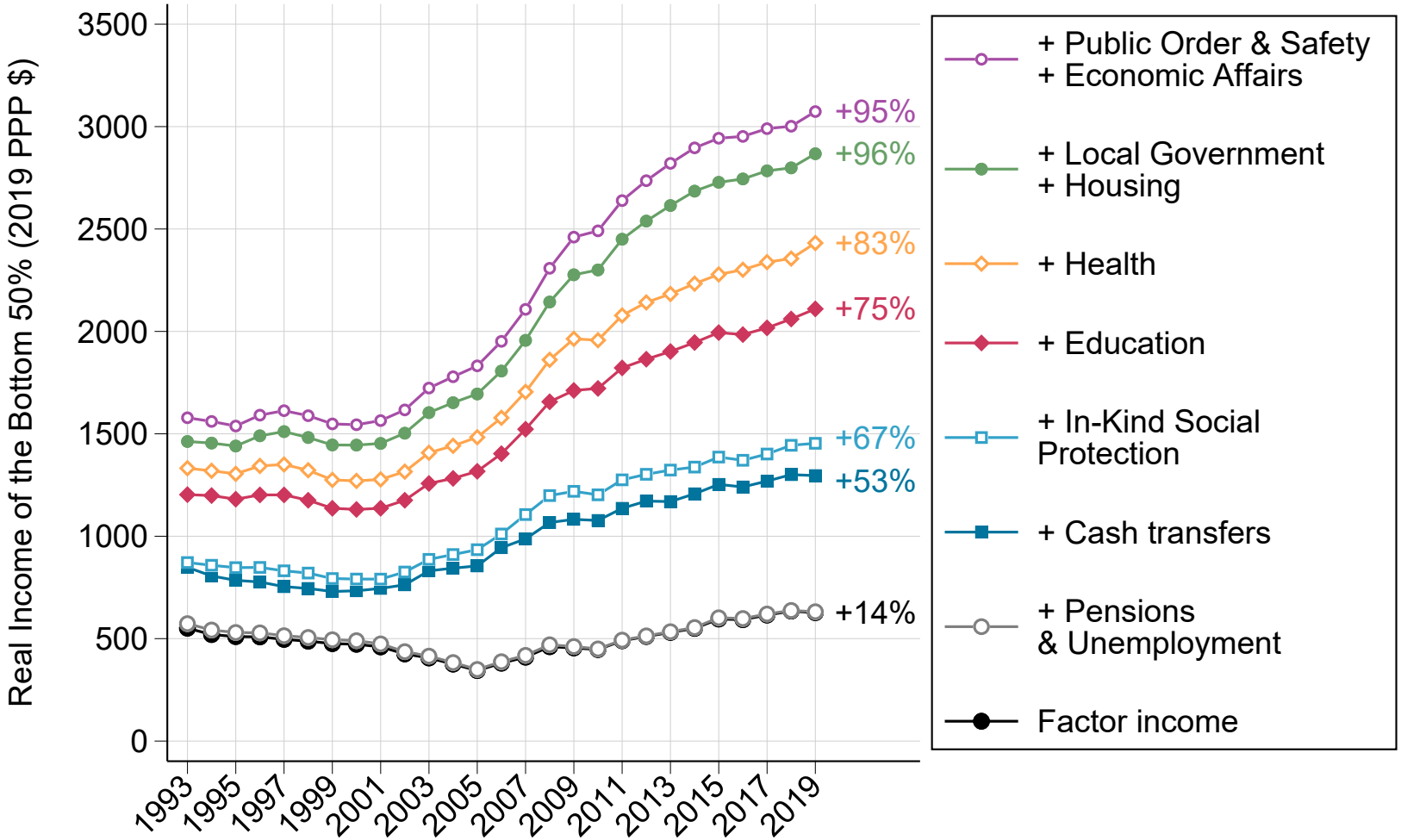
Notes. Figure adapted from Gethin (2024). The figure plots the relationship between healthcare expenditure per capita and quality of healthcare, measured using the Healthcare Access and Quality index reexpressed in units of life expectancy. Each data point is a country-year. The upper dashed line represents the efficient frontier, defined as a piecewise linear estimate of the maximum achievable output at each level of expenditure. The trajectory of South Africa from 1990 to 2016 is highlighted in red.

Figure A6 – The Rise of Redistribution: Government Transfers Received by the Bottom 50%, 1993-2019 (Productivity-Adjusted)



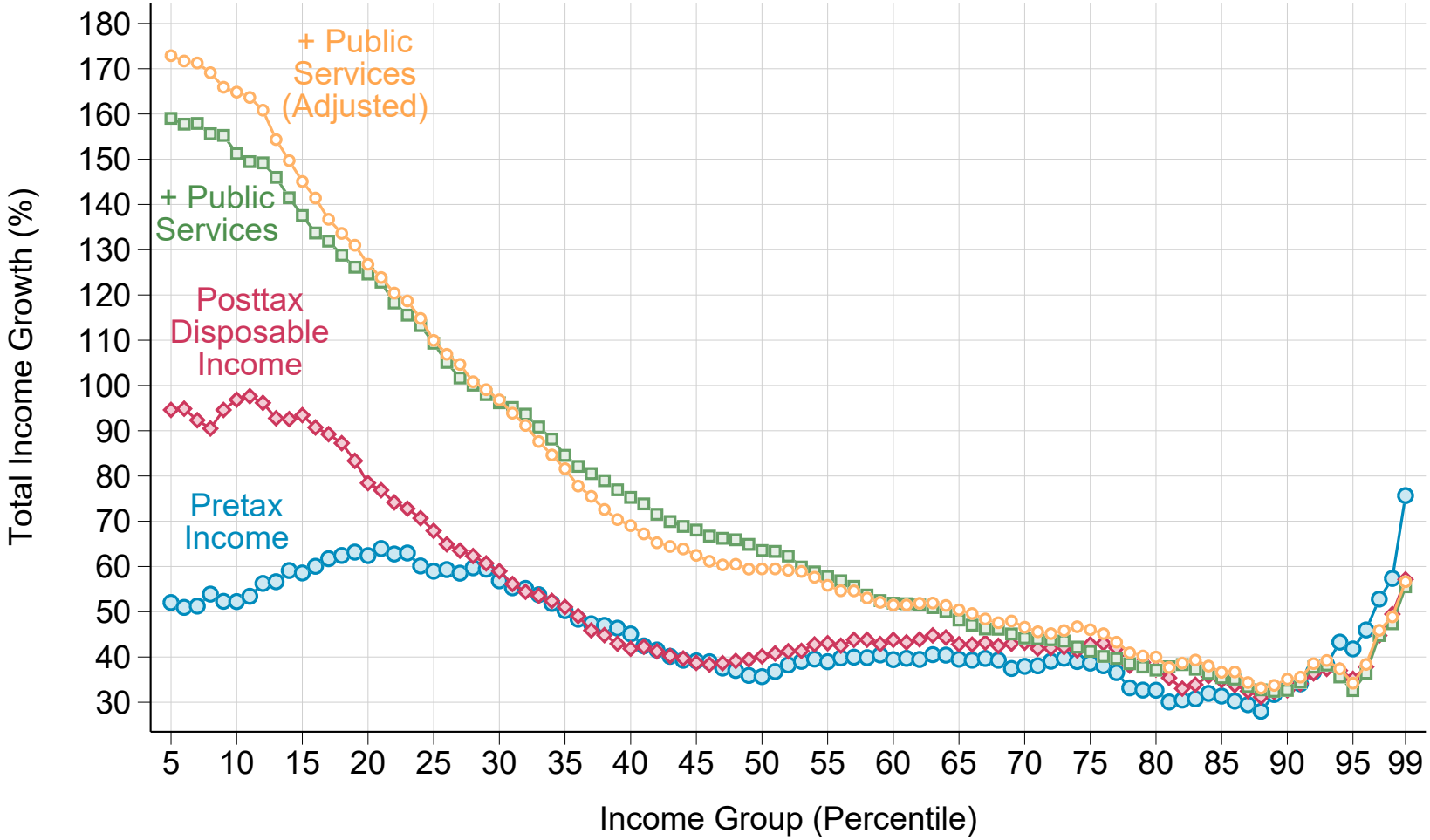
Notes. The figure represents the level and composition of government transfers received by the poorest 50%, expressed as a share of net national income. The value of public services is adjusted for aggregate and heterogeneous productivity. Aggregate productivity refers to the fact that the South African government may be inefficient at providing public services overall. Heterogeneous productivity corresponds to the fact that the quality of public services, controlling for their cost of provision, may vary by income group. Income is split equally between all household members. Figure 3 reproduces this figure without any productivity adjustment.

Figure A7 – Bottom 50% Average Income Before and After Transfers, 1993-2019: Productivity-Adjusted



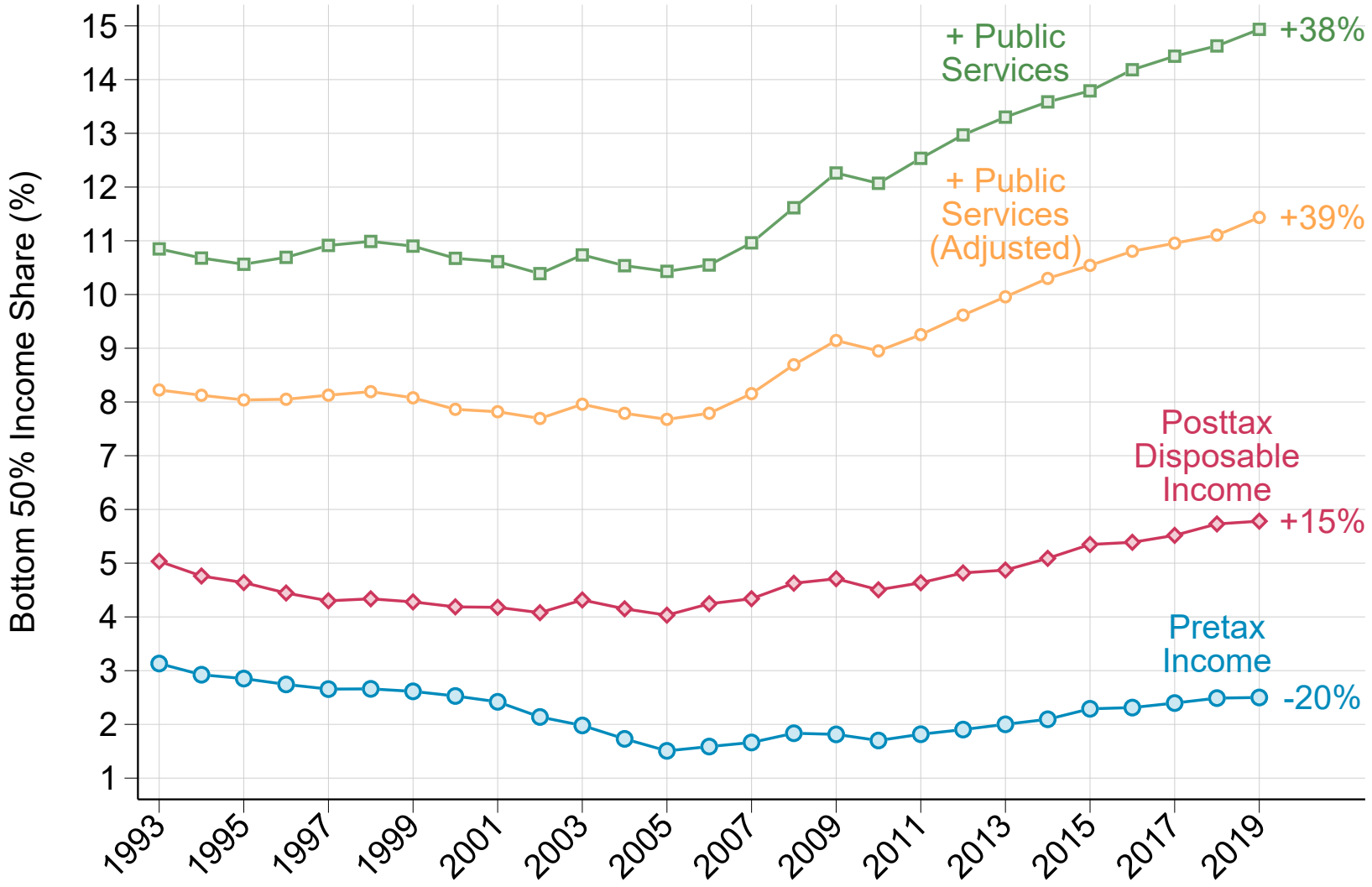
Notes. The figure represents the evolution of the real average income of the bottom 50%, before and after adding cash and in-kind transfers one by one to the analysis. The value of public services is adjusted for aggregate and heterogeneous productivity. Aggregate productivity refers to the fact that the South African government may be inefficient at providing public services overall. Heterogeneous productivity corresponds to the fact that the quality of public services, controlling for their cost of provision, may vary by income group. Income is split equally between all household members. Figure 4 reproduces this figure without any productivity adjustment.

Figure A8 – Public Services and the Distribution of Economic Growth, 1993-2019
(With Productivity-Adjusted Estimates)



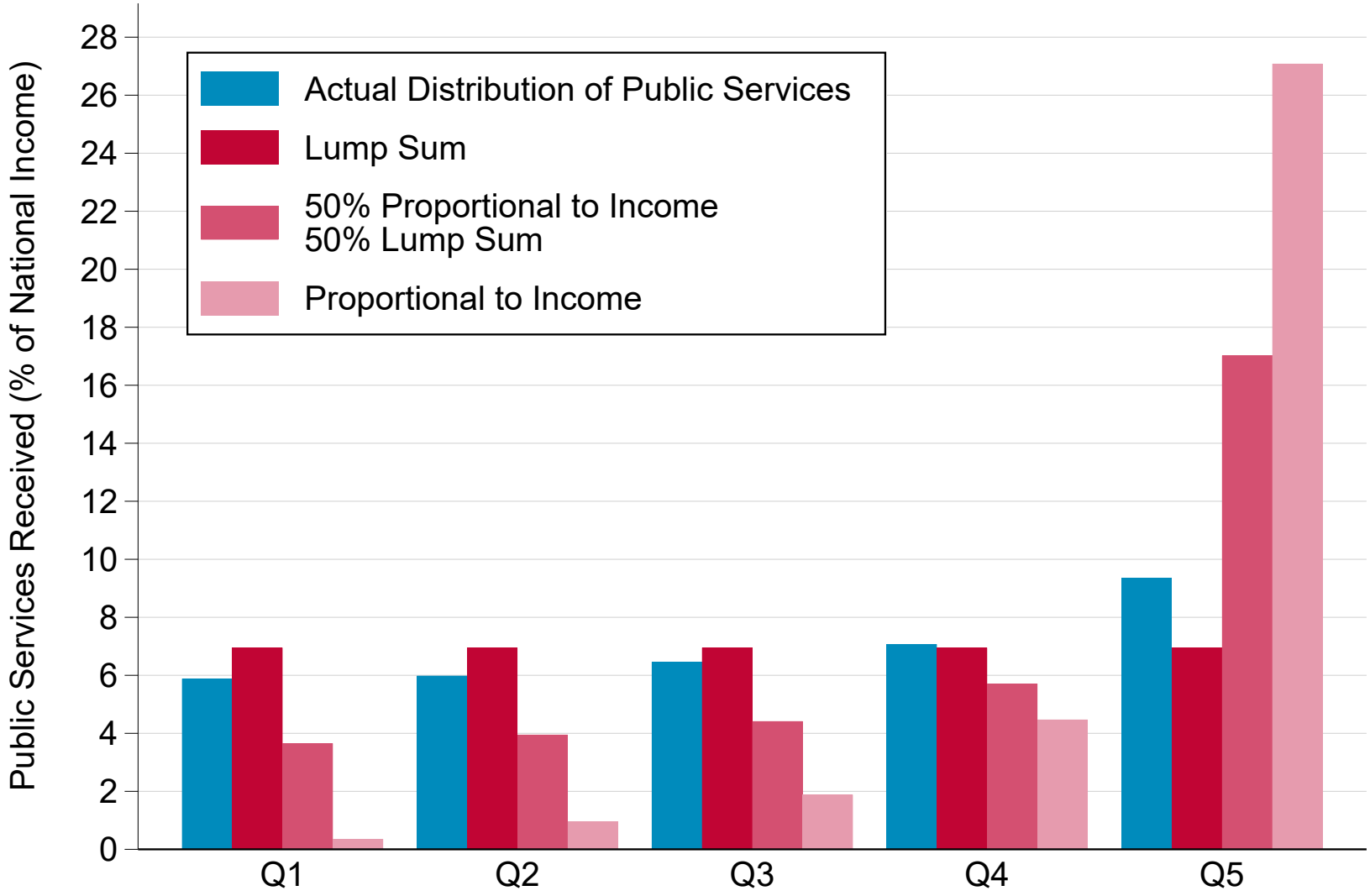
Notes. The figure displays the total real income growth rate for each percentile of the distribution from 1993 to 2019 for different income concepts. Pretax income equals capital and labor income, minus social contributions, plus pension and unemployment benefits. Posttax disposable income equals pretax income, minus direct taxes, plus cash transfers. The two upper lines add the consumption of public services to posttax disposable income, before and after adjusting for aggregate and heterogeneous public sector productivity. Aggregate productivity refers to the fact that the South African government may be inefficient at providing public services overall. Heterogeneous productivity corresponds to the fact that the quality of public services, controlling for their cost of provision, may vary by income group. Income is split equally between all household members. Excludes individuals with incomes lower than 1% of the median income in a given year.

Figure A9 – Public Services and Inequality: Bottom 50% Income Share, 1993-2019
(With Productivity-Adjusted Estimates)



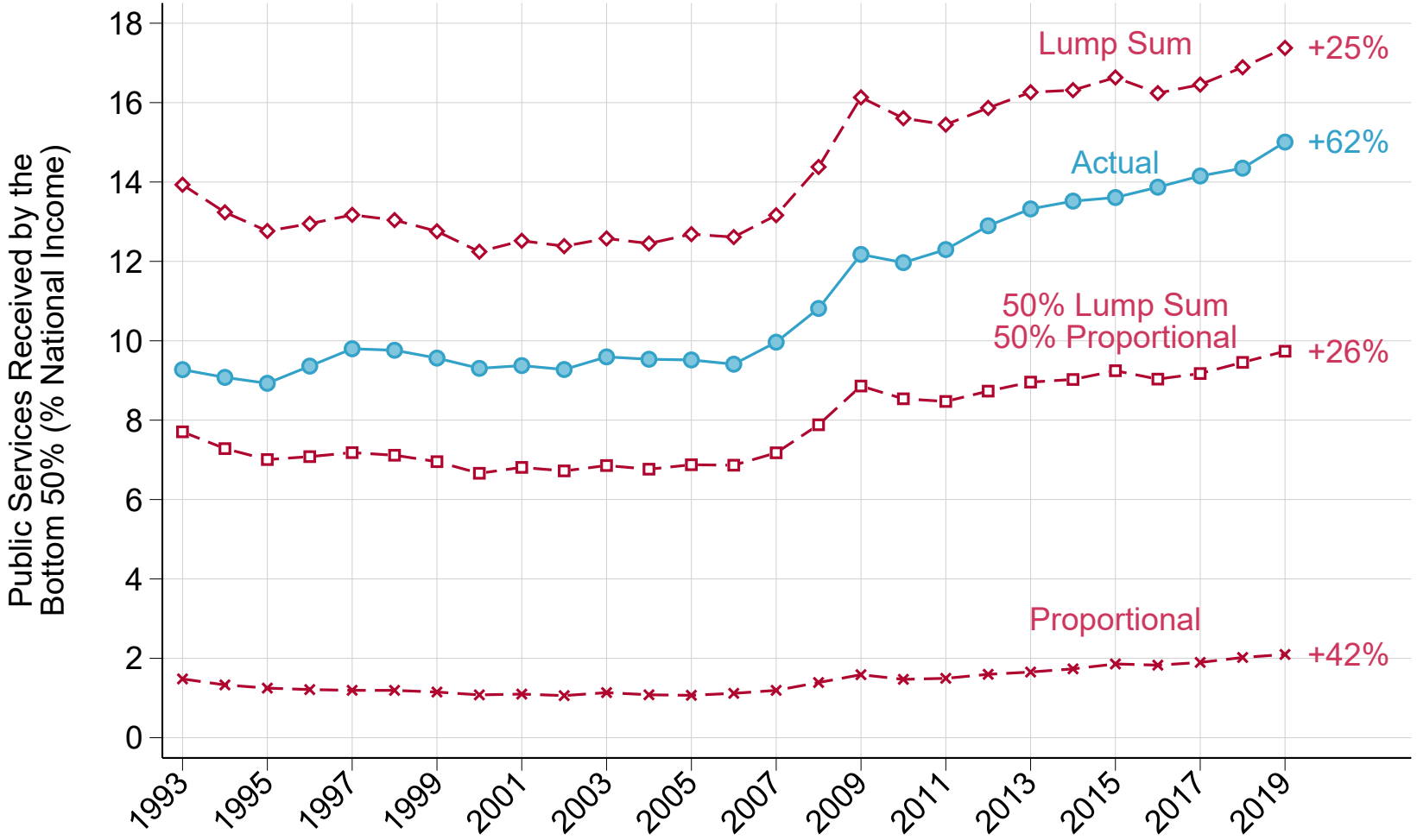
Notes. The figure represents the share of income received by the bottom 50% from 1993 to 2019 for different income concepts. Pretax income equals capital and labor income, minus social contributions, plus pension and unemployment benefits. Posttax disposable income equals pretax income, minus direct taxes, plus cash transfers. The upper line adds the consumption of public services to posttax disposable income. The second line from the top adjusts in-kind transfers for aggregate and heterogeneous productivity. Aggregate productivity refers to the fact that the South African government may be inefficient at providing public services overall. Heterogeneous productivity corresponds to the fact that the quality of public services, controlling for their cost of provision, may vary by income group. Income is split equally between all household members.

Figure A10 – Comparison with Existing Allocation Methods: Public Services Received by Income Quintile (Including Healthcare)



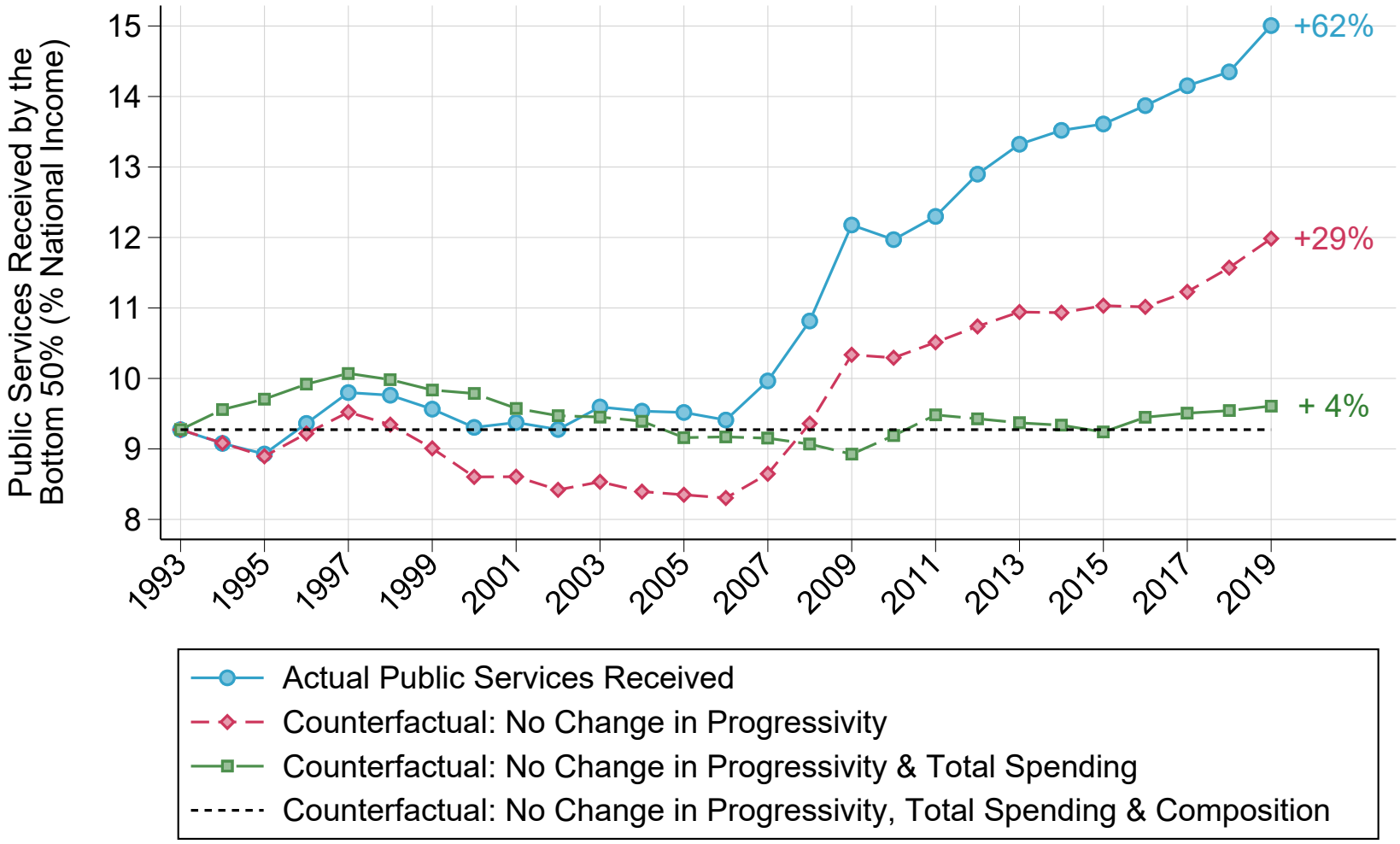
Notes. The figure displays the value of public services received by posttax disposable income quintile in 2019, expressed as a share of national income, depending on the method used to allocate public services to individuals. Public services include healthcare. Actual distribution of public services: estimates from this paper. Lump sum: all public services allocated as a lump sum. 50% proportional to income, 50% lump sum: half of the value of public services allocated proportionally to disposable income, half allocated as a lump sum. Proportional to income: all public services allocated proportionally to disposable income. Income is split equally between all household members.

Figure A11 – Comparison with Existing Allocation Methods: Public Services Received by the Bottom 50%, 1993-2019 (Including Healthcare)



Notes. The figure displays the value of public services received by the bottom 50% from 1993 to 2019, expressed as a share of national income, depending on the method used to allocate public services to individuals. Public services include healthcare. Actual distribution of public services: estimates from this paper. Lump sum: all public services allocated as a lump sum. 50% proportional to income, 50% lump sum: half of the value of public services allocated proportionally to disposable income, half allocated as a lump sum. Proportional to income: all public services allocated proportionally to disposable income. Income is split equally between all household members.

Figure A12 – Decomposing Redistribution: The Roles of the Progressivity, Total Value, and Composition of Public Services (Including Healthcare)



Notes. The figure plots the value of public services received by the bottom 50% from 1993 to 2019, expressed as a share of national income, for different counterfactual scenarios. No change in progressivity: bottom 50% share of spending on each public service fixed to its 1993 value. No change in progressivity and total value: in addition to no change in progressivity, fix total public spending to its 1993 value. No change in progressivity, total value, and composition: in addition to no change in progressivity and total value, fix the composition of spending by type of public service to its 1993 value. By construction, this latter counterfactual is equal to the 1993 transfer.

Table A1 – The Distribution of Income in South Africa in 2019 (With Posttax National Income)

	Pretax Income		Posttax Disposable Income		Disposable Income + Public Services		Posttax National Income	
	Average Income ($)	Income Share (%)	Average Income ($)	Income Share (%)	Average Income ($)	Income Share (%)	Average Income ($)	Income Share (%)
Full population	11,800	100	10,700	100	14,800	100	11,800	100
Bottom 50%	630	2.7	1,290	6.0	4,550	15.4	3,550	15.1
Bottom 20%	45	0.1	550	1.0	3,100	4.2	2,160	3.7
Next 30%	1,020	2.6	1,780	5.0	5,530	11.2	4,470	11.4
Middle 40%	8,410	28.6	8,380	31.4	12,900	34.9	10,300	35.0
Top 10%	80,700	68.7	67,000	62.6	73,500	49.7	58,700	49.9
Top 1%	329,000	28.0	267,000	24.9	278,000	18.8	218,000	18.6
Top 0.1%	970,000	8.3	739,000	6.9	747,000	5.1	630,000	5.4

Notes. The table reports statistics on the distribution of income in South Africa in 2019 for different income concepts. Pretax income equals capital and labor income, minus social contributions, plus pension and unemployment benefits. Posttax disposable income equals pretax income, minus direct taxes, plus cash transfers. Posttax national income deducts all taxes and adds all government transfers. Income is split equally between all household members.

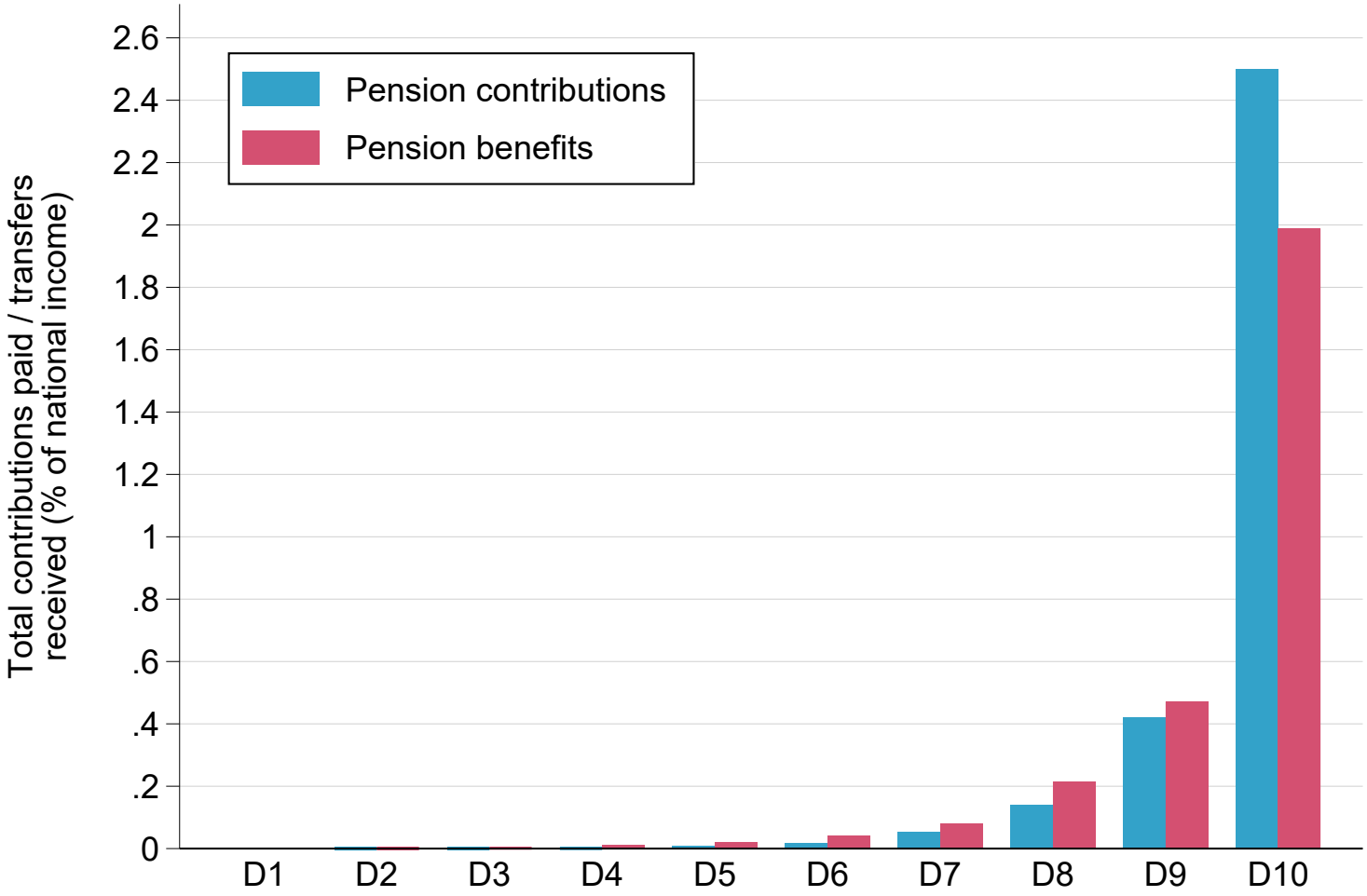
Table A2 – The Distribution of Income in South Africa in 2019: Productivity-Adjusted

	Pretax Income		Posttax Disposable Income		Disposable Income + Public Services	
	Average Income ($)	Income Share (%)	Average Income ($)	Income Share (%)	Average Income ($)	Income Share (%)
Full population	11,800	100	10,700	100	13,000	100
Bottom 50%	630	2.7	1,290	6.0	3,070	11.8
Bottom 20%	45	0.1	550	1.0	1,990	3.1
Next 30%	1,020	2.6	1,780	5.0	3,790	8.7
Middle 40%	8,410	28.6	8,380	31.4	10,900	33.5
Top 10%	80,700	68.7	67,000	62.6	71,000	54.7
Top 1%	329,000	28.0	267,000	24.9	274,000	21.1
Top 0.1%	970,000	8.3	739,000	6.9	744,000	5.7

Notes. The table reports statistics on the distribution of income in South Africa in 2019 for different income concepts. Pretax income equals capital and labor income, minus social contributions, plus pension and unemployment benefits. Posttax disposable income equals pretax income, minus direct taxes, plus cash transfers. Public services are adjusted for aggregate and heterogeneous productivity. Aggregate productivity refers to the fact that the South African government may be inefficient at providing public services overall. Heterogeneous productivity corresponds to the fact that the quality of public services, controlling for their cost of provision, may vary by income group. Income is split equally between all household members.

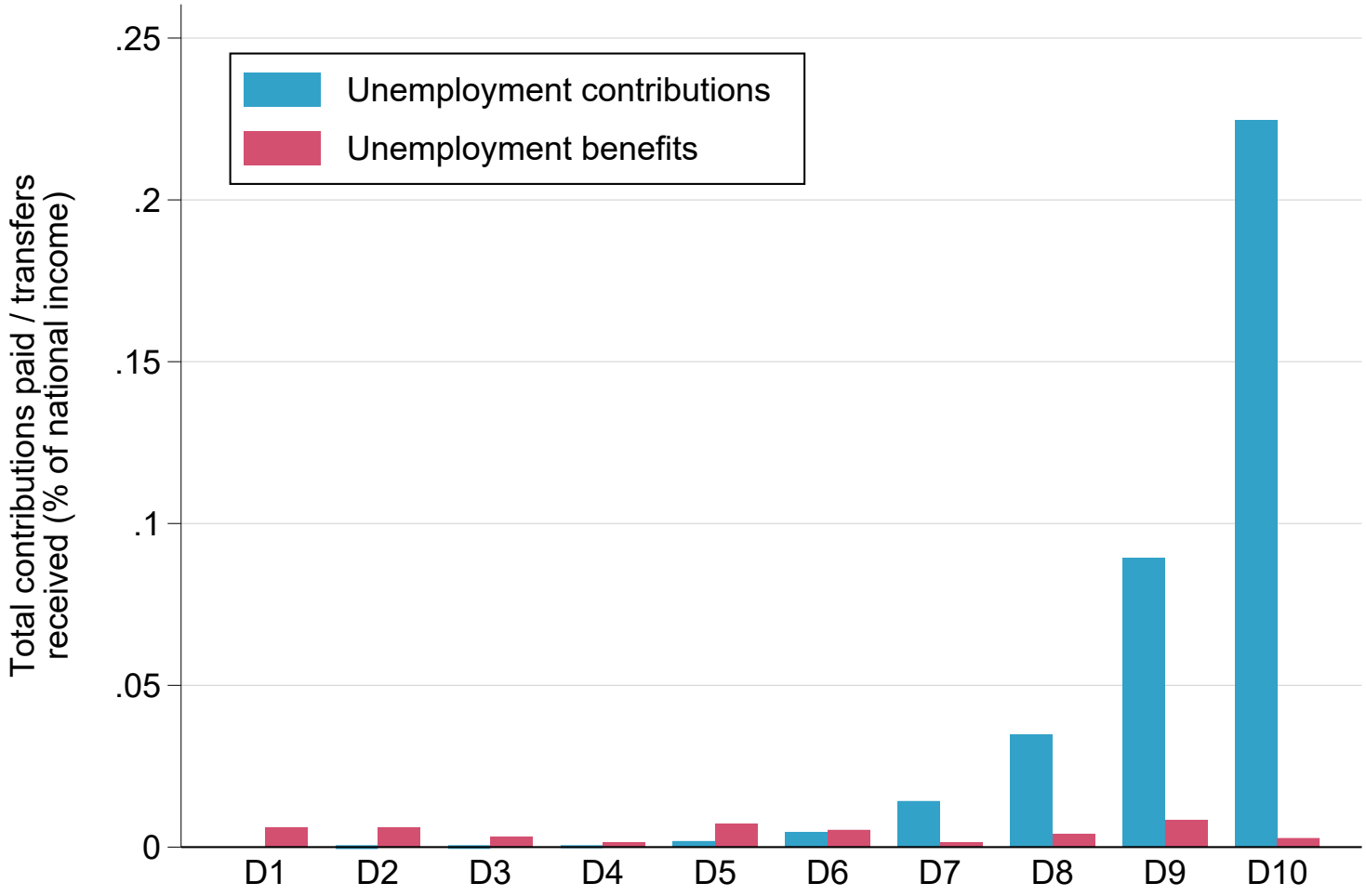
B. Pension and Unemployment Systems

Figure B1 – Pension Contributions and Benefits Paid/Received by Income Decile, 2019



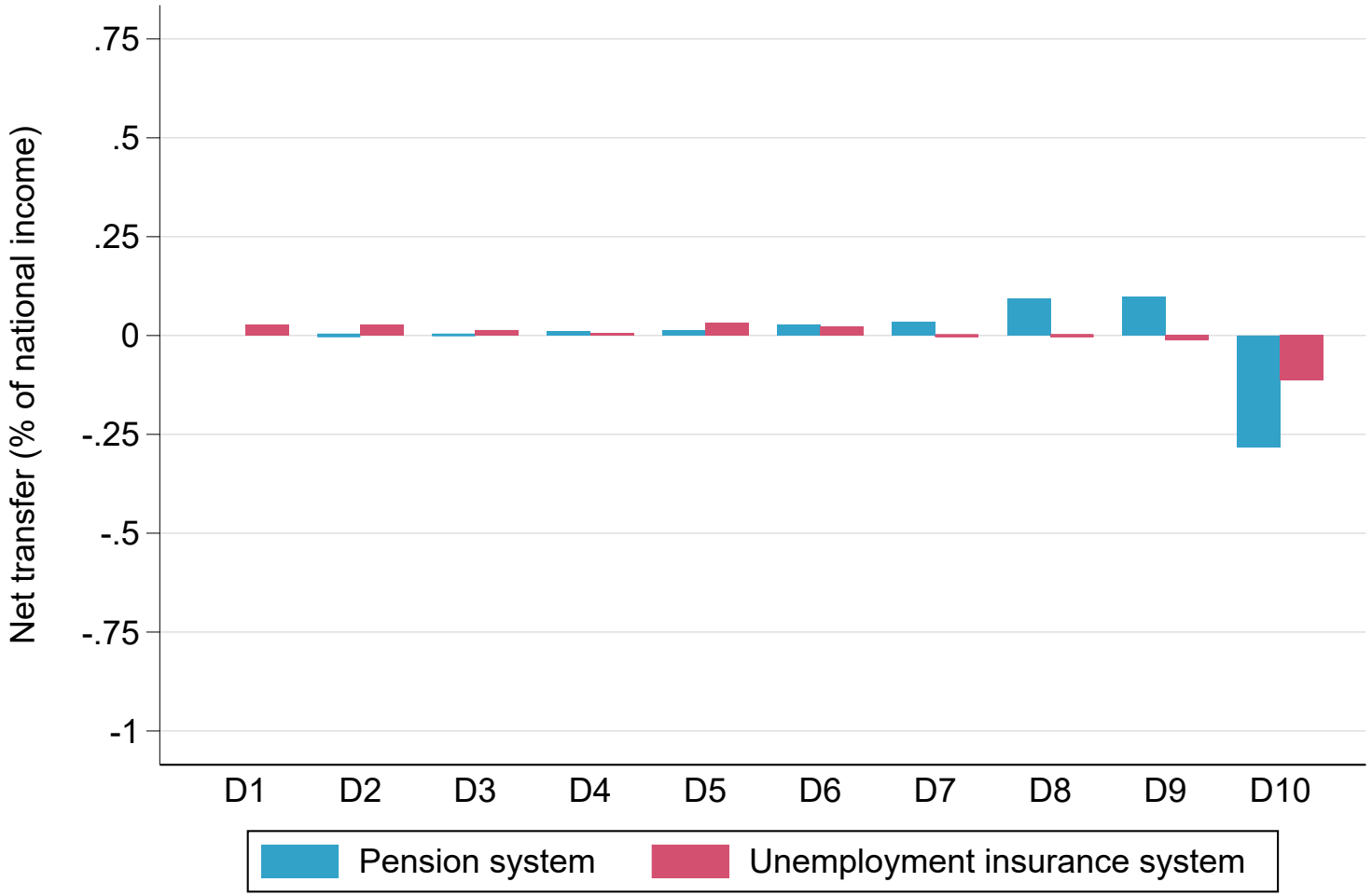
Notes. The figure plots the pension contributions paid and pension benefits received by pretax income decile in 2019, expressed as a share of national income. Author's computations combining surveys, tax, and national accounts data (see Chatterjee, Czajka, and Gethin, 2023).

Figure B2 – Unemployment Insurance Contributions and Benefits Paid/Received by Income Decile, 2019



Notes. The figure plots the unemployment insurance contributions paid and unemployment insurance benefits received by pretax income decile in 2019, expressed as a share of national income. Author's computations combining surveys, tax, and national accounts data (see Chatterjee, Czajka, and Gethin, 2023).

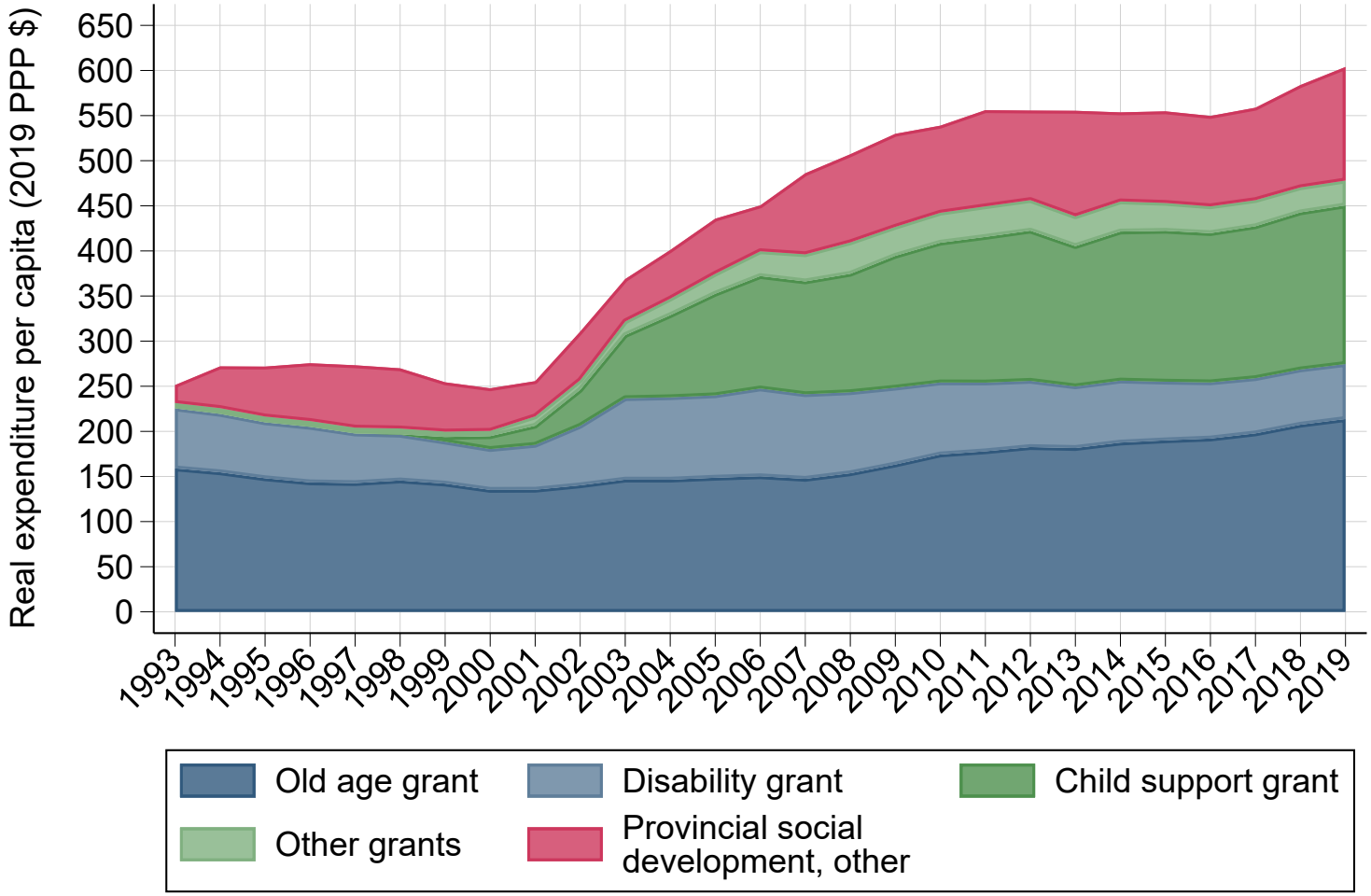
Figure B3 – Net Transfers Operated by the Pension and Unemployment Insurance Systems Between Income Deciles, 2019



Notes. The figure plots the gap between benefits received and contributions paid by pretax income decile, for both the pension and unemployment insurance systems, expressed as a share of national income. Author's computations combining surveys, tax, and national accounts data (see Chatterjee, Czajka, and Gethin, 2023).

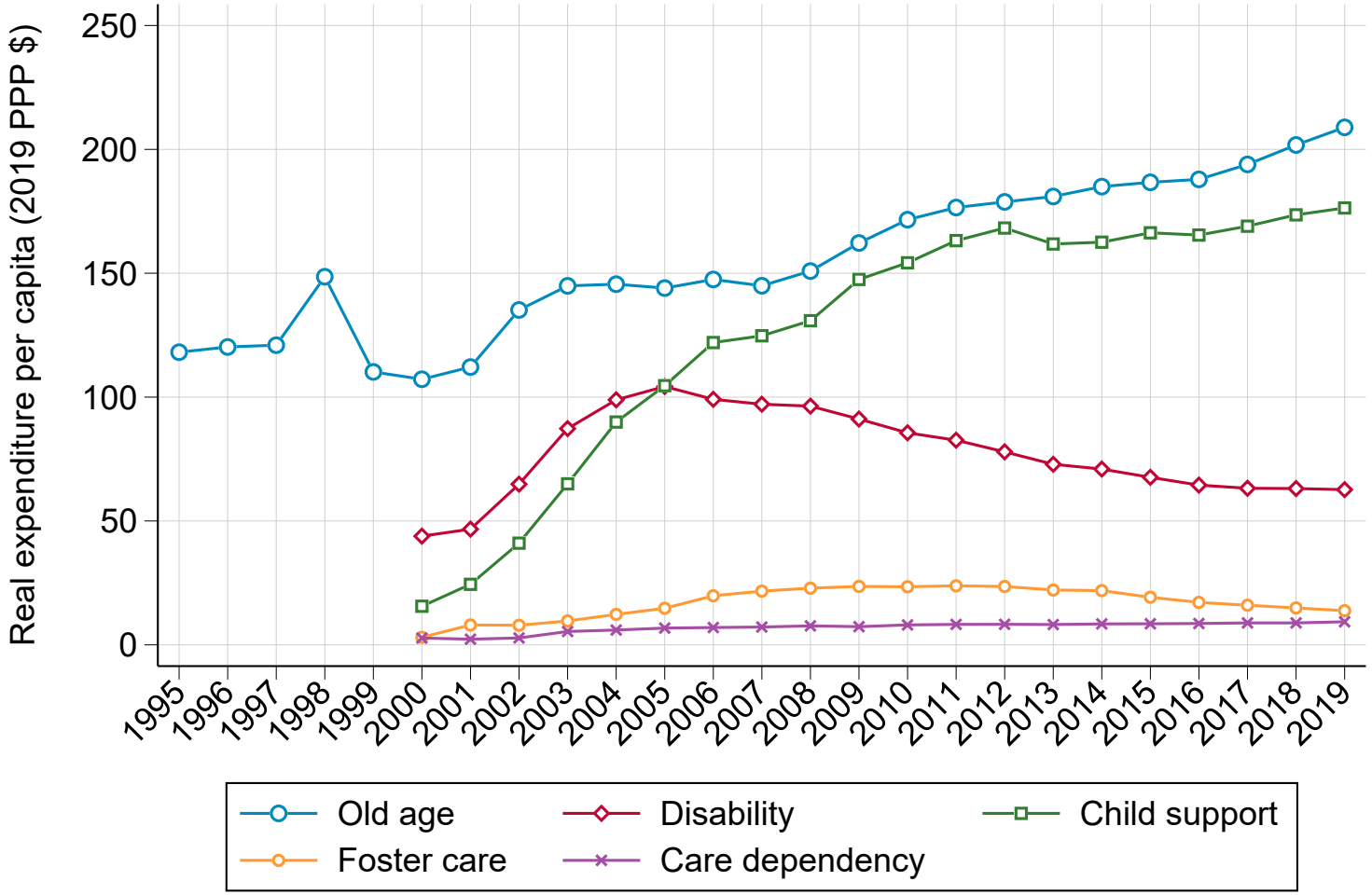
C. Social Protection

Figure C1 – Level and Composition of Social Protection Expenditure in South Africa, 1993-2019



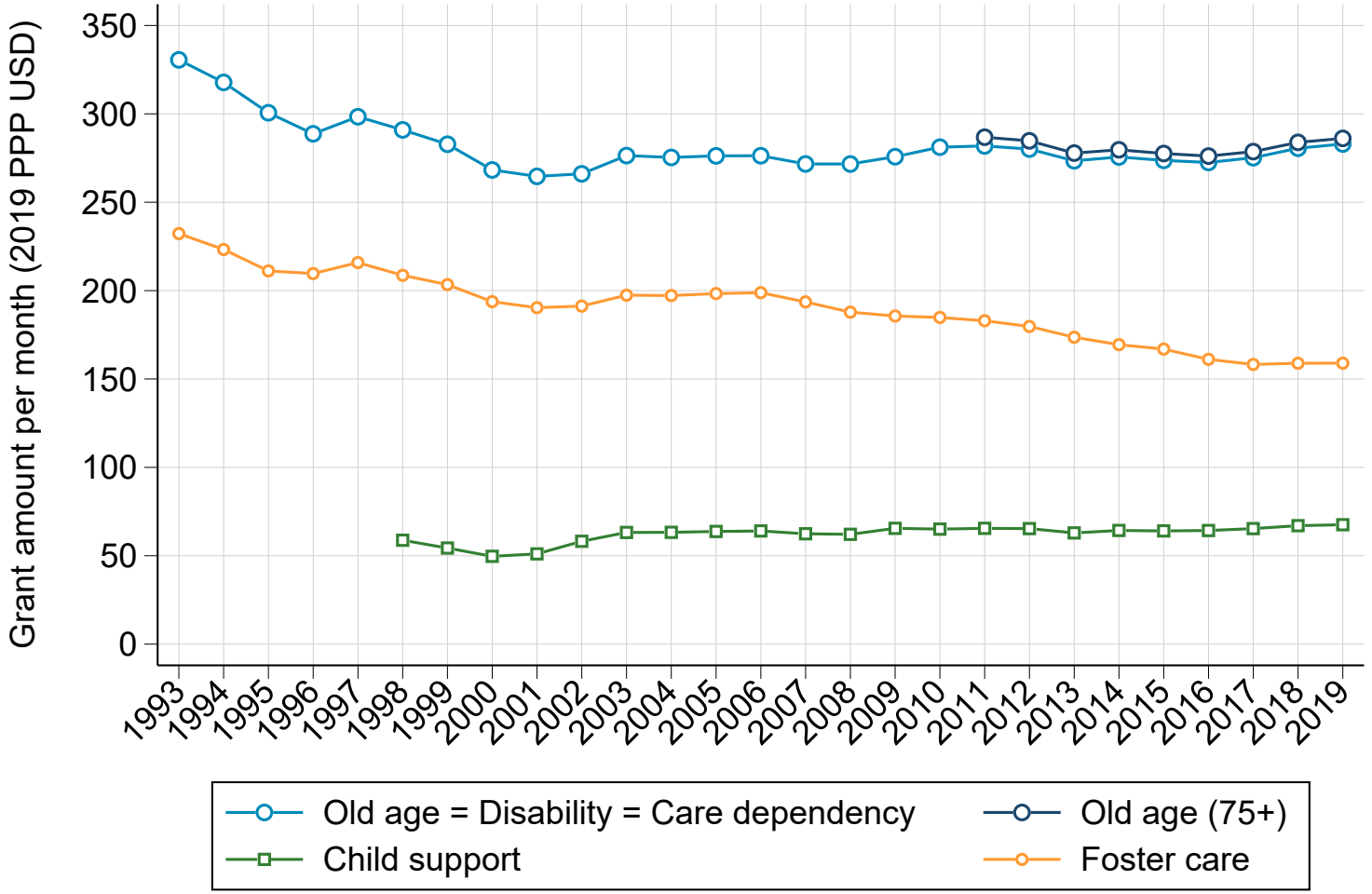
Notes. Author's computations combining data from South African National Treasury Budget Reports (1994-2020).

Figure C2 – Per Capita Expenditure on Social Grants in South Africa, 1993-2019



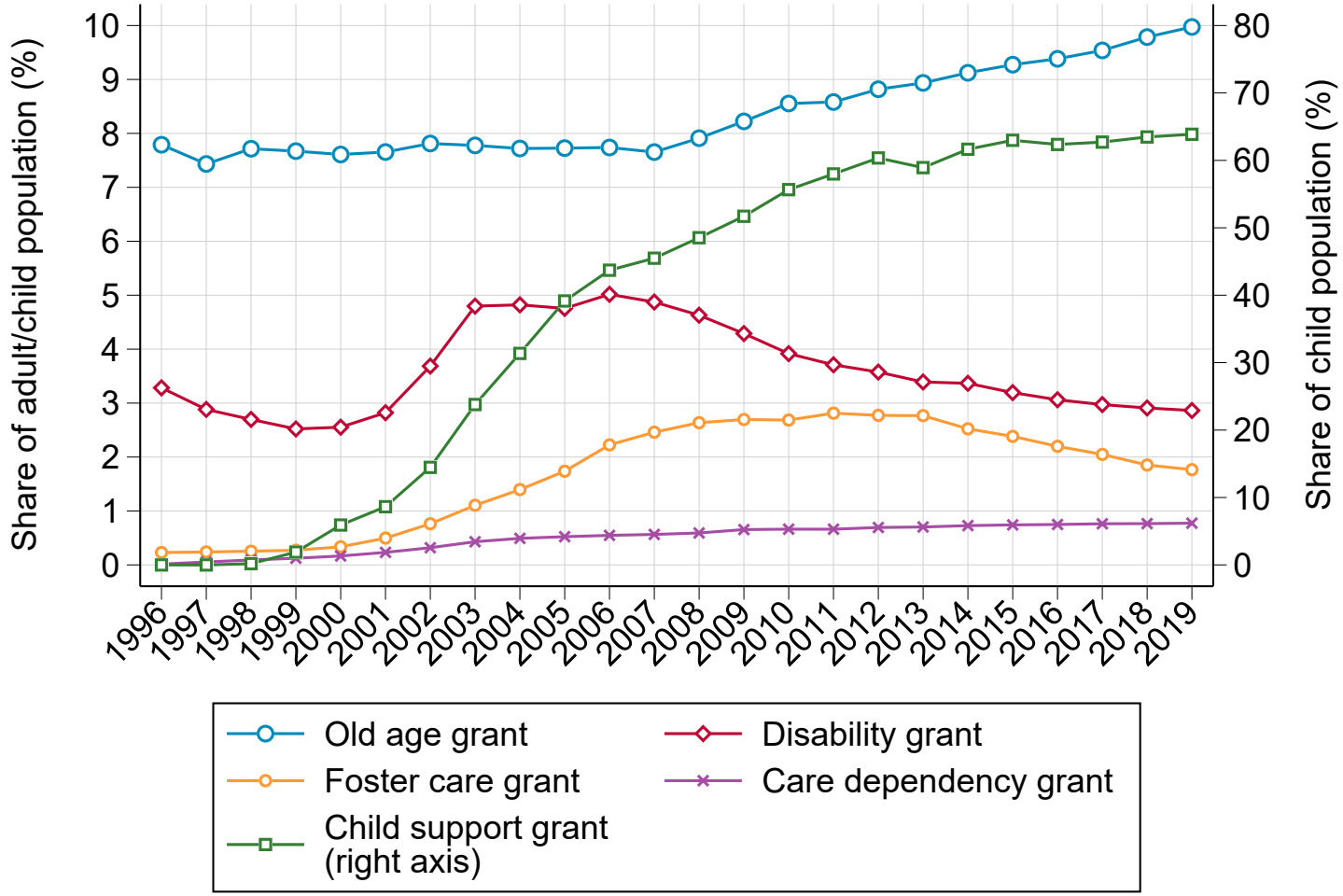
Notes. Author's computations combining data from South African National Treasury Budget Reports (1994-2020).

Figure C3 – Real Monthly Value of Social Grants in South Africa, 1993-2019



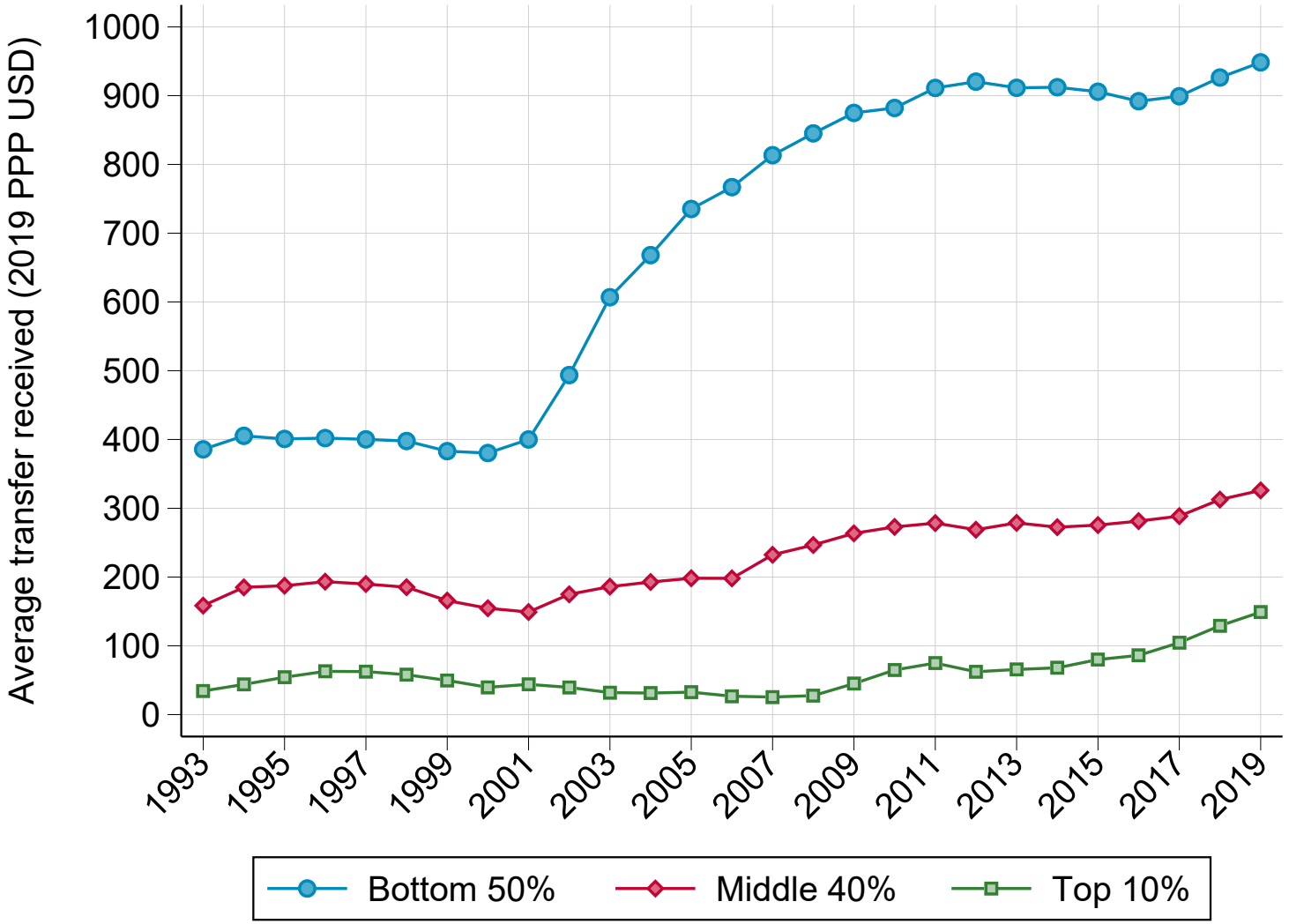
Notes. Author's computations combining data from South African National Treasury Budget Reports (1994-2020).

Figure C4 – Share of Population Receiving Social Grants in South Africa, 1993-2019



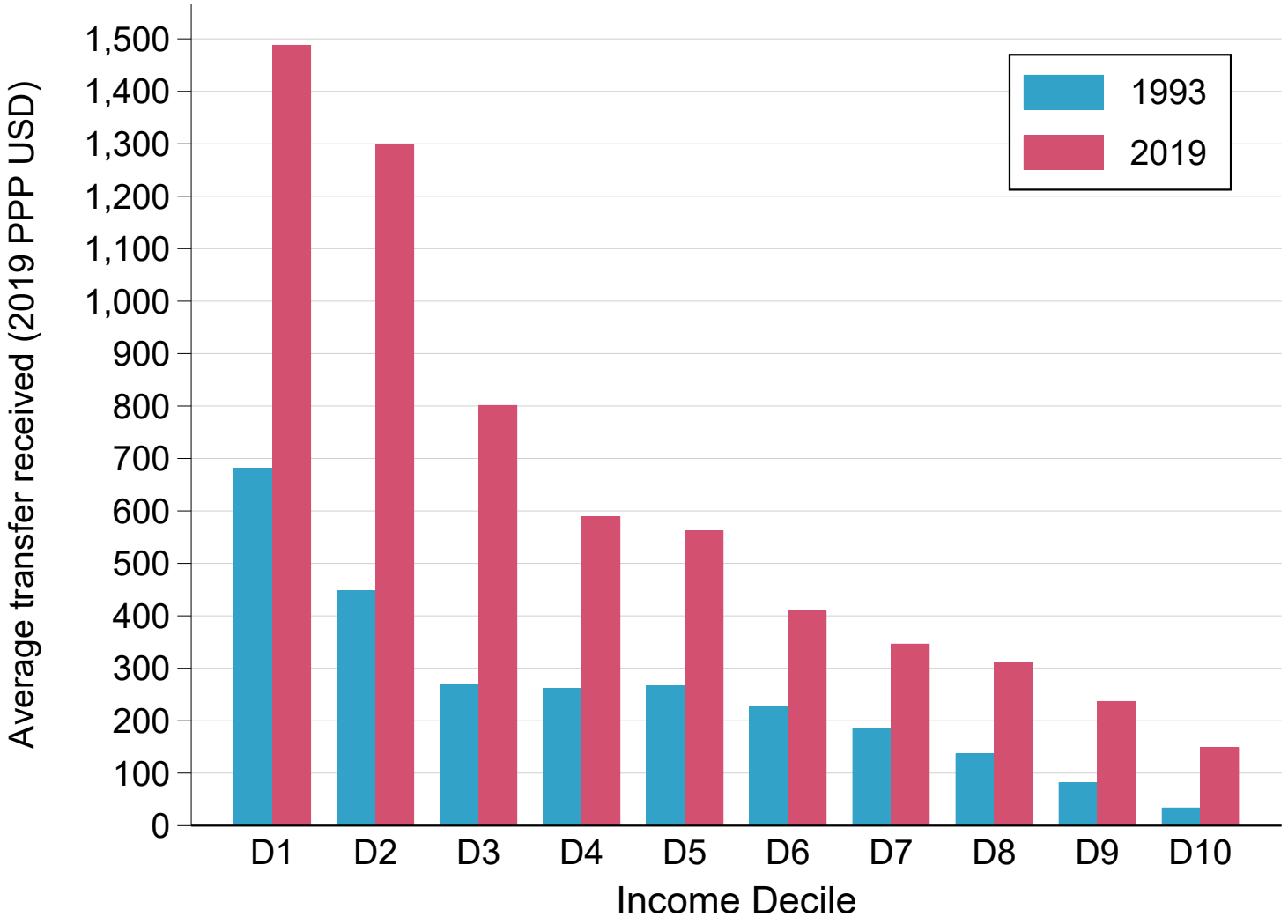
Notes. Author's computations combining data from South African National Treasury Budget Reports (1994-2020).

Figure C5 – Average Social Protection Transfer Received by Income Group, 1993-2019



Notes. The figure plots the average social protection transfer received by pretax income group from 1993 to 2019. Social protection expenditure includes both cash transfers and in-kind social protection programs. Income and transfers are split equally between all household members.

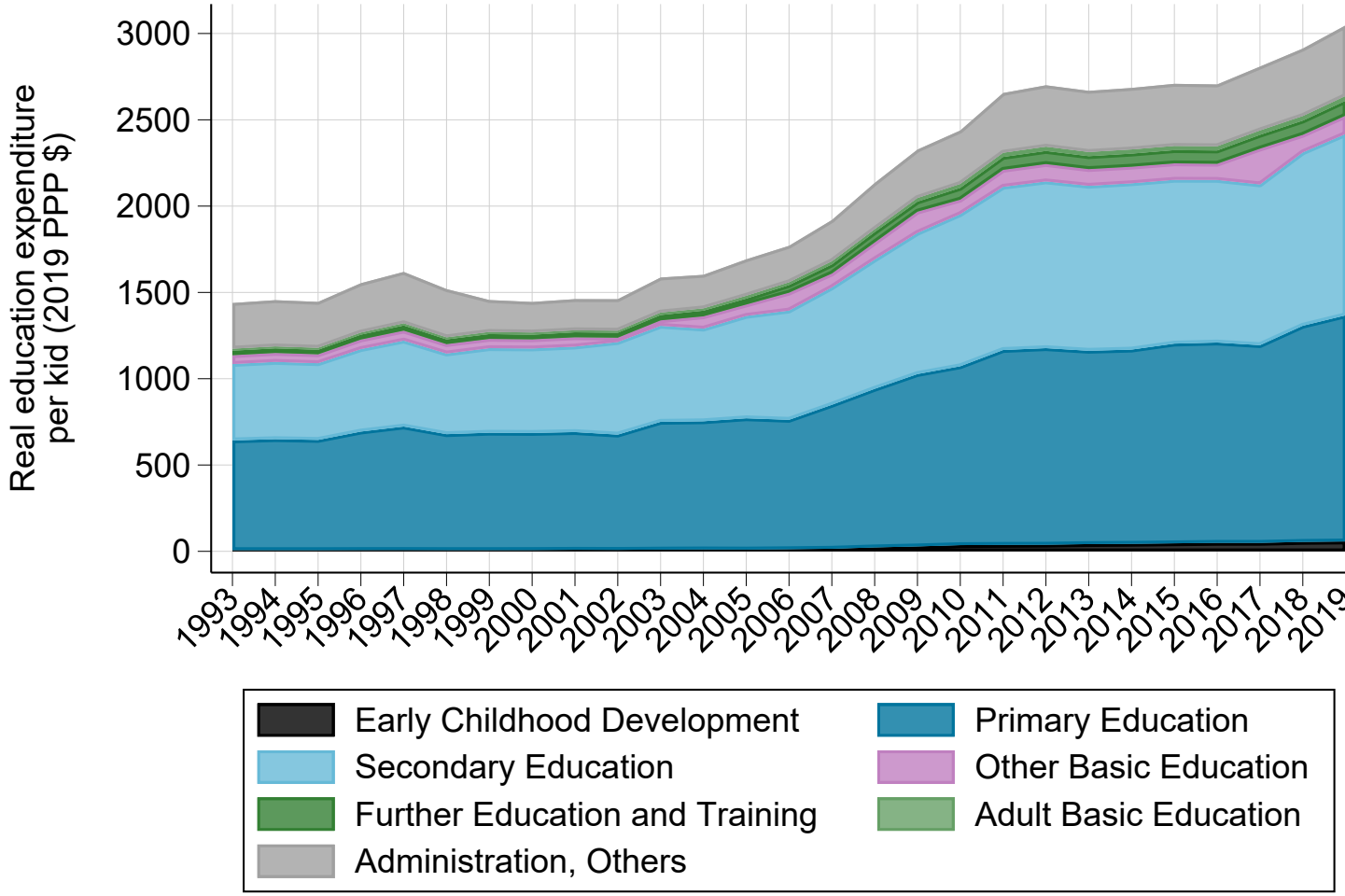
Figure C6 – Average Social Protection Transfer Received by Income Decile, 1993-2019



Notes. The figure plots the average social protection transfer received by pretax income decile in 1993 and 2019. Social protection expenditure includes both cash transfers and in-kind social protection programs. Income and transfers are split equally between all household members.

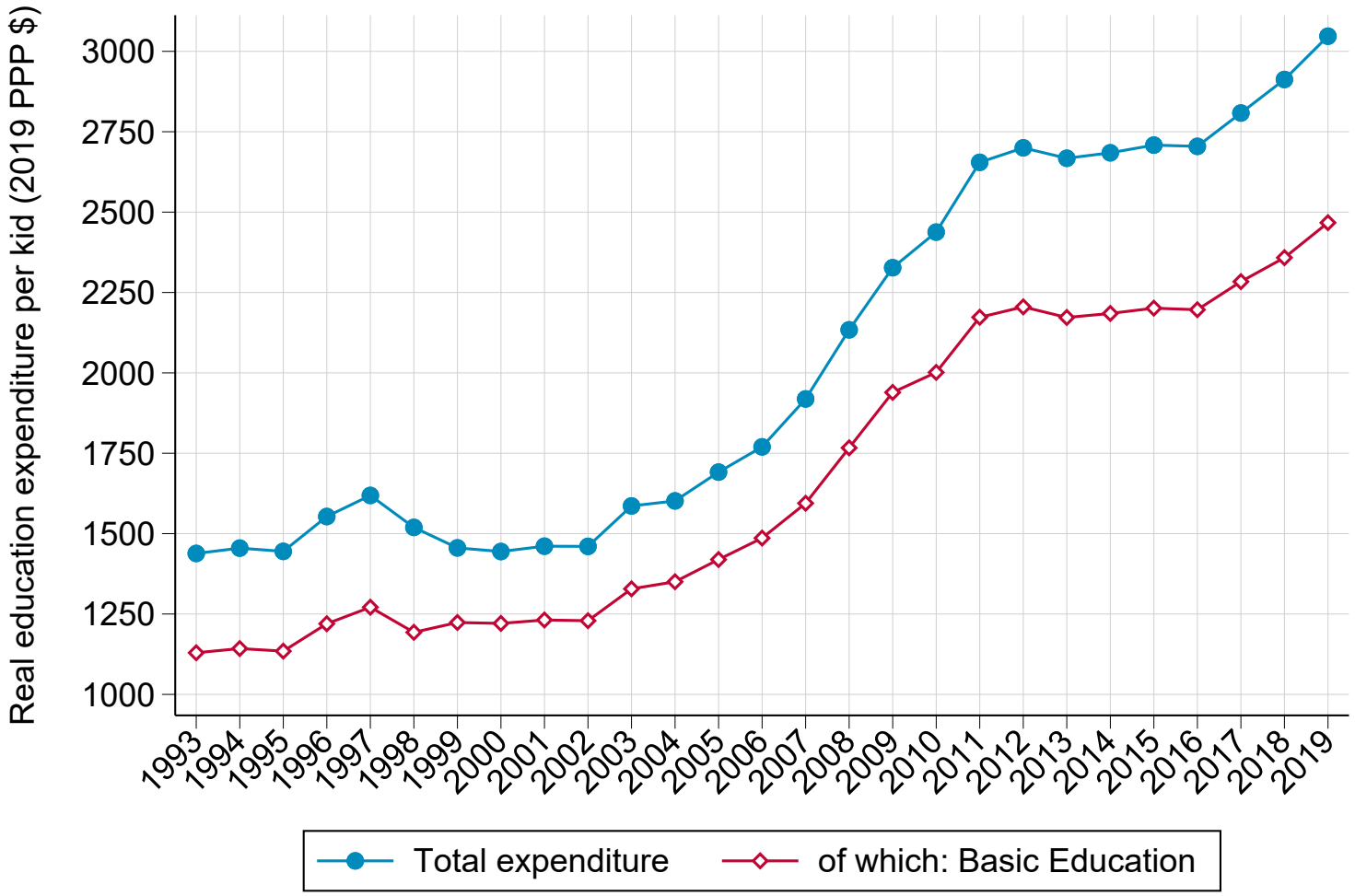
D. Education

Figure D1 – Level and Composition of Education Expenditure in South Africa, 1993-2019



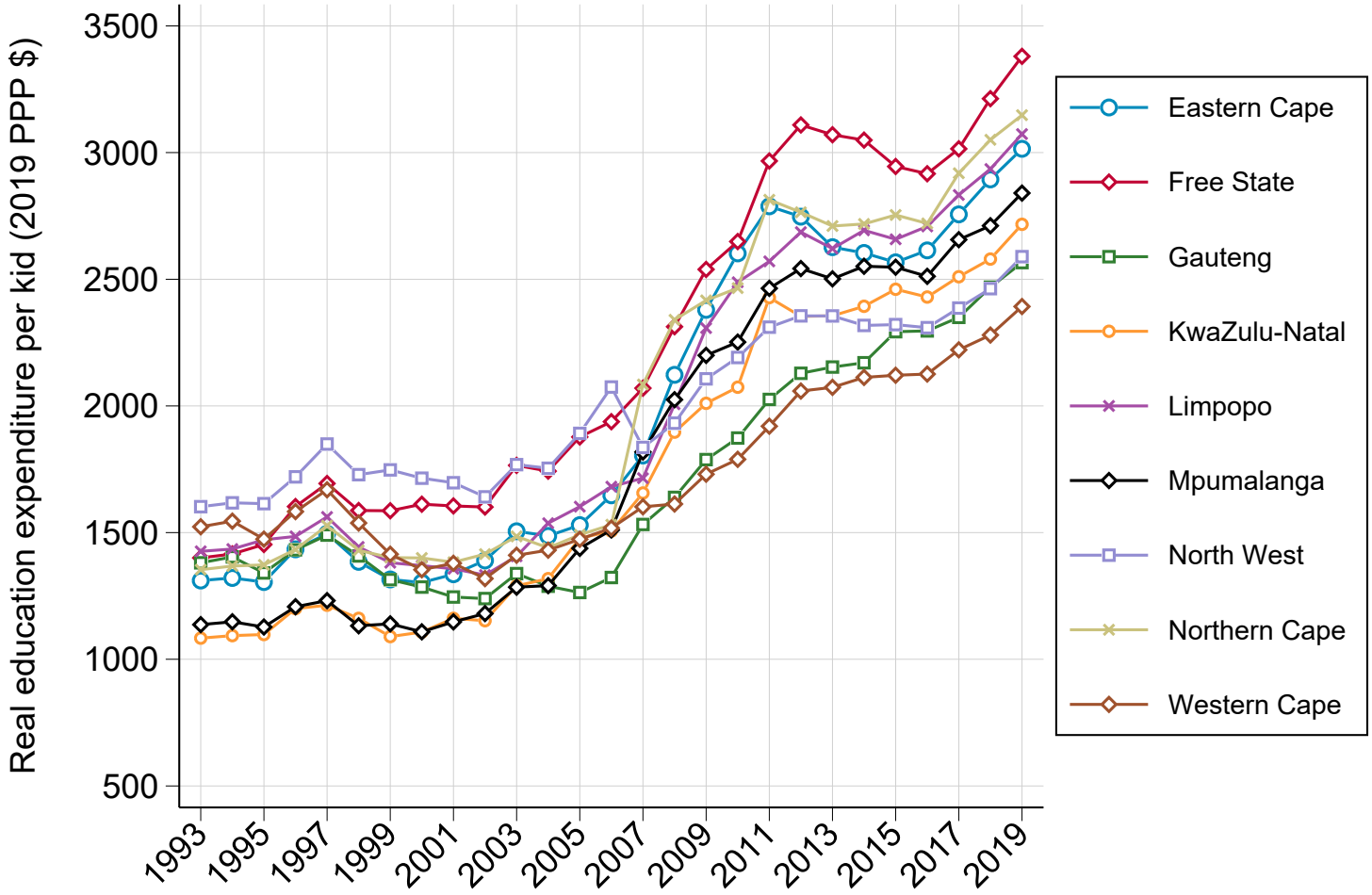
Notes. The figure plots the level and composition of public education expenditure in South Africa from 1993 to 2019. Author's computations combining data from South African National Treasury Budget Reports (1994-2020) and Provincial Budget Reports (2002-2020).

Figure D2 – The Rise of Education Expenditure in South Africa, 1993-2019:
The Role of Basic Education



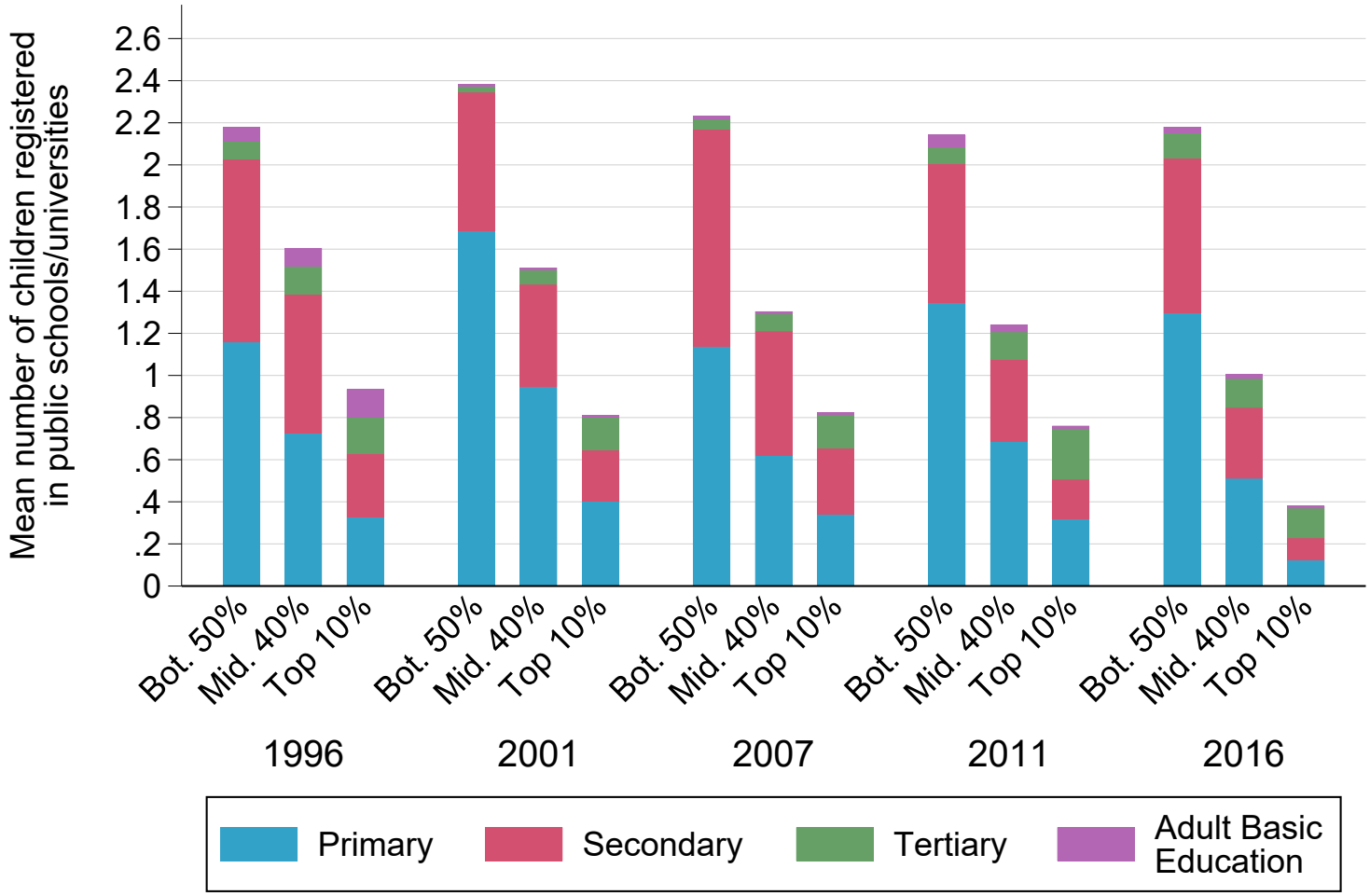
Notes. Author's computations combining data from South African National Treasury Budget Reports (1994-2020).

Figure D3 – Real Education Expenditure Per Child by South African Province, 1993-2019



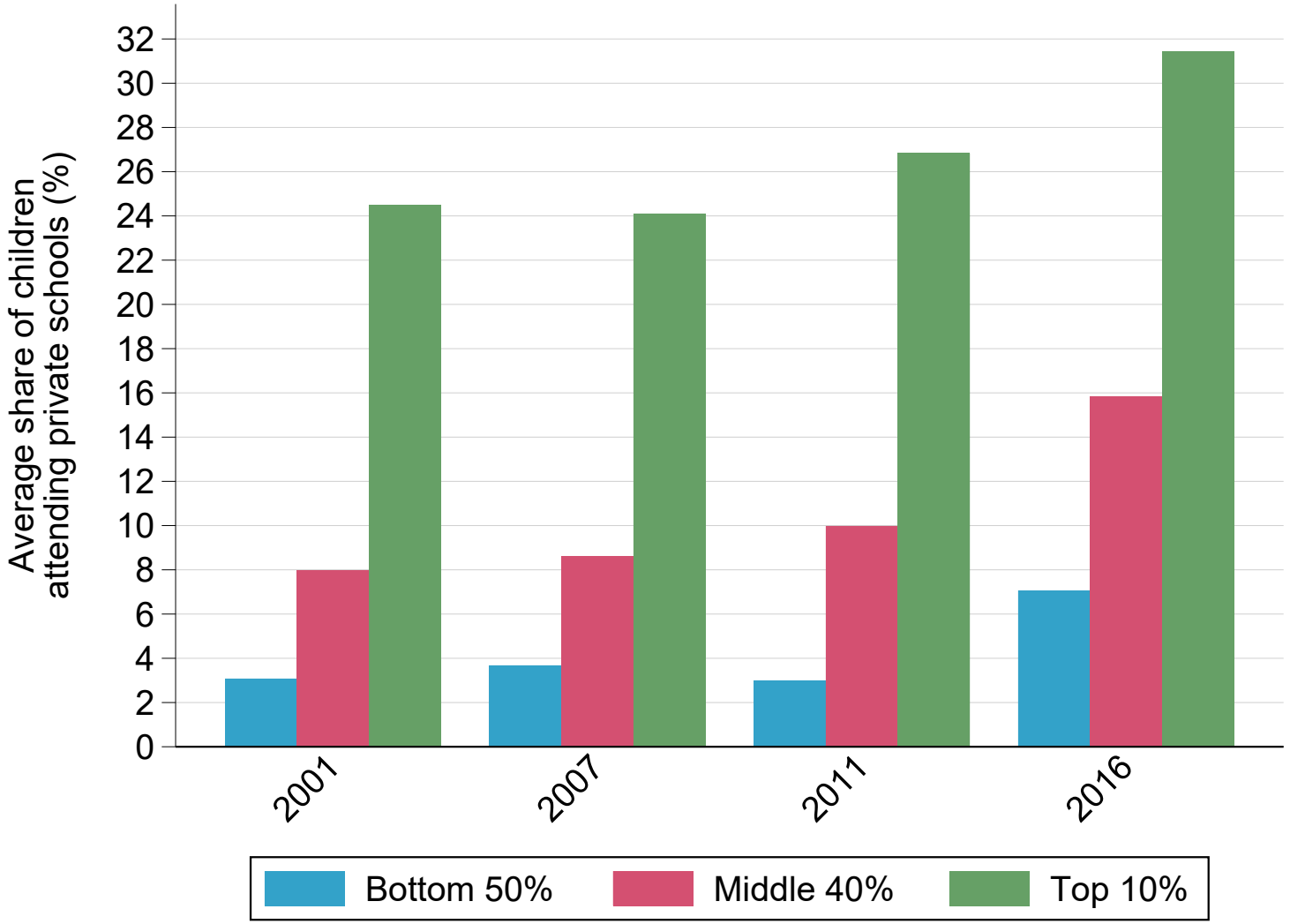
Notes. The figure plots the evolution of average education expenditure per child by province from 1993 to 2019. Author's computations combining data from South African National Treasury Budget Reports (1994-2020) and Provincial Budget Reports (2002-2020).

Figure D4 – Average Number of Children Attending Public Schools by Income Group, 1996-2016



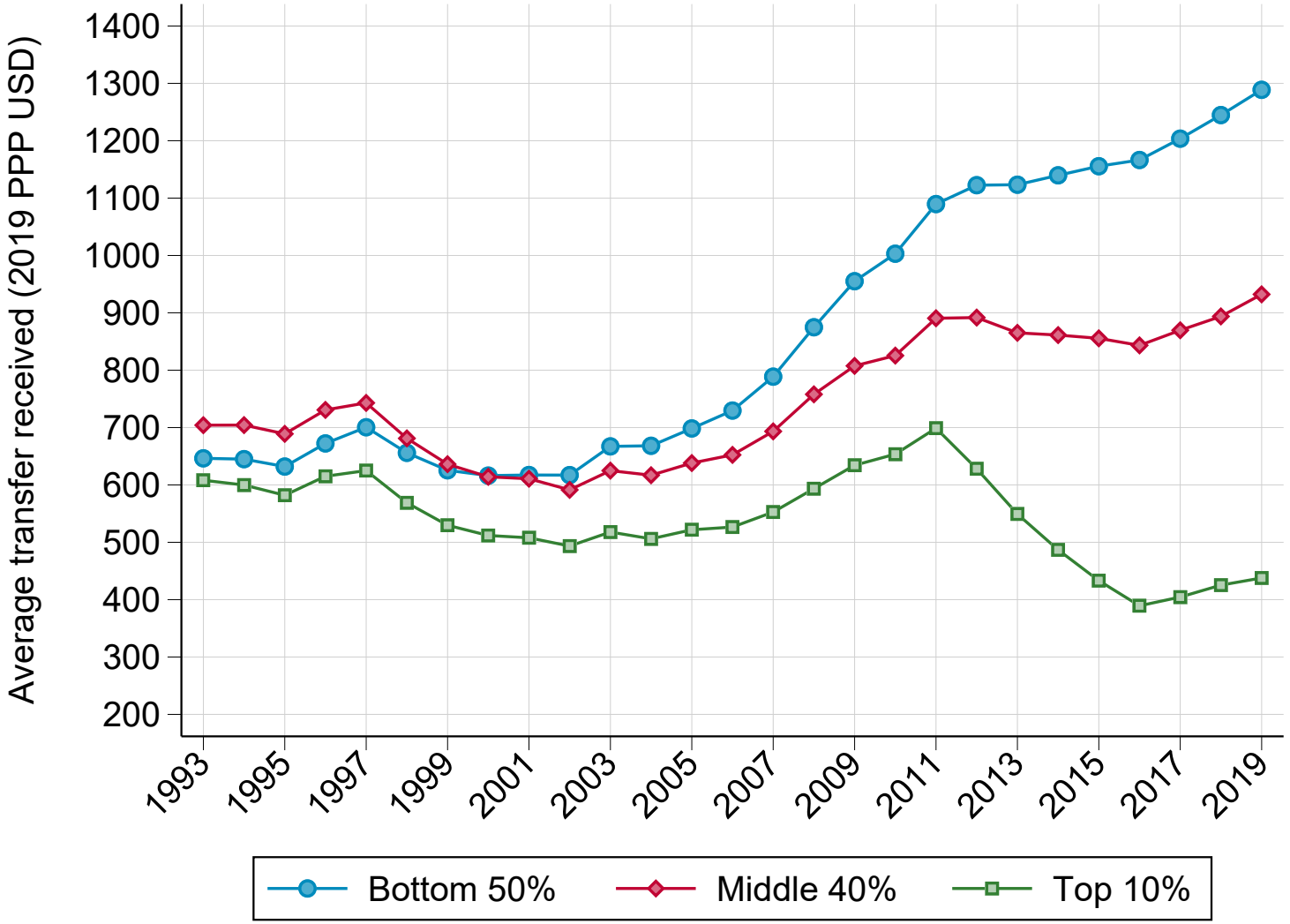
Notes. The figure plots the average number of children currently attending public schools by pretax income group. Author's computations using census sample microdata.

Figure D5 – Share of Children Attending Private Schools by Income Group, 2001-2016



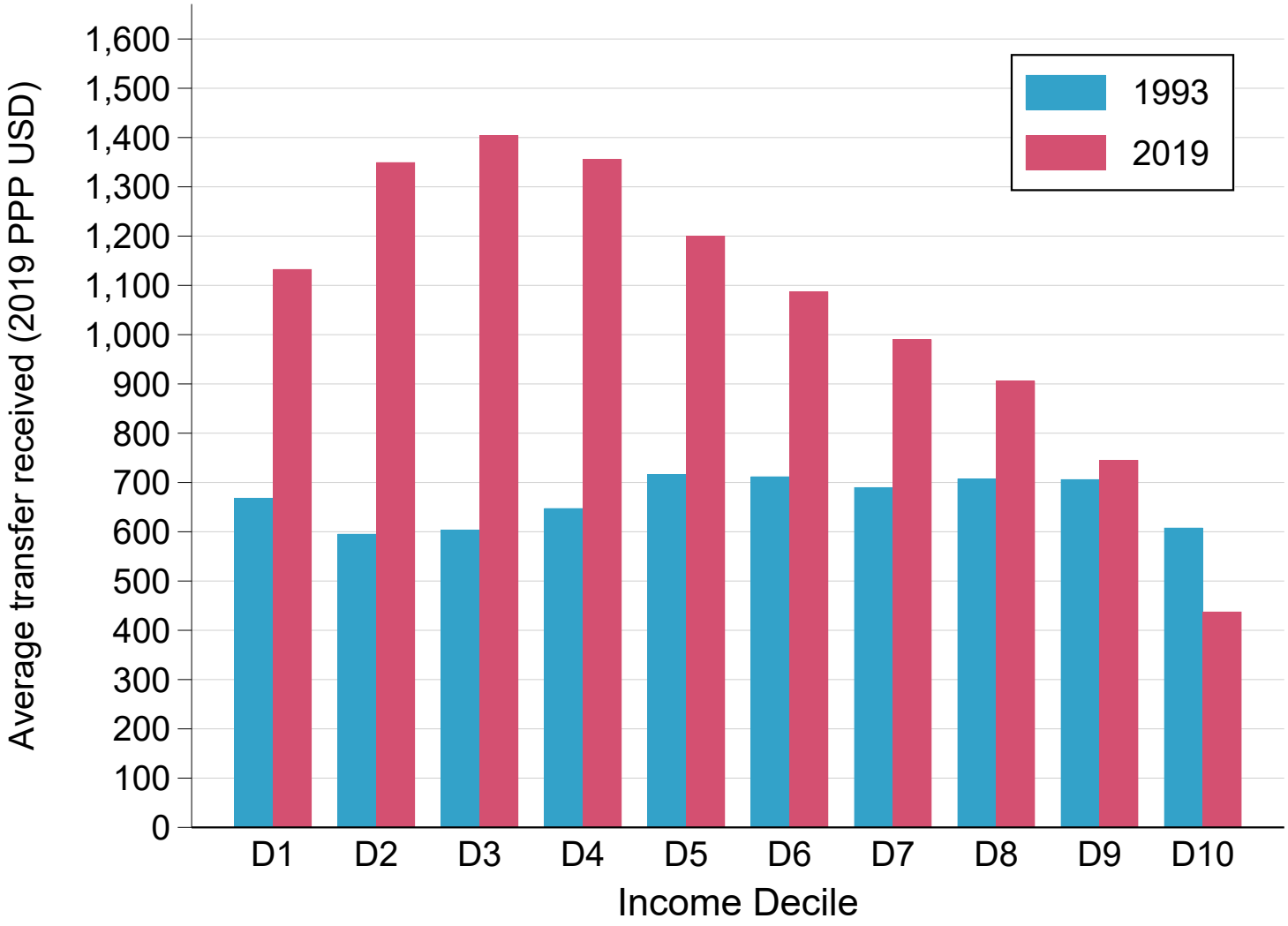
Notes. The figure plots the share of children currently attending private schools by pretax income group. Author's computations using census sample microdata.

Figure D6 – Average Education Transfer Received by Income Group, 1993-2019



Notes. The figure plots the average public education transfer received by pretax income group from 1993 to 2019. Income and transfers are split equally between all household members.

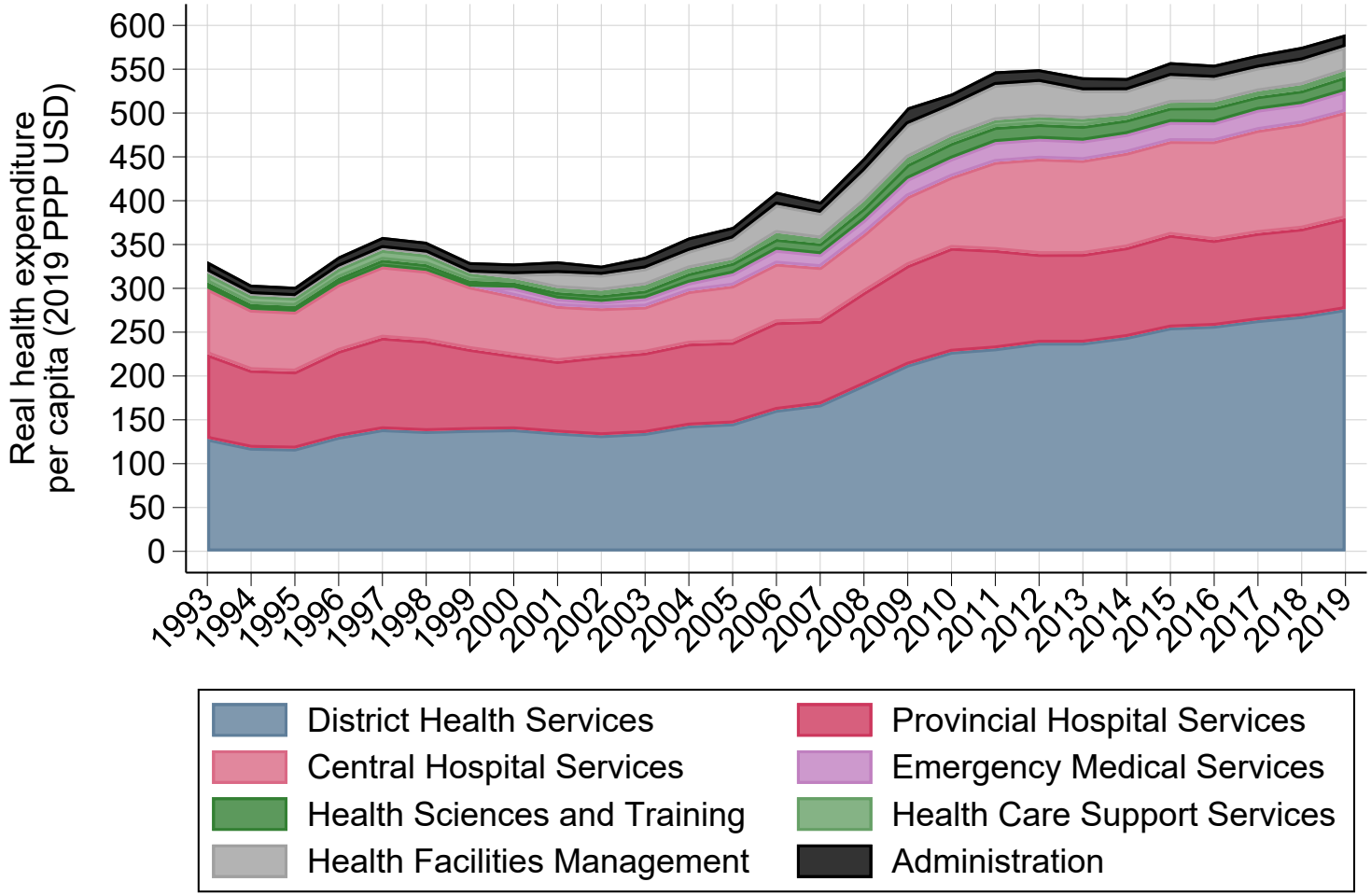
Figure D7 – Average Education Transfer Received by Income Decile, 1993-2019



Notes. The figure plots the average public education transfer received by pretax income decile in 1993 and 2019. Income and transfers are split equally between all household members.

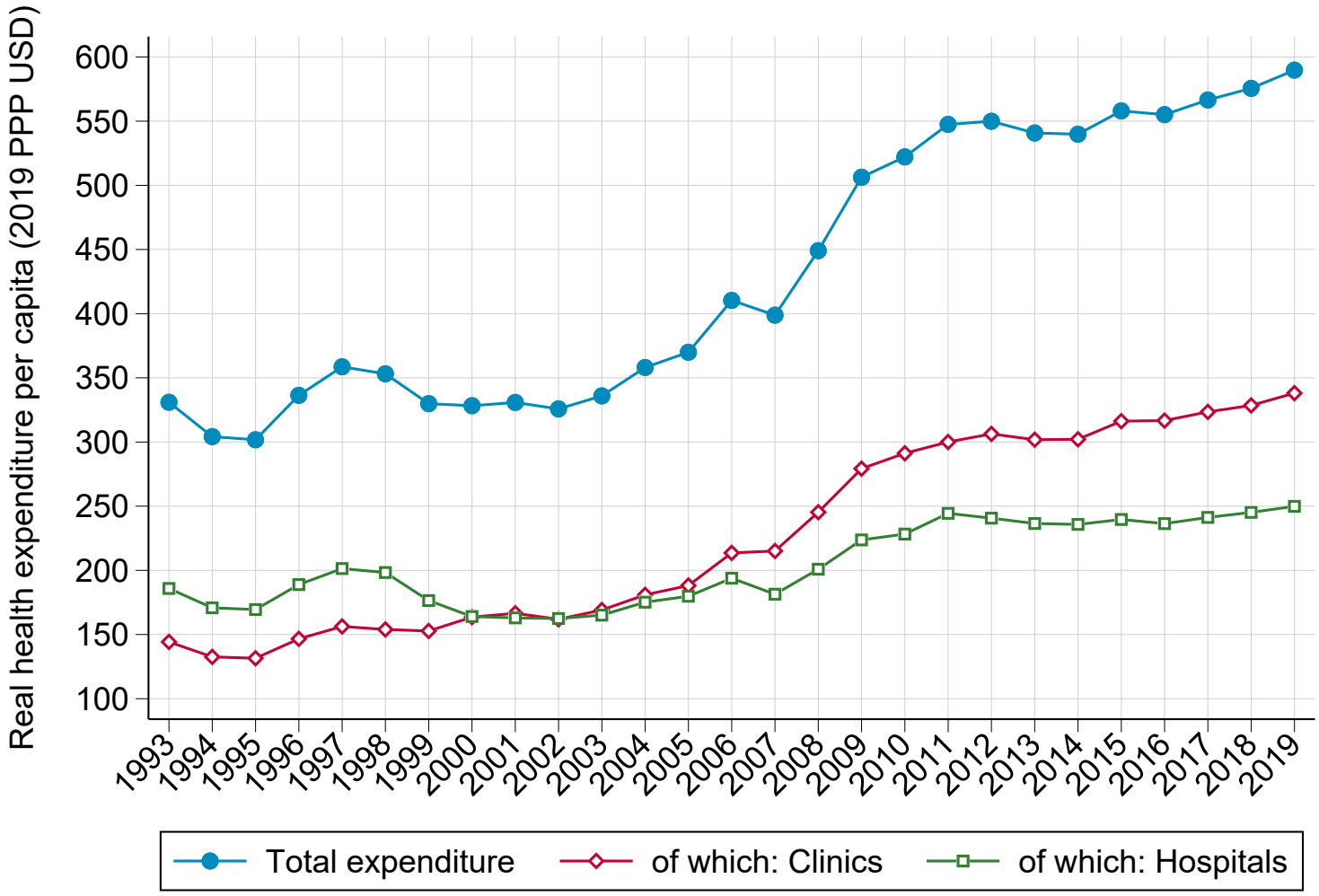
E. Health

Figure E1 – Level and Composition of Health Expenditure in South Africa, 1993-2019



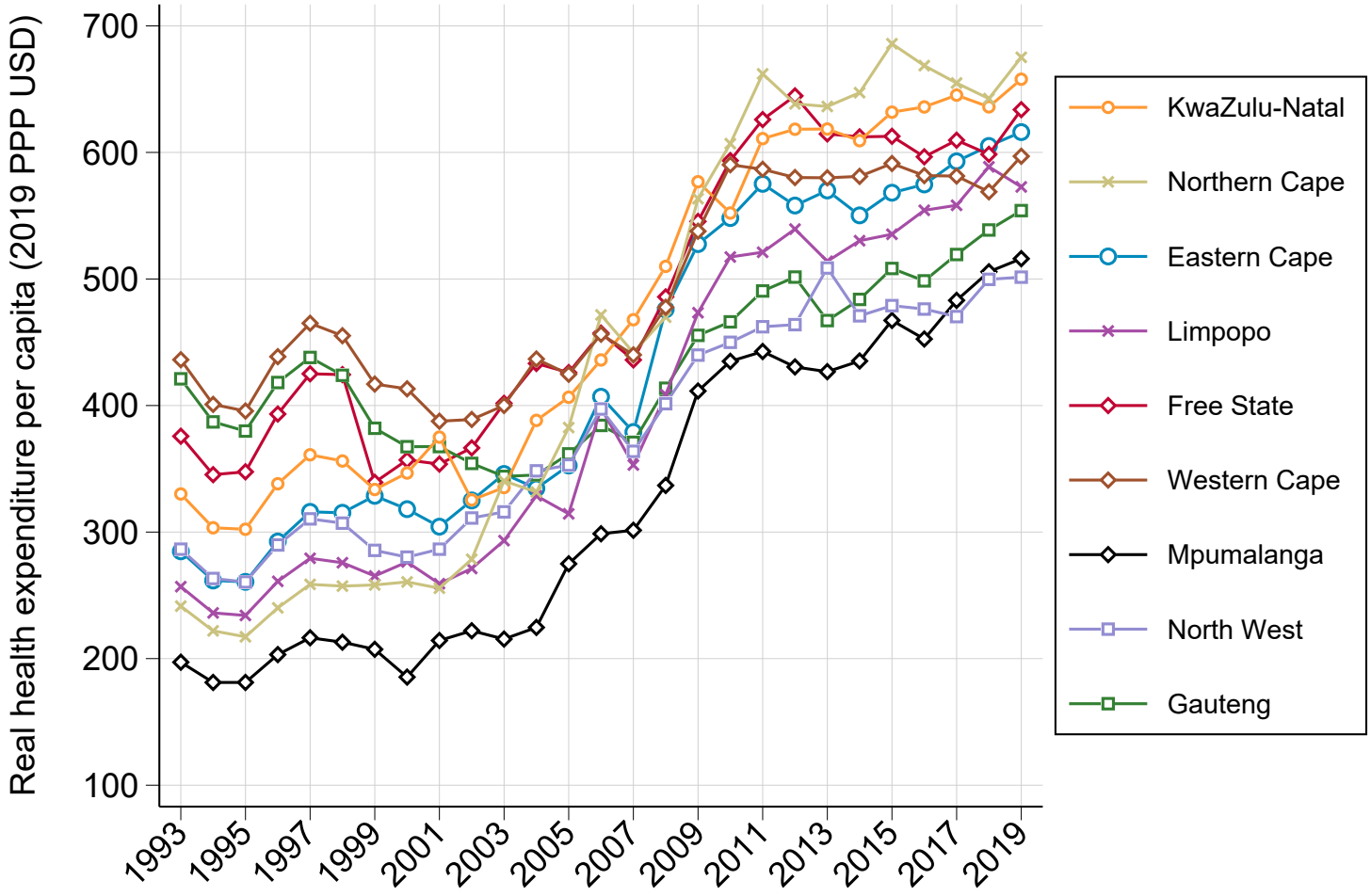
Notes. The figure plots the level and composition of public health expenditure from 1993 to 2019. Author's computations combining data from South African National Treasury Budget Reports (1994-2020) and Provincial Budget Reports (2002-2020).

Figure E2 – Level and Composition of Health Expenditure in South Africa, 1993-2019: Clinics Versus Hospitals



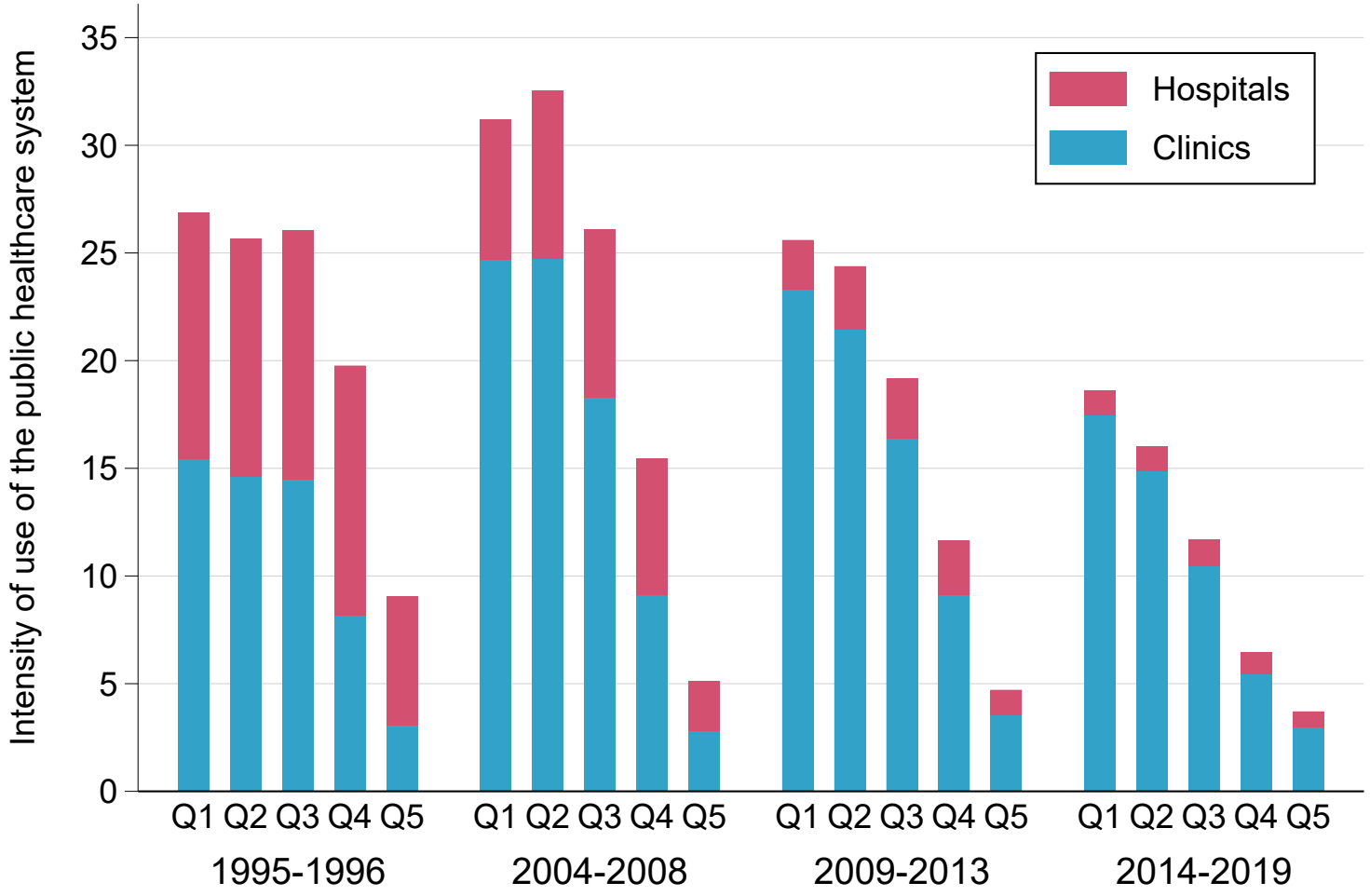
Notes. The figure plots per-capita health expenditure made by clinics and hospitals in South Africa from 1993 to 2019. Author's computations combining data from South African National Treasury Budget Reports (1994-2020) and Provincial Budget Reports (2002-2020).

Figure E3 – Real Health Expenditure Per Capita by South African Province, 1993-2019



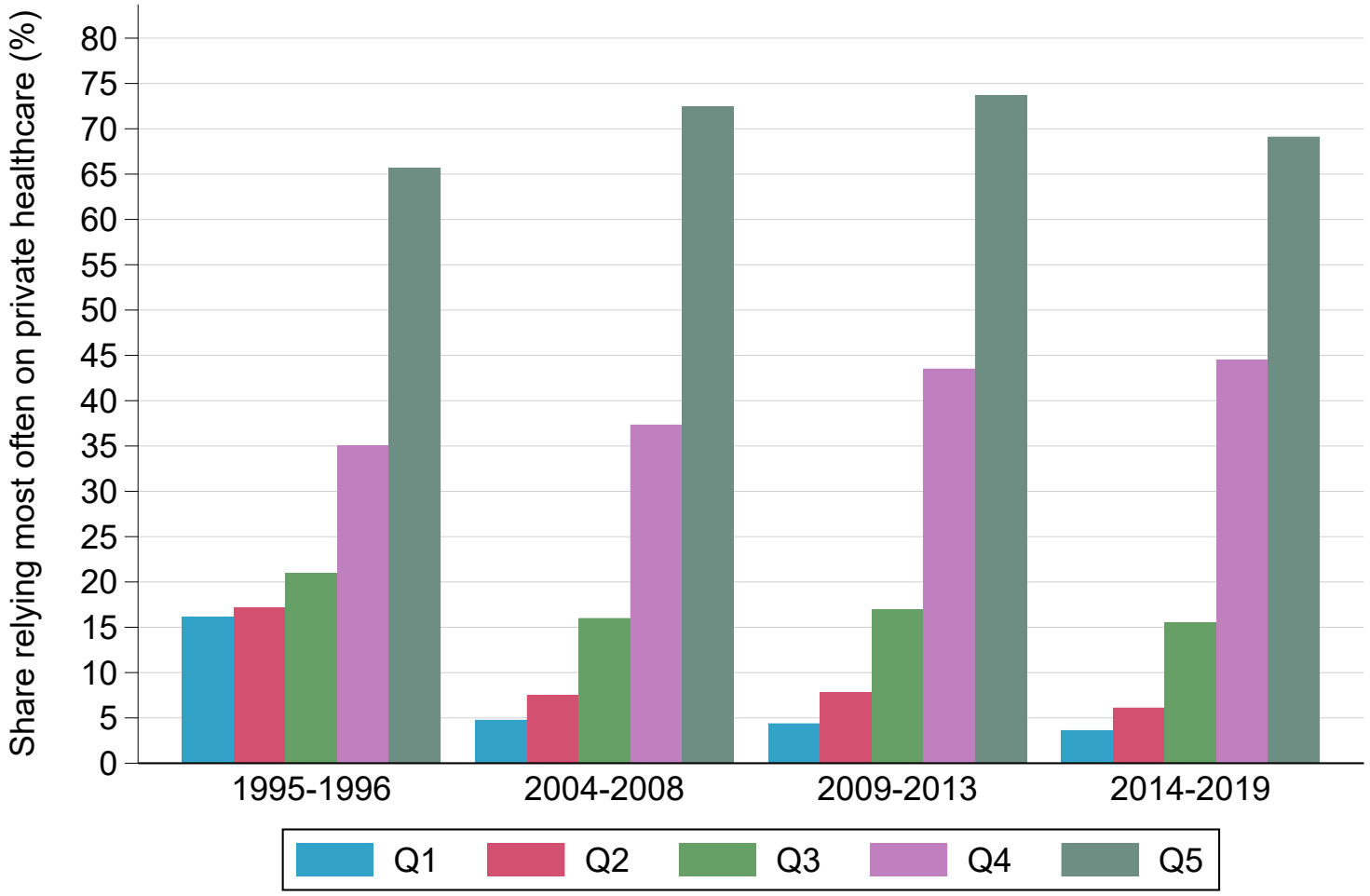
Notes. The figure plots the evolution of average health expenditure per capita by province from 1993 to 2019. Author's computations combining data from South African National Treasury Budget Reports (1994-2020) and Provincial Budget Reports (2002-2020).

Figure E4 – Intensity of Use of the Public Healthcare System by Income Quintile, 1995-2019



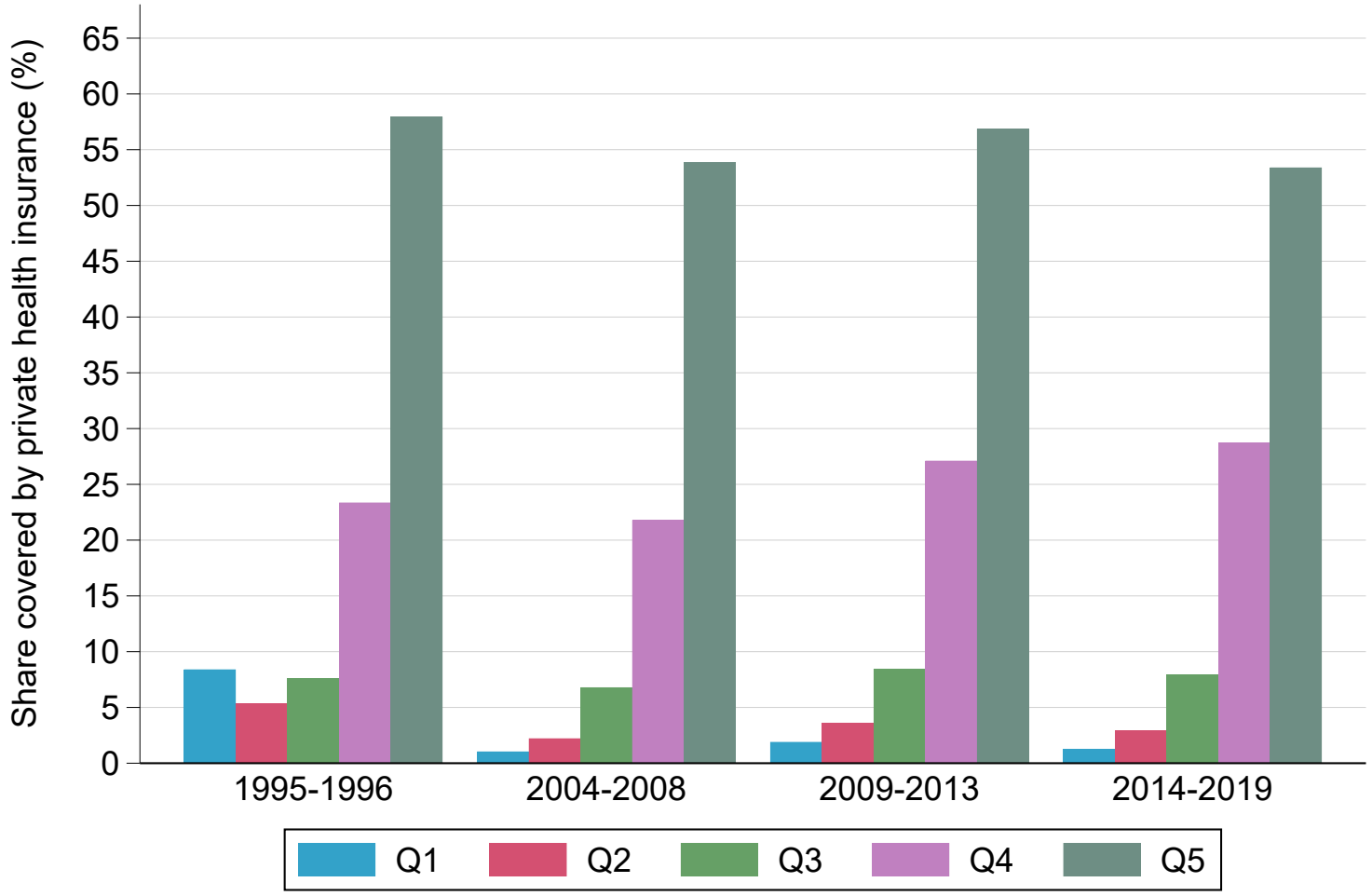
Notes. The figure plots average intensity of use of the public healthcare system by pretax income quintile. Author's computations using October Household Surveys (OHS, 1995-1996) and General Household Surveys (GHS, 2004-2019). OHS figures correspond to the share of individuals who either went to the hospital, or consulted a health worker in the past month, and declare going most often to public institutions to do so. GHS figures correspond to the share of individuals who consulted a health worker in the past three months and declare going most often to public institutions to do so.

Figure E5 – Private Healthcare Use by Income Quintile, 1995-2019



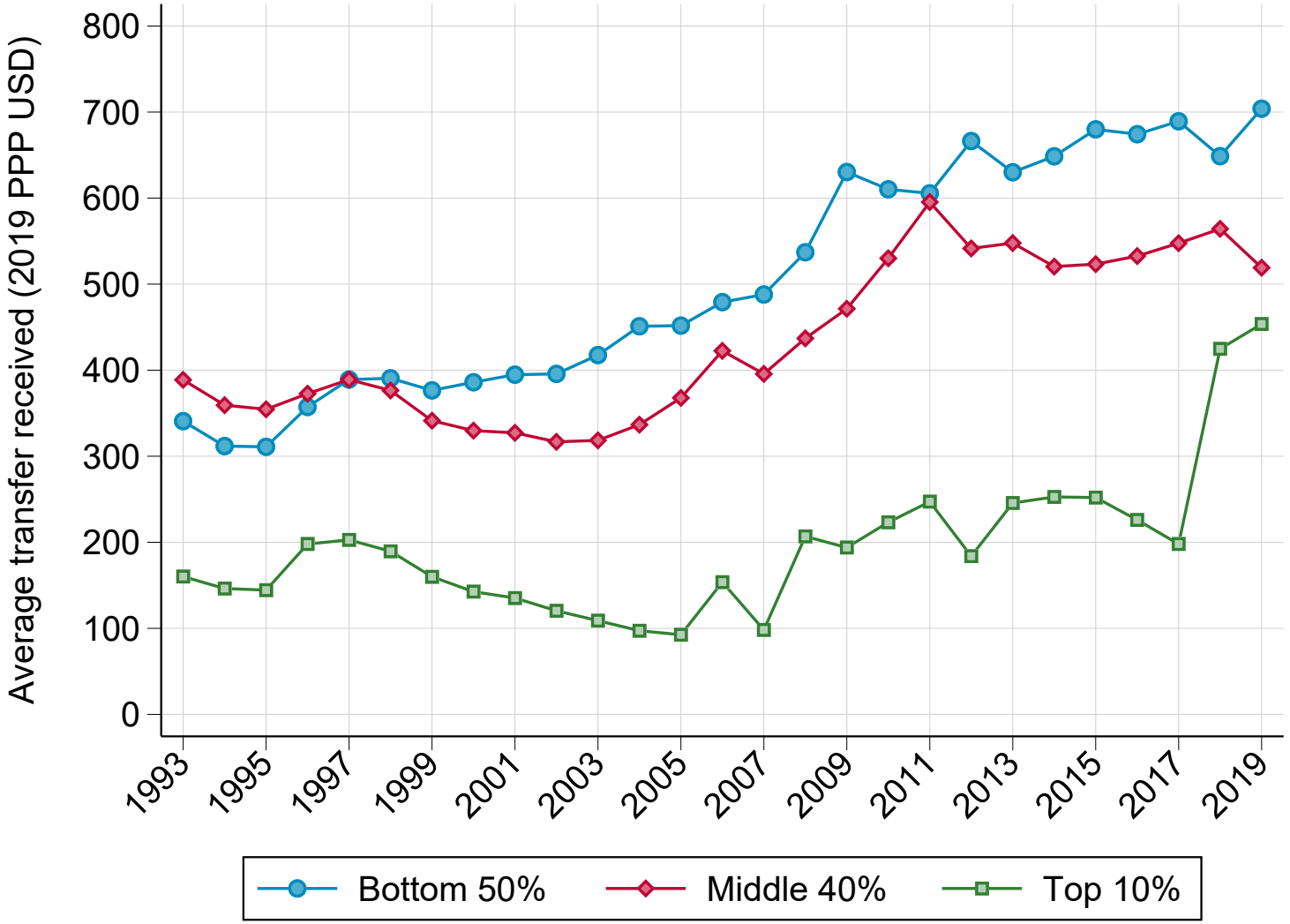
Notes. The figure plots the share of individuals declaring going most often to private clinics or private hospitals for healthcare by pretax income quintile. Author's computations using General Household Surveys (GHS, 2004-2019) and October Household Surveys (OHS, 1995-1996).

Figure E6 – Private Health Insurance Coverage by Income Quintile, 1995-2019



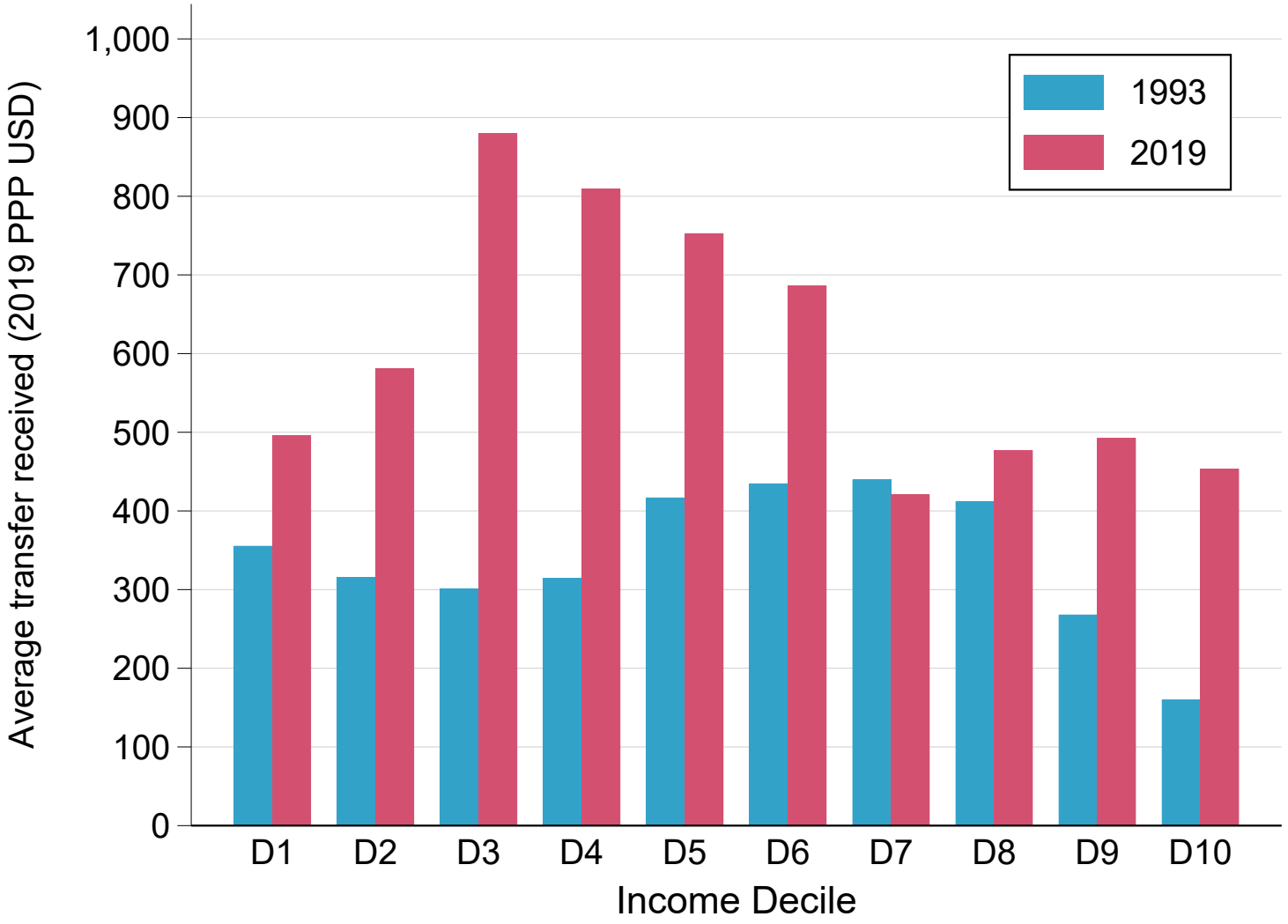
Notes. The figure plots the share of individuals declaring being covered by a medical aid, a medical benefit scheme, or any other form of private insurance by pretax income quintile. Author's computations using General Household Surveys (GHS, 2004-2019) and October Household Surveys (OHS, 1995-1996).

Figure E7 – Average Health Transfer Received by Income Group, 1993-2019



Notes. The figure plots the average public health transfer received by pretax income group from 1993 to 2019. Income and transfers are split equally between all household members.

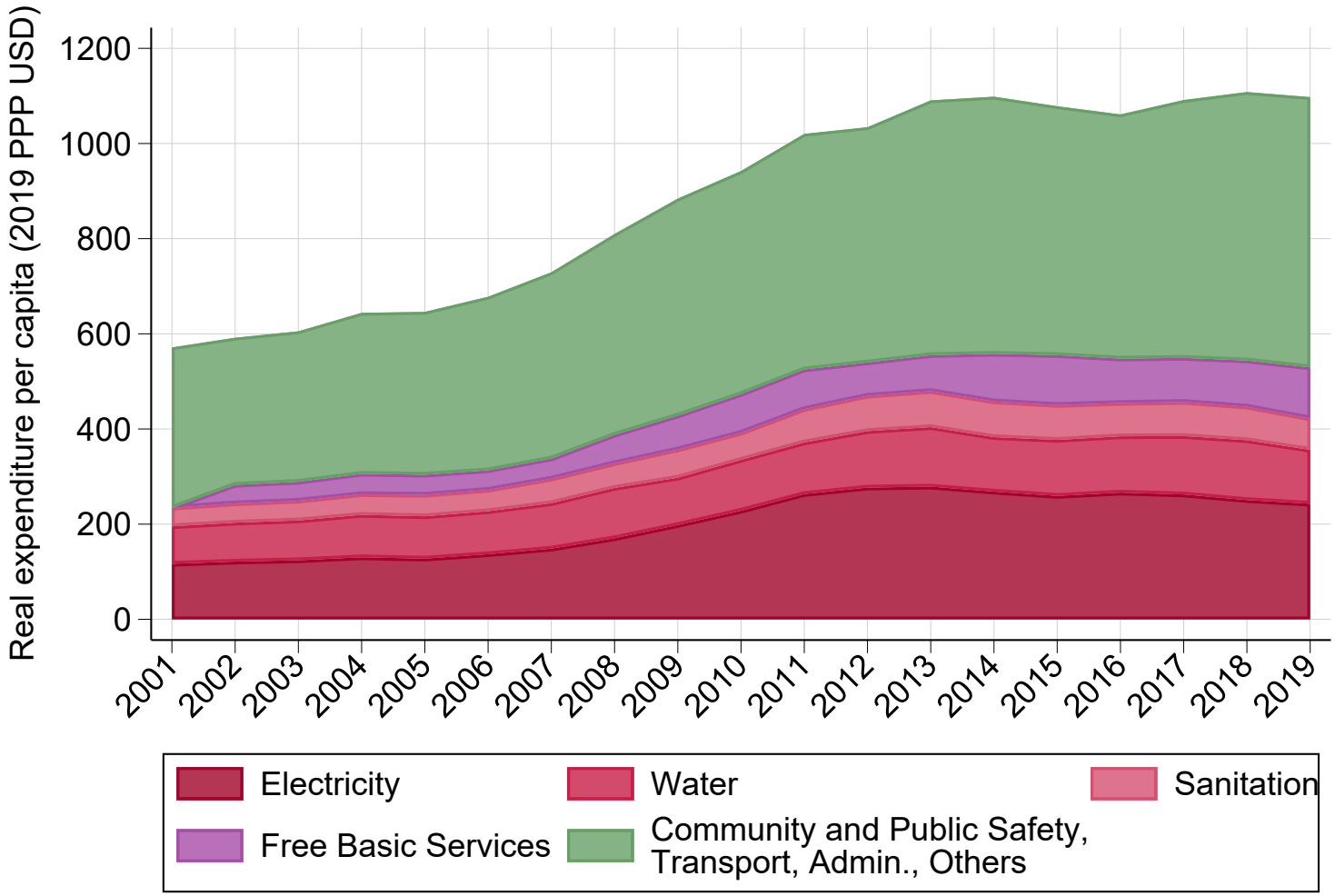
Figure E8 – Average Health Transfer Received by Income Decile, 1993-2019



Notes. The figure plots the average public health transfer received by pretax income decile from 1993 to 2019. Income and transfers are split equally between all household members.

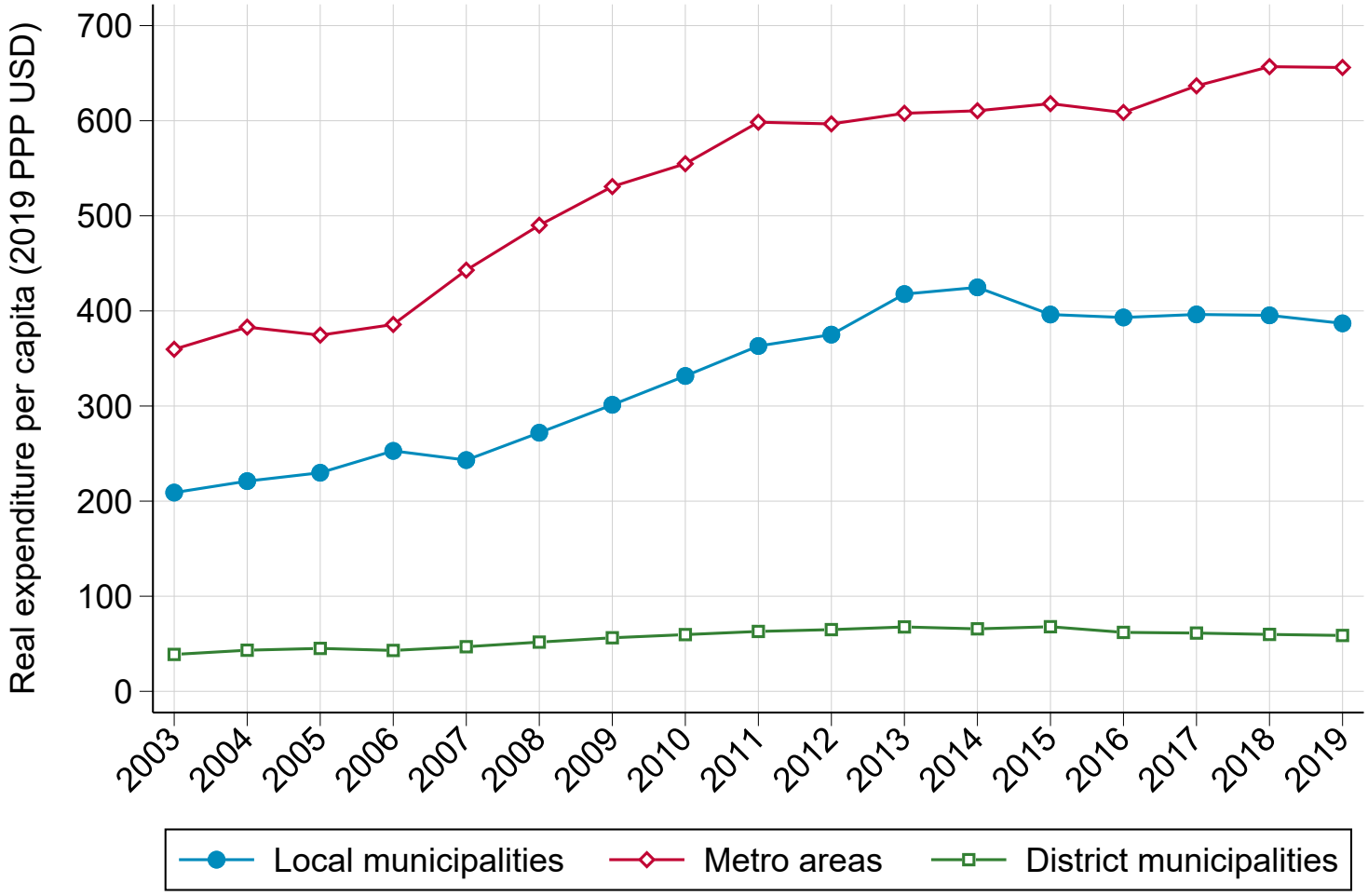
F. Local Government

Figure F1 – Level and Composition of Local Government Expenditure, 2001-2019



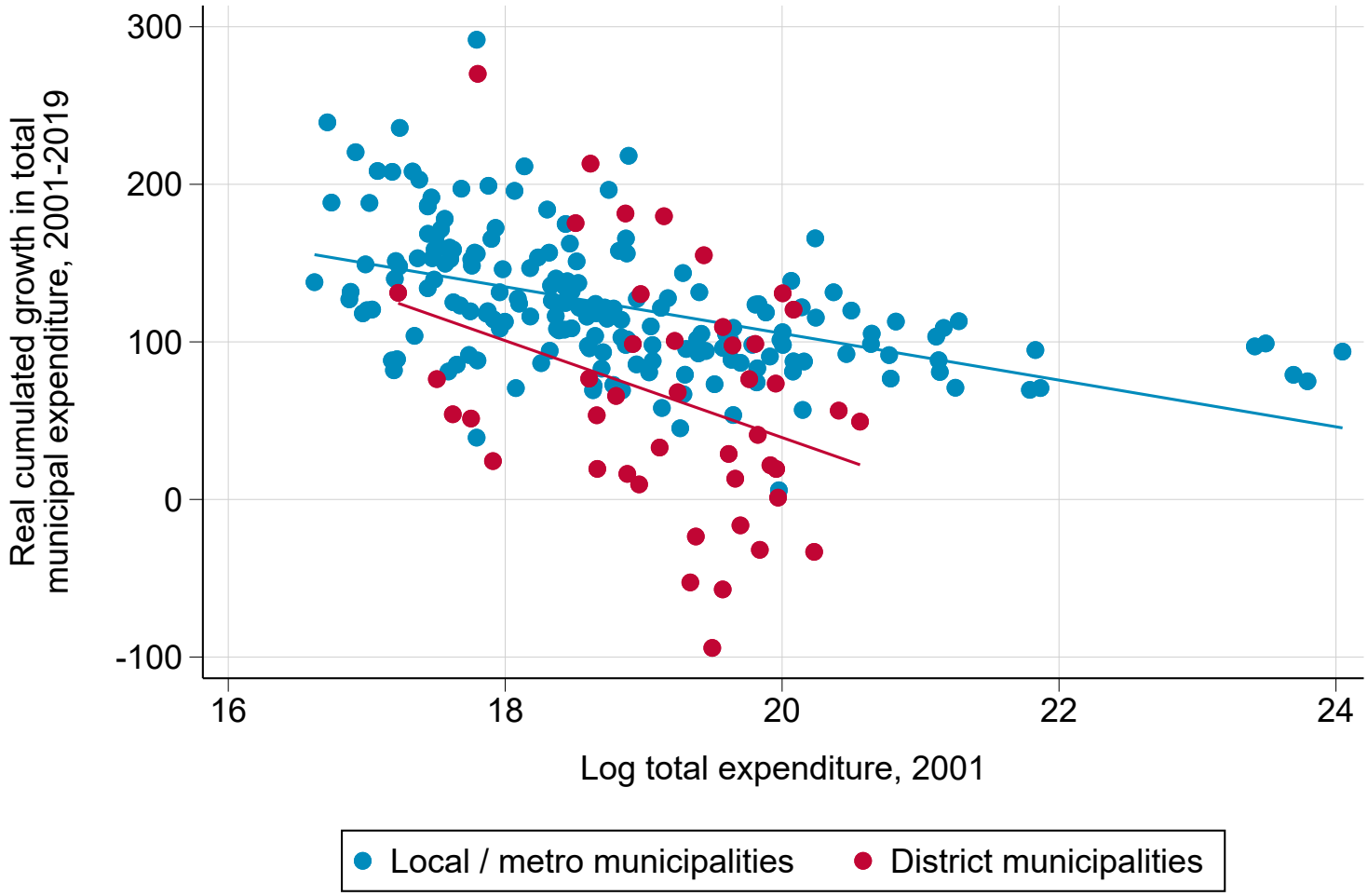
Notes. The figure plots the level and composition of local government expenditure in South Africa from 1993 to 2019. Local government expenditure includes all spending made by district and local municipalities. Author's computations combining data from Local Government Budget Reports.

Figure F2 – Local Government Expenditure in South Africa by Type of Municipality, 2003-2019



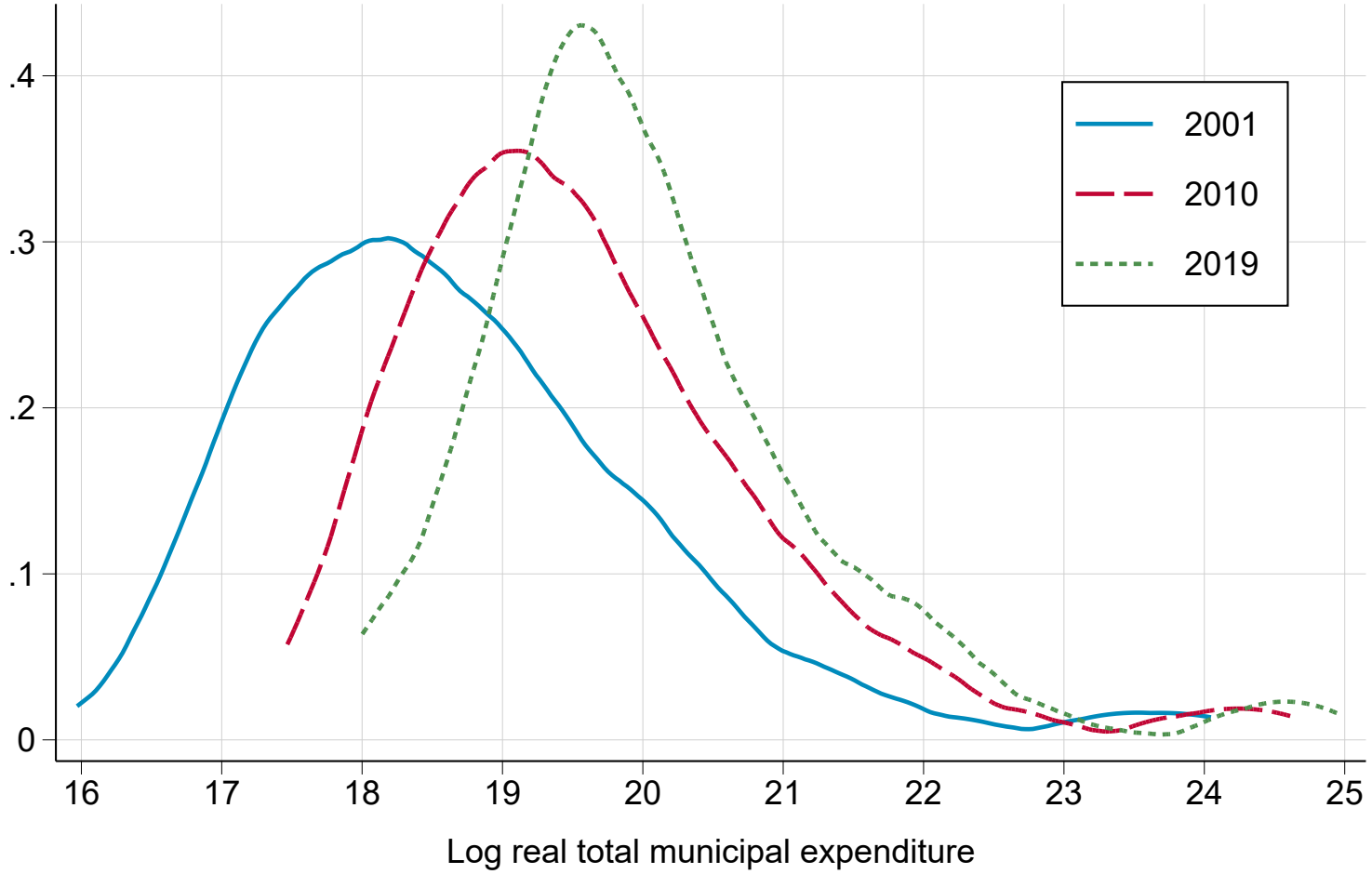
Notes. The figure plots the evolution of per-capita expenditure made by local municipalities, district municipalities, and metro areas from 1993 to 2019. Author's computations combining data from Local Government Budget Reports.

Figure F3 – The Decline of Spatial Inequalities in Local Public Goods:
Total Expenditure in 2001 Versus 2001-2019 Growth Rate



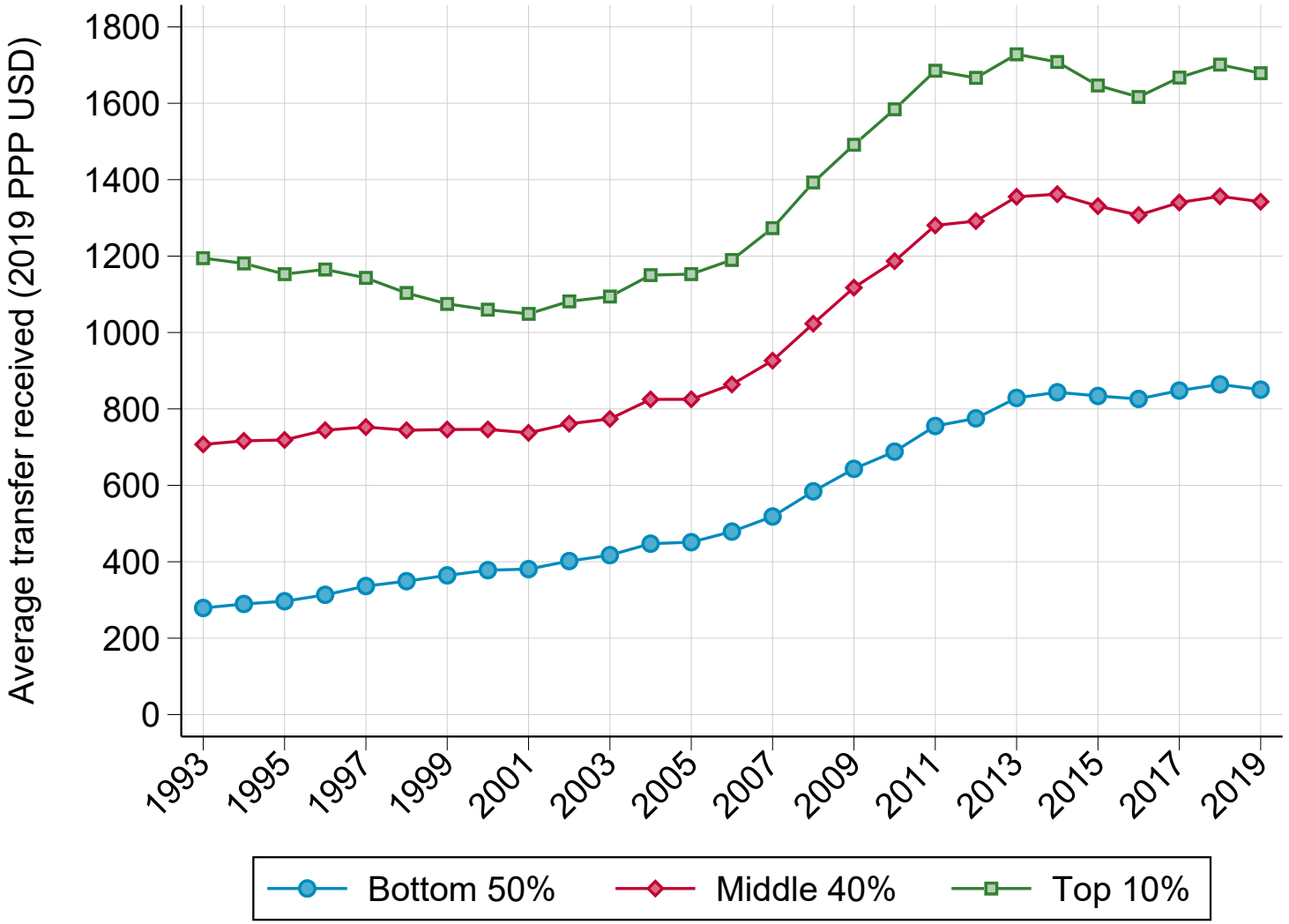
Notes. The figure compare total expenditure in 2001 to total spending growth experienced between 2001 and 2019 by municipality, separately for local/metro municipalities and district municipalities. There has been a convergence in local spending: municipalities with lower levels of spending in 2001 have seen a greater increase in public spending since then. Author's computations combining data from Local Government Budget Reports.

Figure F4 – The Decline of Spatial Inequalities in Local Public Goods:
Kernel Density of Local Municipality Total Expenditure, 2001-2019



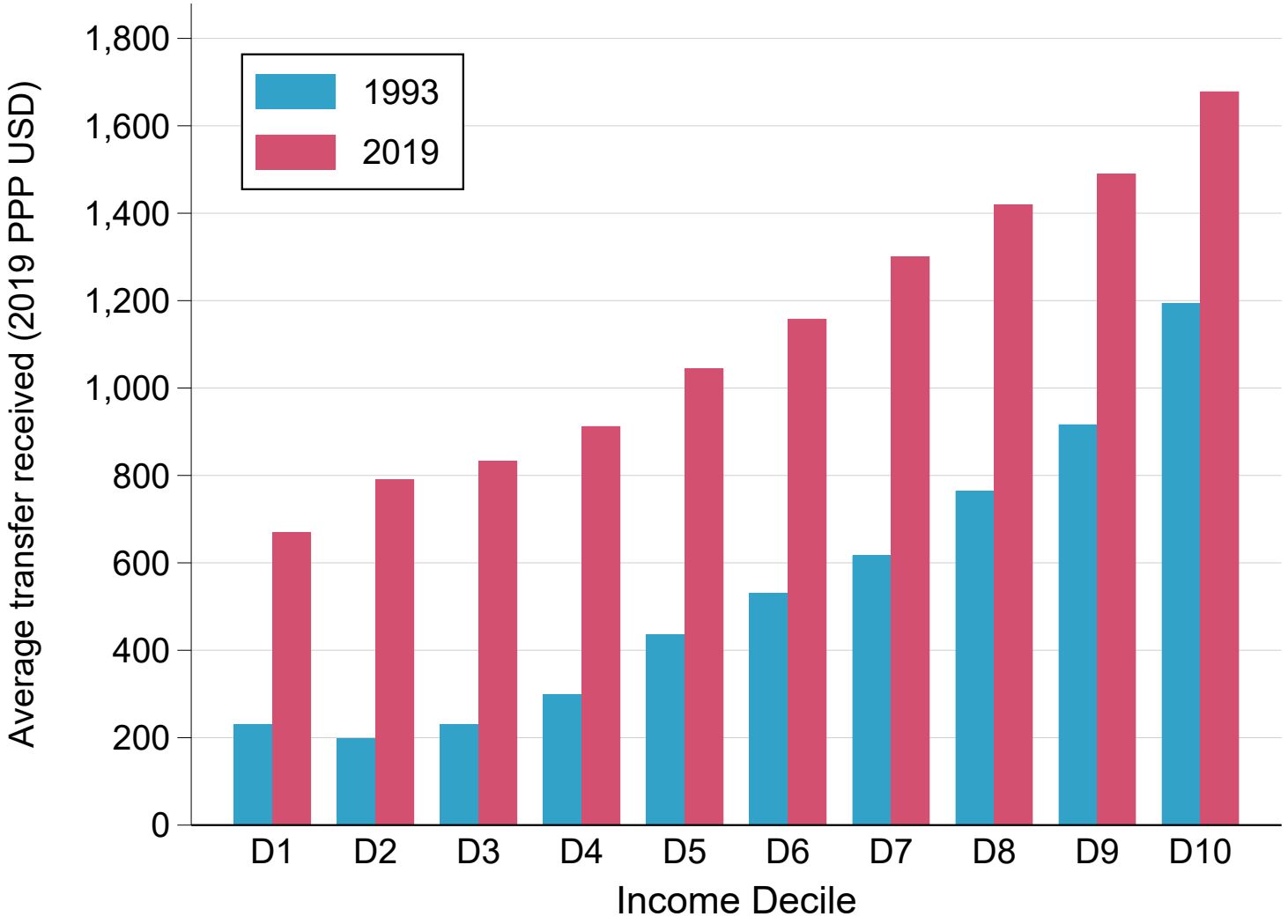
Notes. The figure plots the distribution of public spending across municipalities in 2001, 2010, and 2019. There has been a convergence in spending across municipalities: spatial variations in spending patterns are lower in 2019 than in 2001. Author's computations combining data from Local Government Budget Reports.

Figure F5 – Average Local Government Transfer Received by Income Group, 1993-2019



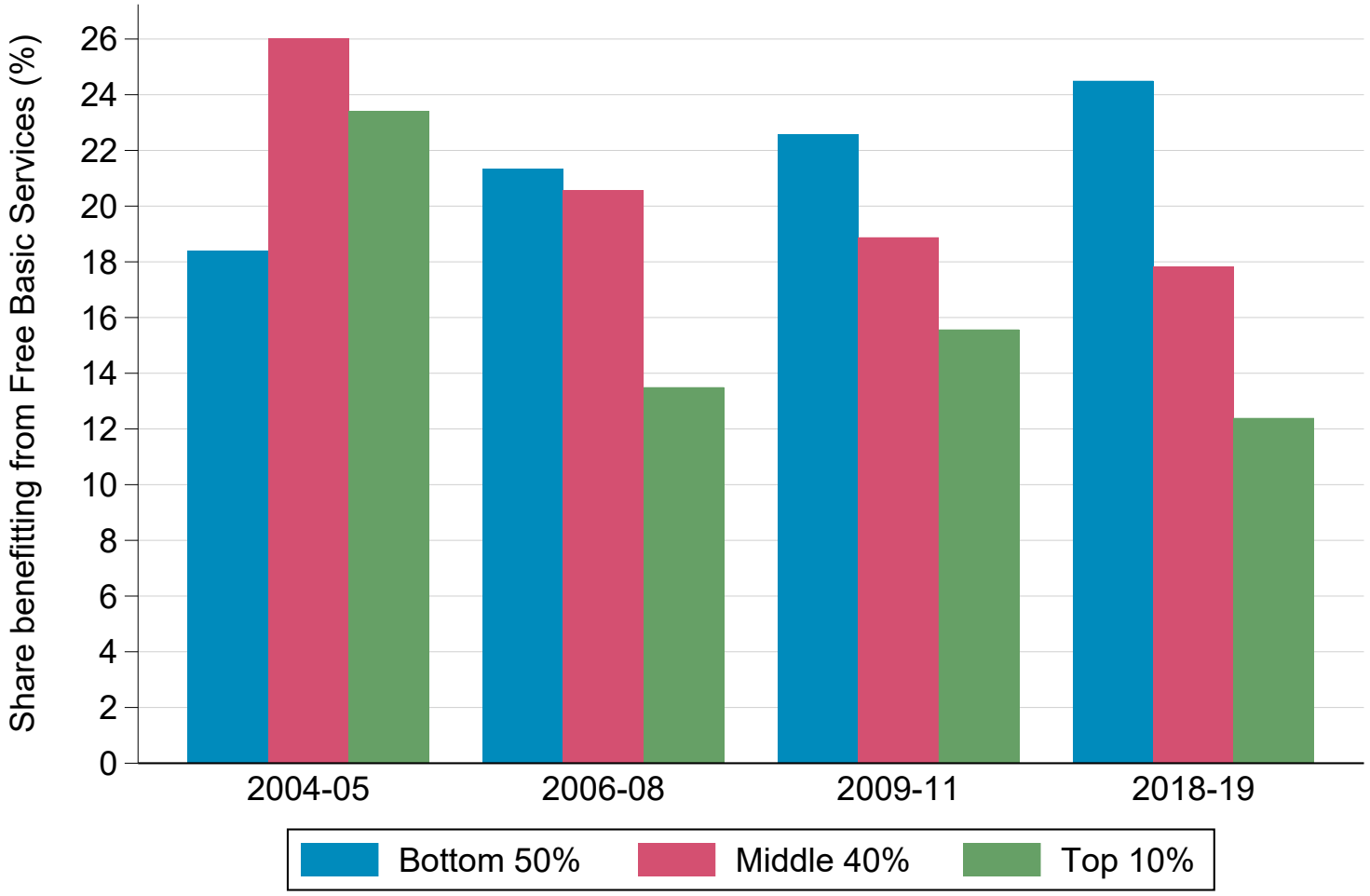
Notes. The figure plots the average local government transfer received by pretax income group from 1993 to 2019. Local government expenditure includes all spending made by district and local municipalities. Income and transfers are split equally between all household members.

Figure F6 – Average Local Government Transfer Received by Income Decile, 1993-2019



Notes. The figure plots the average local government transfer received by pretax income decile in 1993 and 2019. Local government expenditure includes all spending made by district and local municipalities. Income and transfers are split equally between all household members.

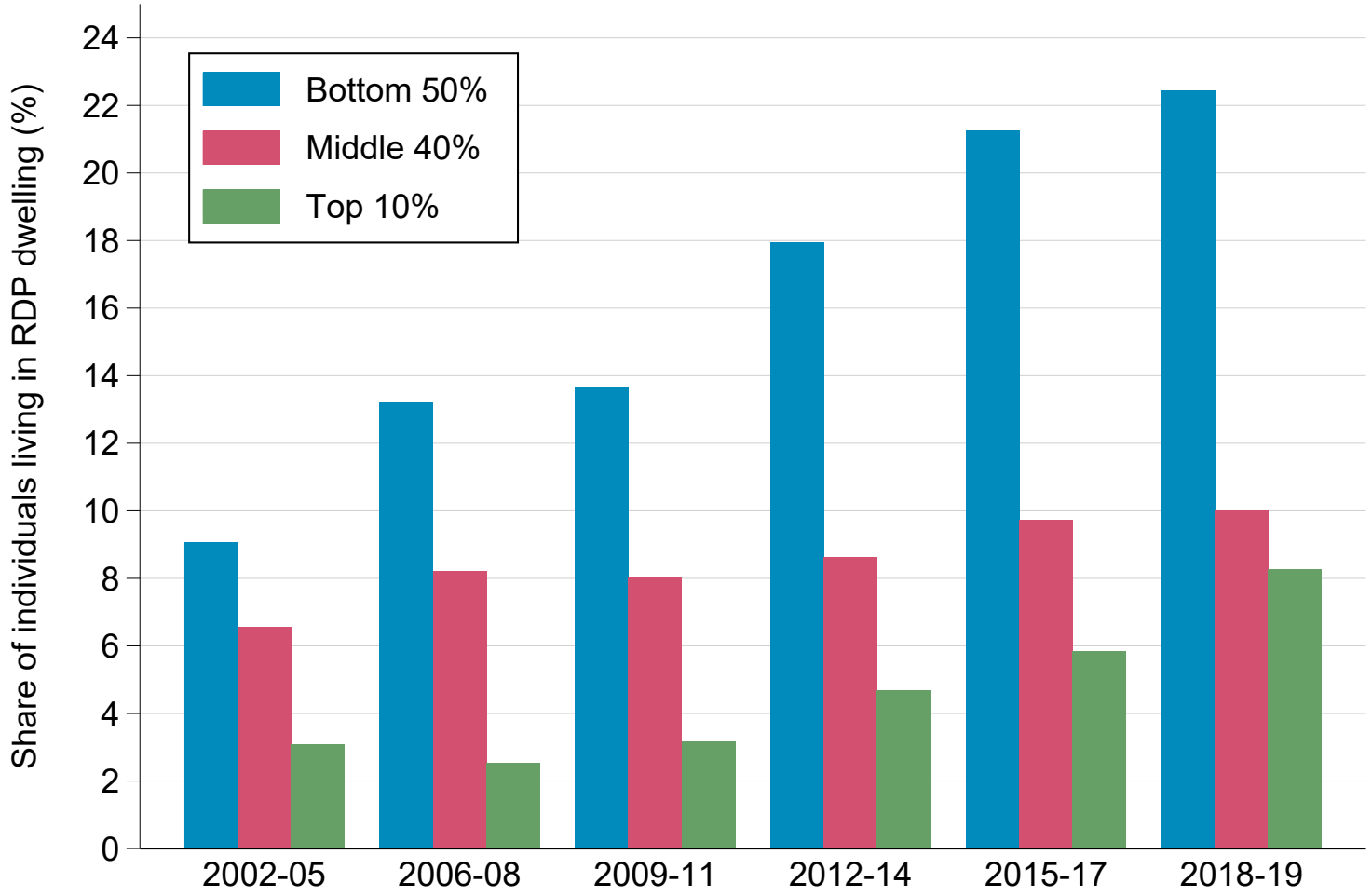
Figure F7 – Access to Free Basic Electricity by Income Group, 2004-2019



Notes. The figure represents the share of individuals who declare benefiting from free basic electricity in their municipality of residence by pretax income group. Author's computations combining data from General Household Surveys.

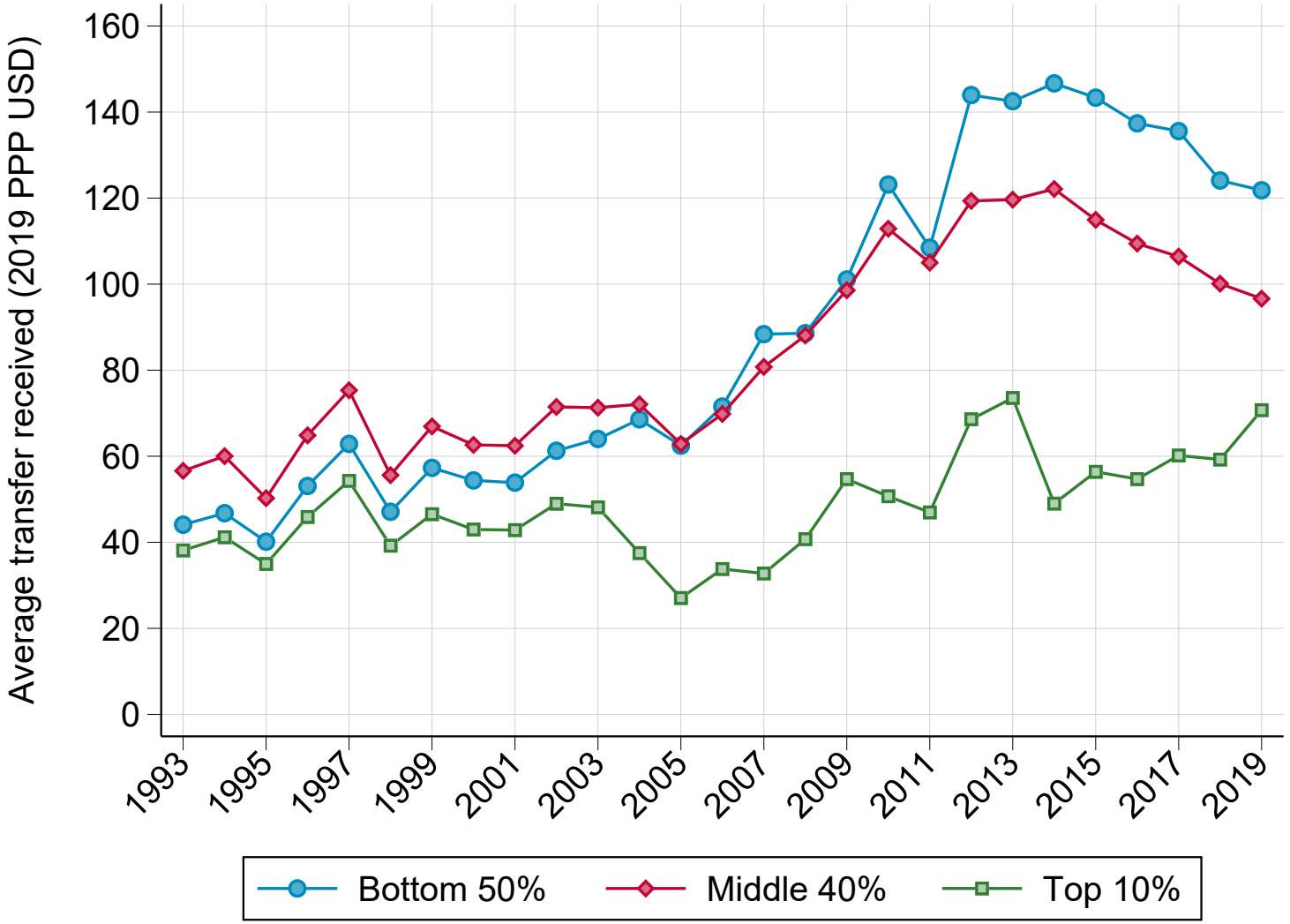
G. Housing

Figure G1 – Share of Individuals Living in Government-Subsidized Dwelling by Income Group, 2008-2019



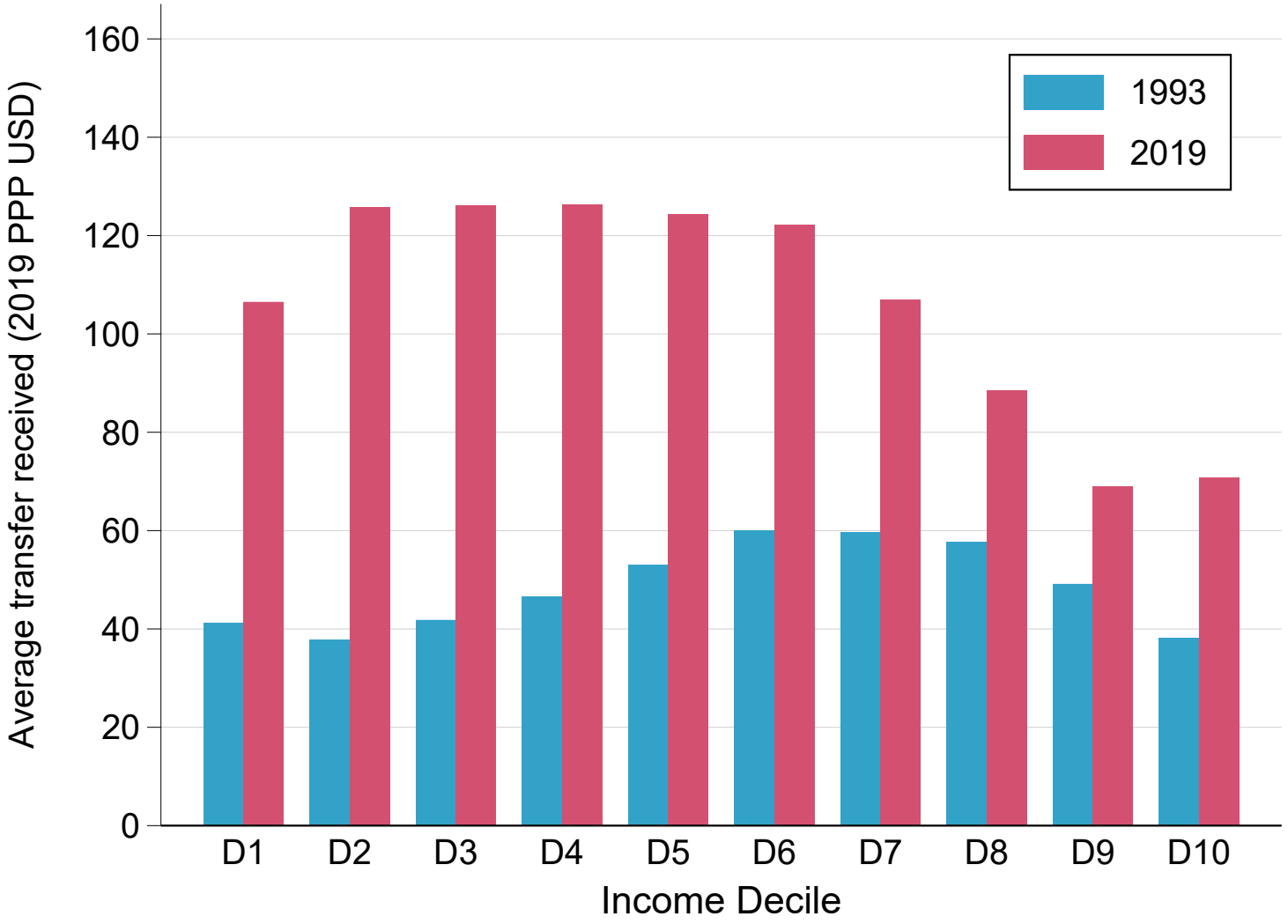
Notes. The figure shows the share of individuals living in households with at least one person who declared receiving "assistance from government to obtain this, or any other dwelling," by pretax income group. Author's computations combining General Household Surveys.

Figure G2 – Average Housing Transfer Received by Income Group, 1993-2019



Notes. The figure plots the average public housing transfer received by pretax income group from 1993 to 2019. Income and transfers are split equally between all household members.

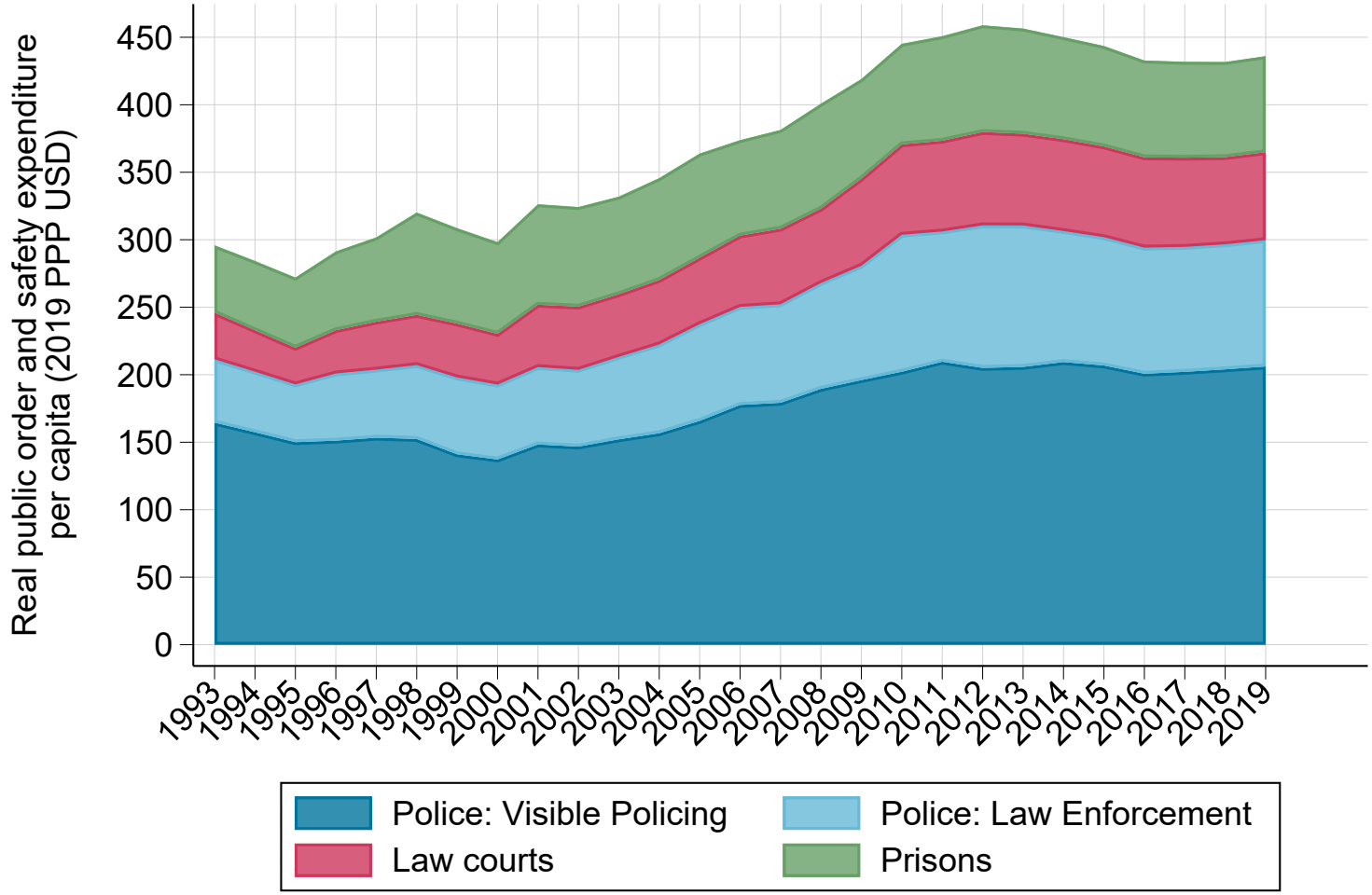
Figure G3 – Average Housing Transfer Received by Income Decile, 1993-2019



Notes. The figure plots the average public housing transfer received by pretax income decile in 1993 and 2019. Income and transfers are split equally between all household members.

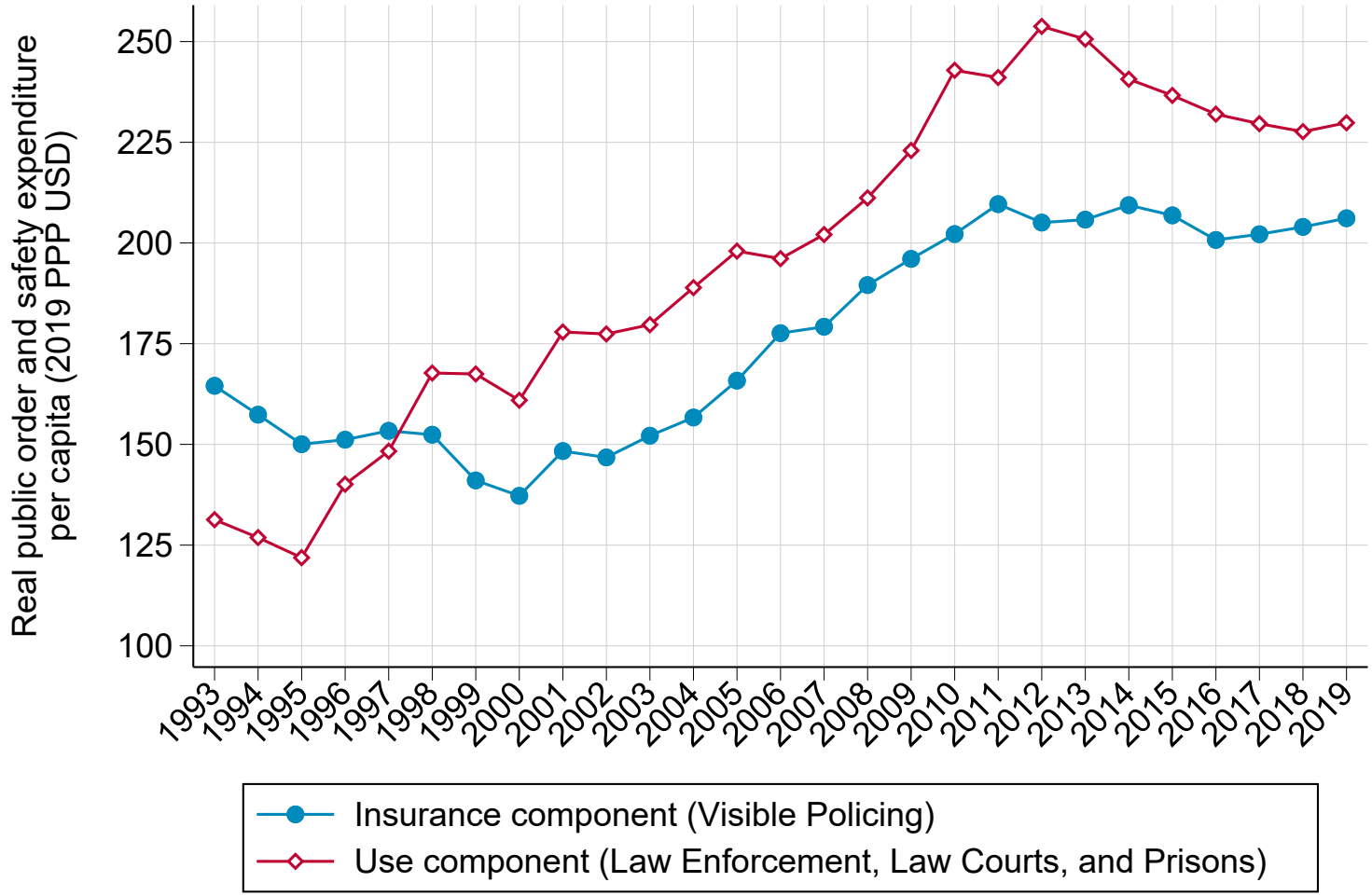
H. Public Order and Safety

Figure H1 – Level and Composition of Public Order and Safety Expenditure in South Africa, 1993-2019



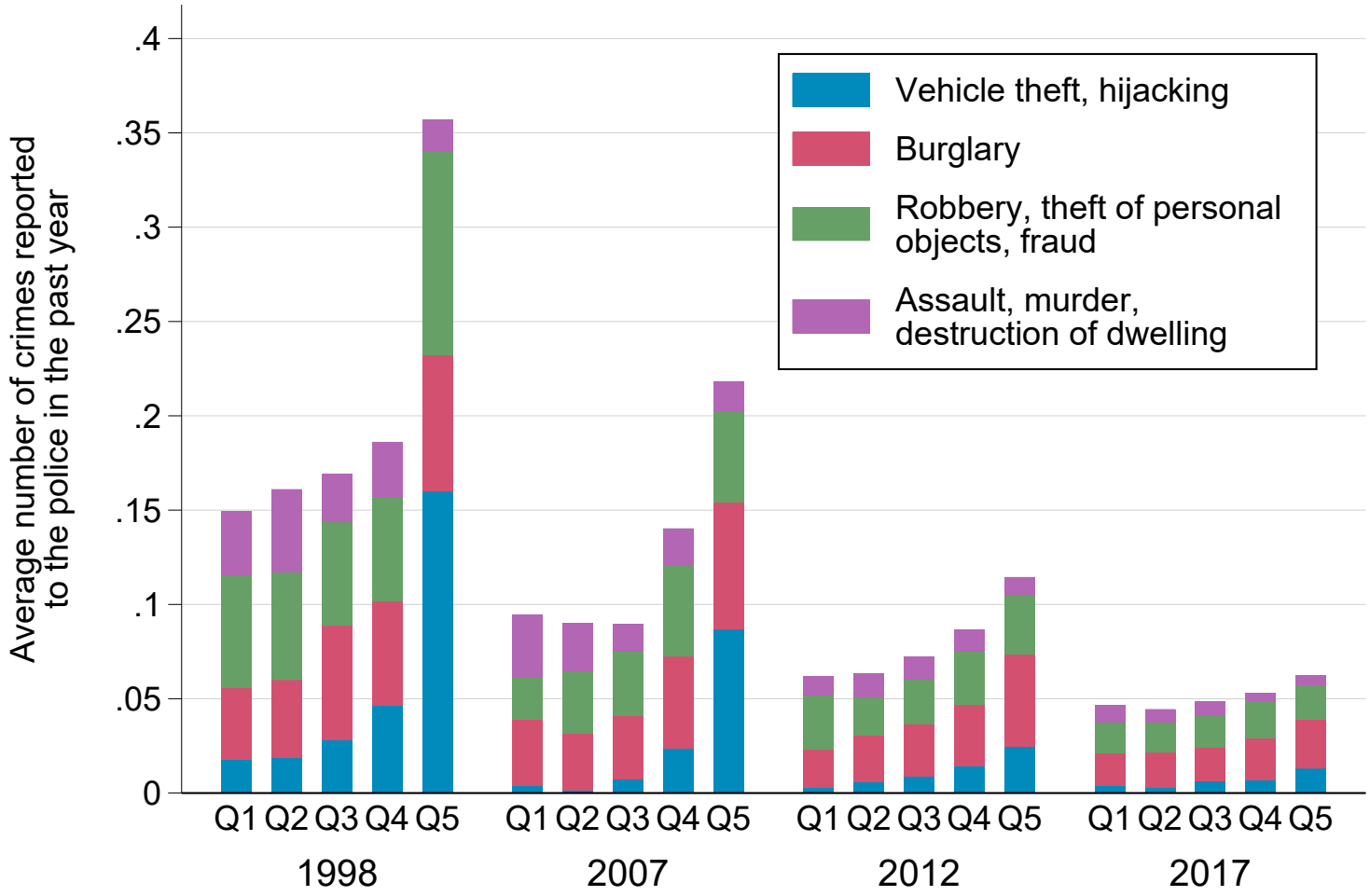
Notes. The figure plots the level and composition of public order and safety expenditure from 1993 to 2019. Author's computations combining data from South African National Treasury Budget Reports (1994-2020).

Figure H2 – Level and Composition of Public Order and Safety Expenditure in South Africa, 1993-2019: Insurance Versus Use



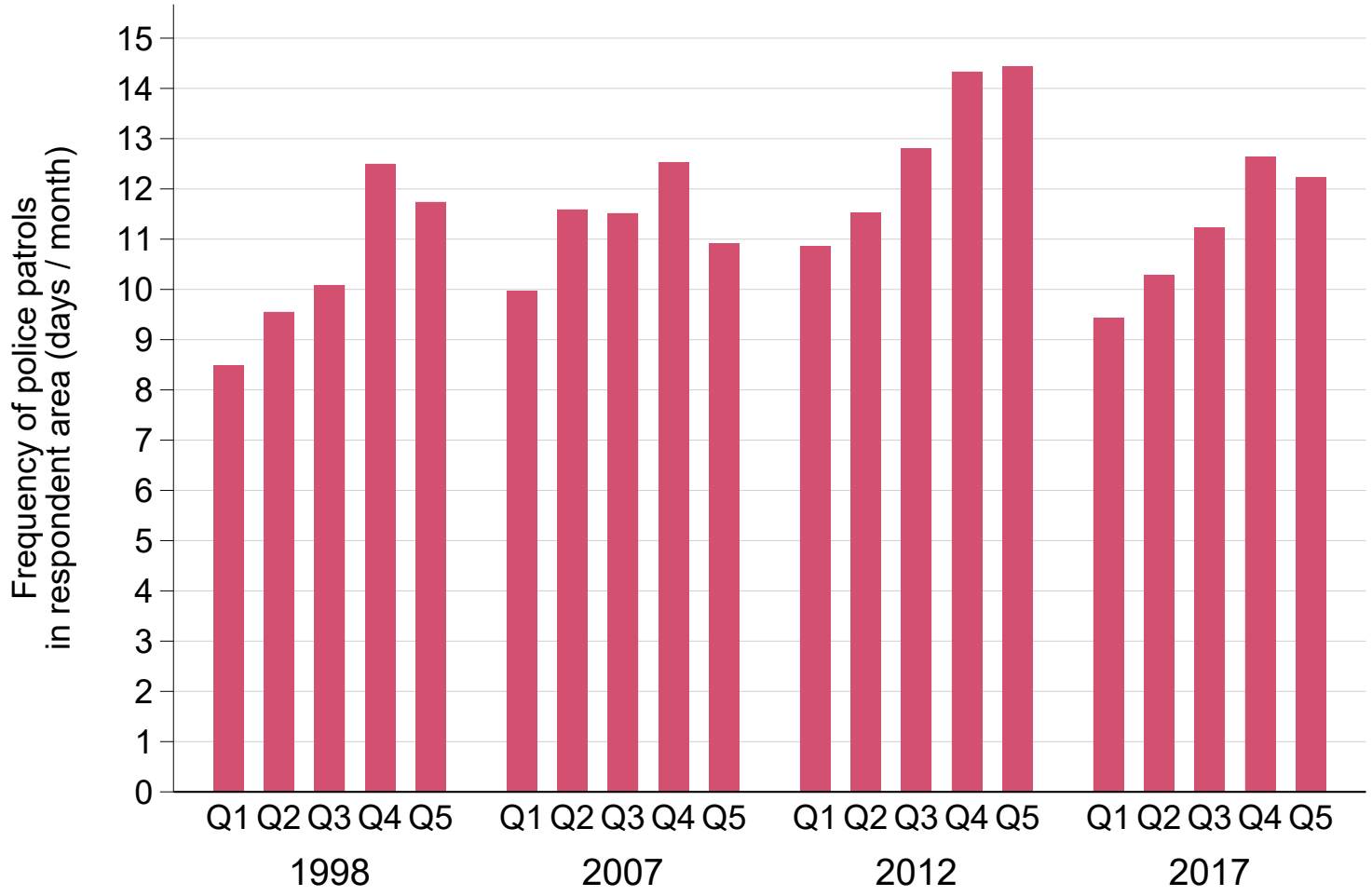
Notes. The figure plots per-capita public spending on the insurance (visible policing) and use (law enforcement, law courts, and prisons) components of public order and safety expenditure from 1993 to 2019. Author's computations combining data from South African National Treasury Budget Reports (1994-2020).

Figure H3 – Number of Crimes Reported to the Police by Income Quintile, 1998-2017



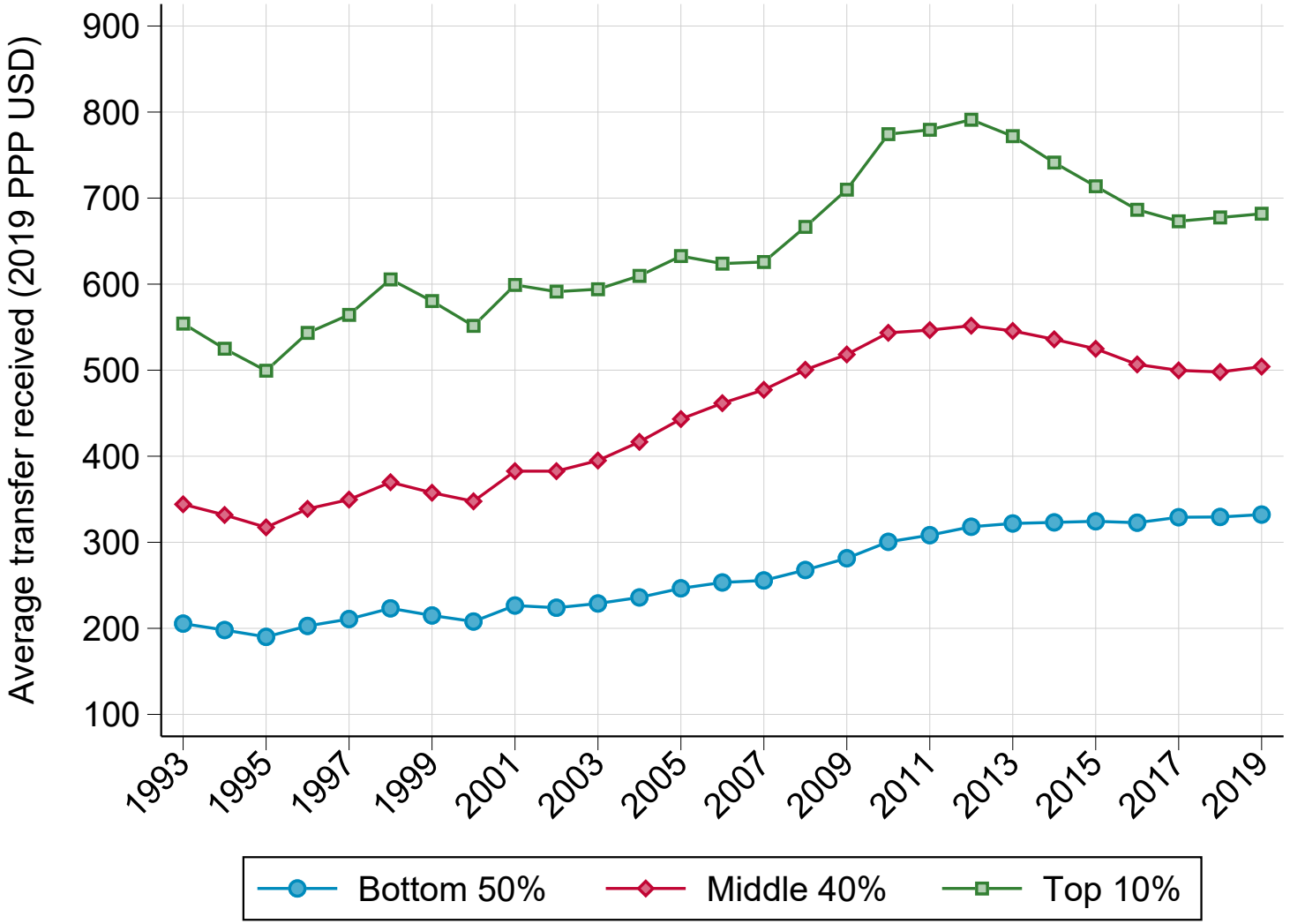
Notes. The figure plots the average number of crimes reported to the police by pretax income quintile, as well as their composition. Author's computations combining data from Victims of Crime Surveys.

Figure H4 – Intensity of Local Police Presence by Income Quintile, 1998-2017



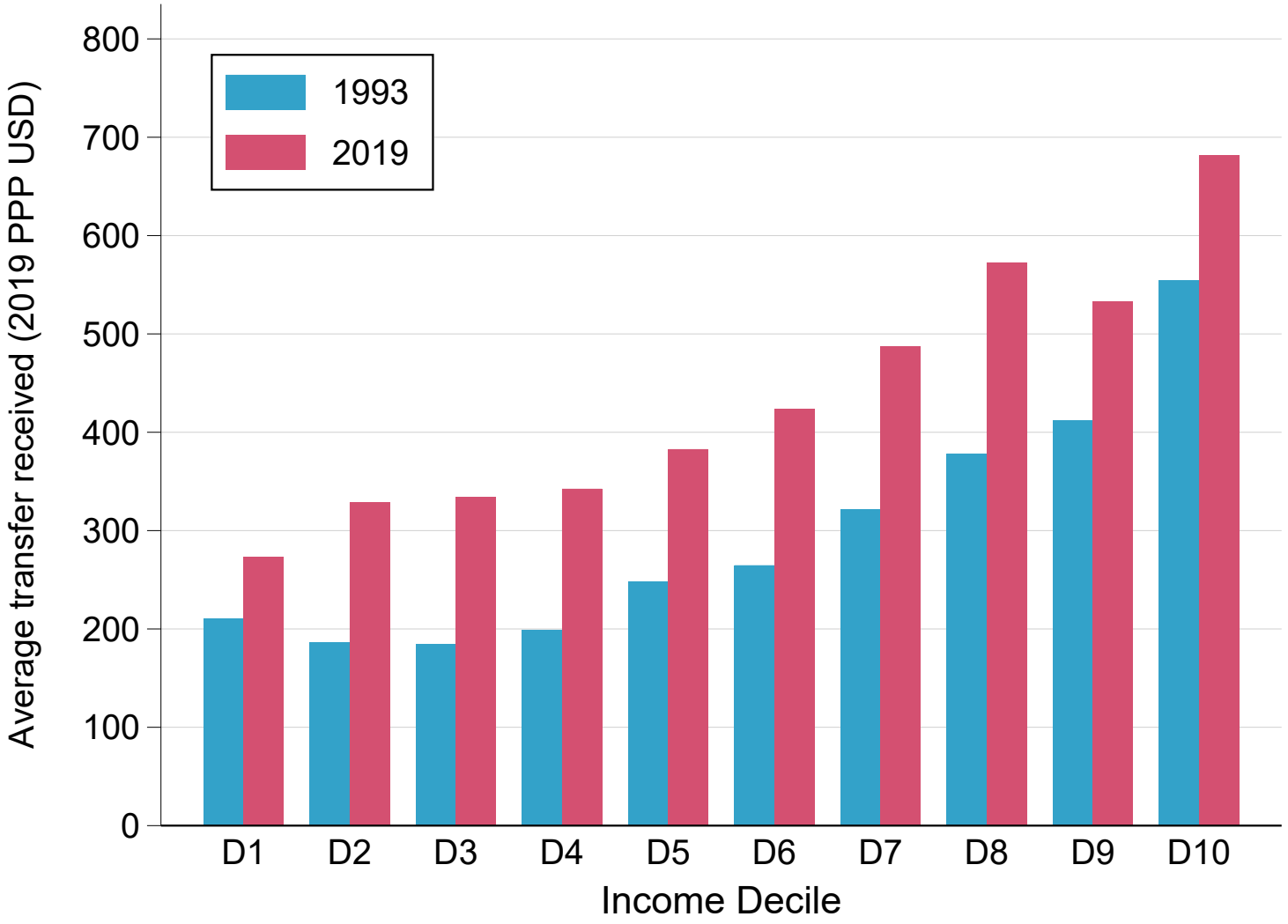
Notes. The figure plots the average intensity of police presence by pretax income quintile, measured as the average number of days per month that the respondent declares seeing a police officer in uniform or a police vehicle in their area. Author's computations combining data from Victims of Crime Surveys.

Figure H5 – Average Public Order and Safety Transfer Received by Income Group, 1993-2019



Notes. The figure plots the average public order and safety transfer received by pretax income group from 1993 to 2019. Income and transfers are split equally between all household members.

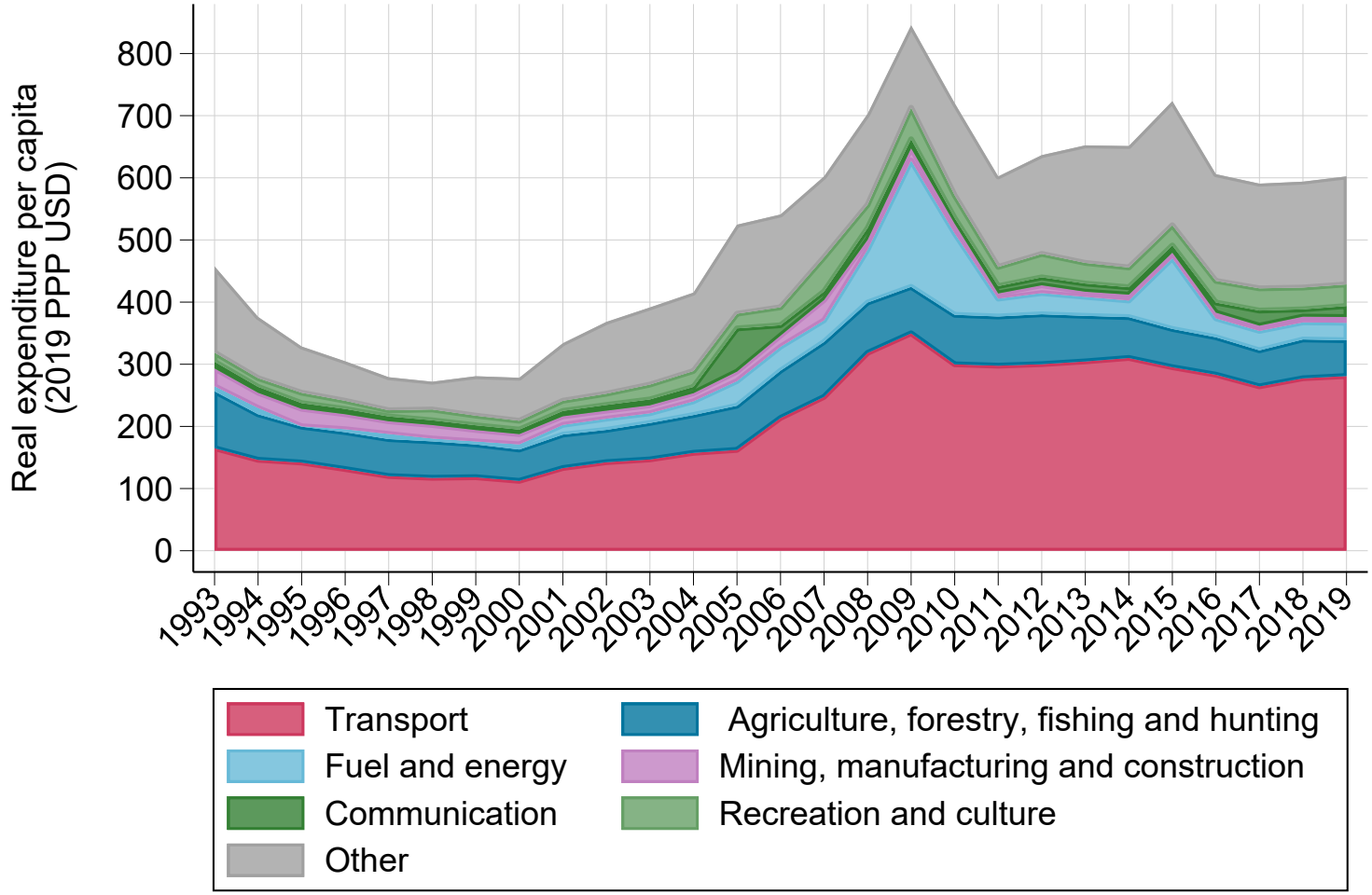
Figure H6 – Average Public Order and Safety Transfer Received by Income Decile, 1993-2019



Notes. The figure plots the average public order and safety transfer received by pretax income decile from 1993 to 2019. Income and transfers are split equally between all household members.

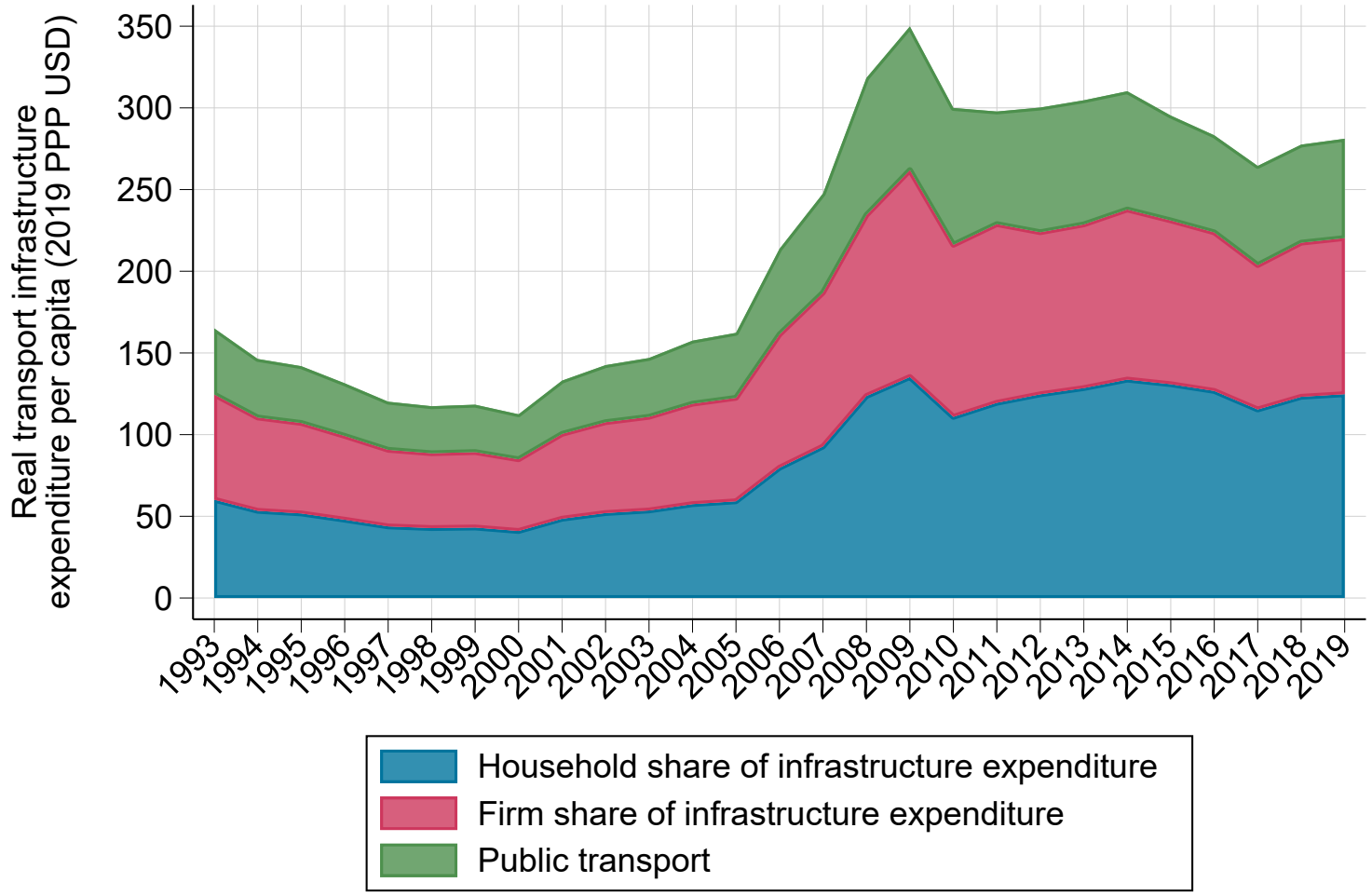
I. Transport and Other Economic Affairs

Figure I1 – Level and Composition of Expenditure on Economic Affairs in South Africa, 1993-2019



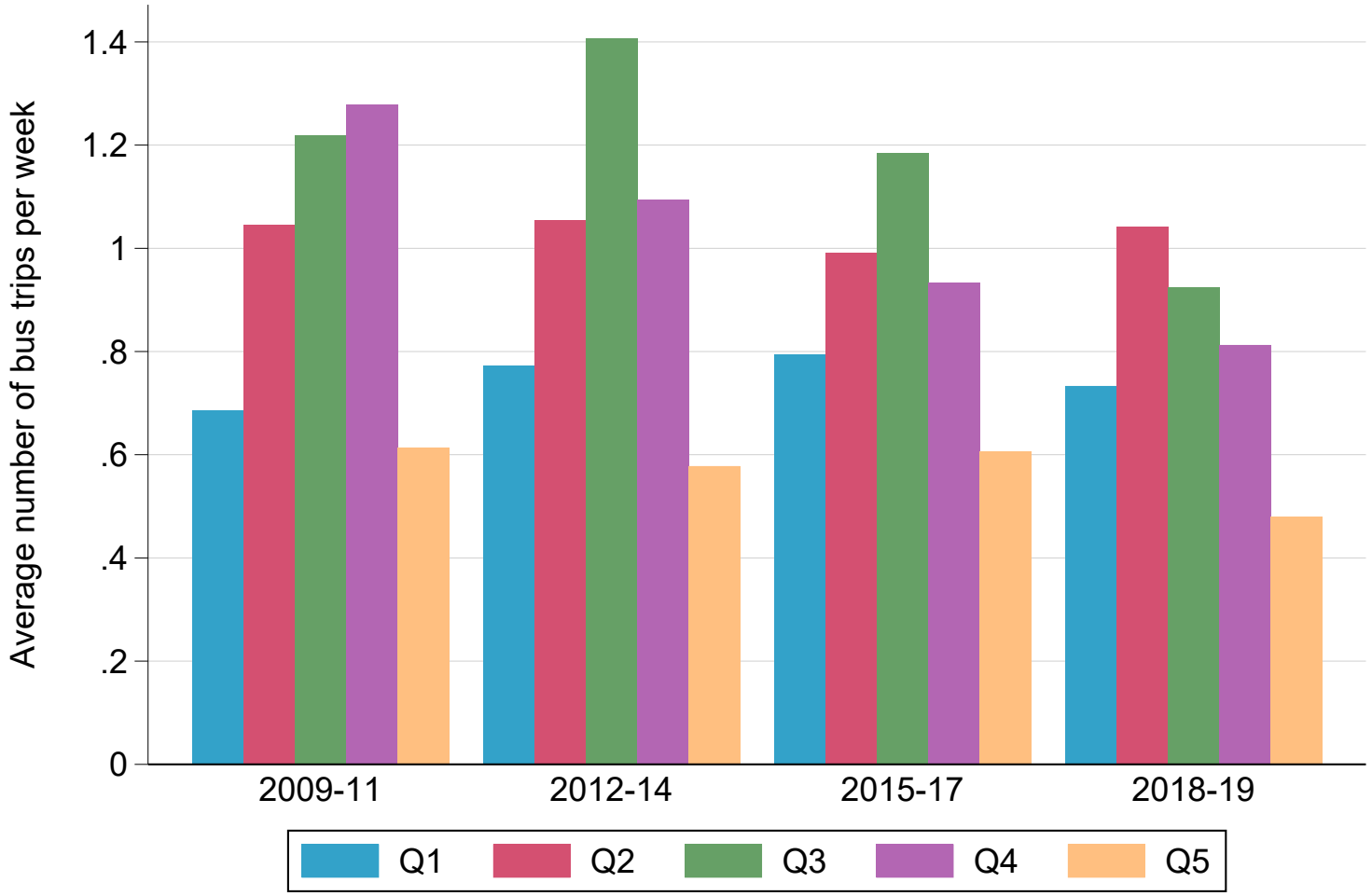
Notes. The figure plots the level and composition of public spending on economic affairs in South Africa from 1993 to 2019. Author's computations combining data from South African National Treasury Budget Reports (1994-2020).

Figure I2 – Level and Composition of Transport Expenditure in South Africa, 1993-2019



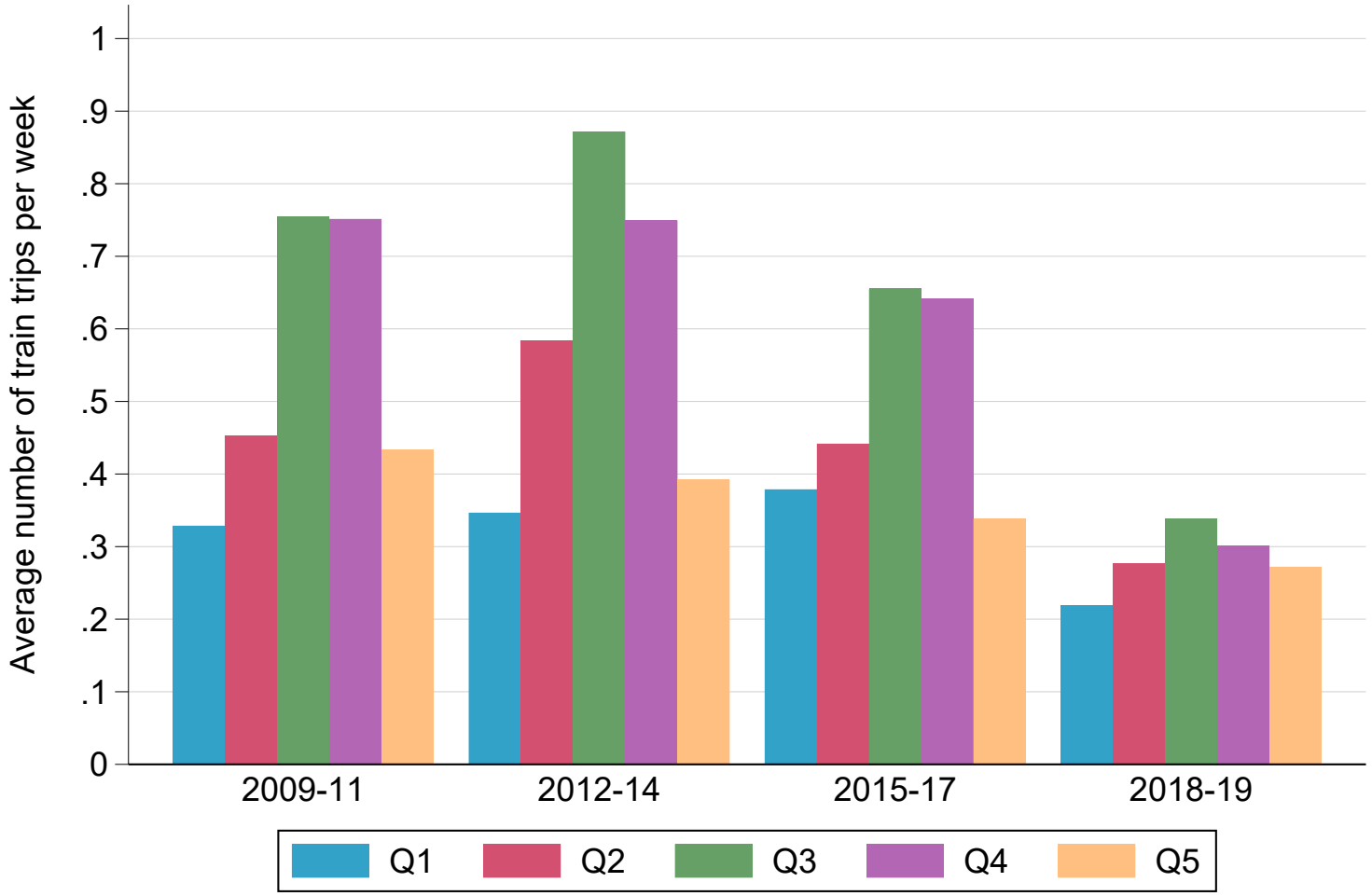
Notes. The figure plots the level and composition of public transport expenditure in South Africa from 1993 to 2019. Household share of infrastructure expenditure: share of spending indirectly received by households through their use of infrastructure expenditure for personal transport. Firm share of infrastructure expenditure: share of spending indirectly received by firms through their use of infrastructure expenditure for the transport of goods and persons. Public transport: expenditure on both public transport and transport infrastructure used by public transport vehicles. Author's computations combining data from South African National Treasury Budget Reports (1994-2020) with input-output tables available from the OECD and Stats SA.

Figure I3 – Public Transport Use Intensity by Income Quintile: Buses



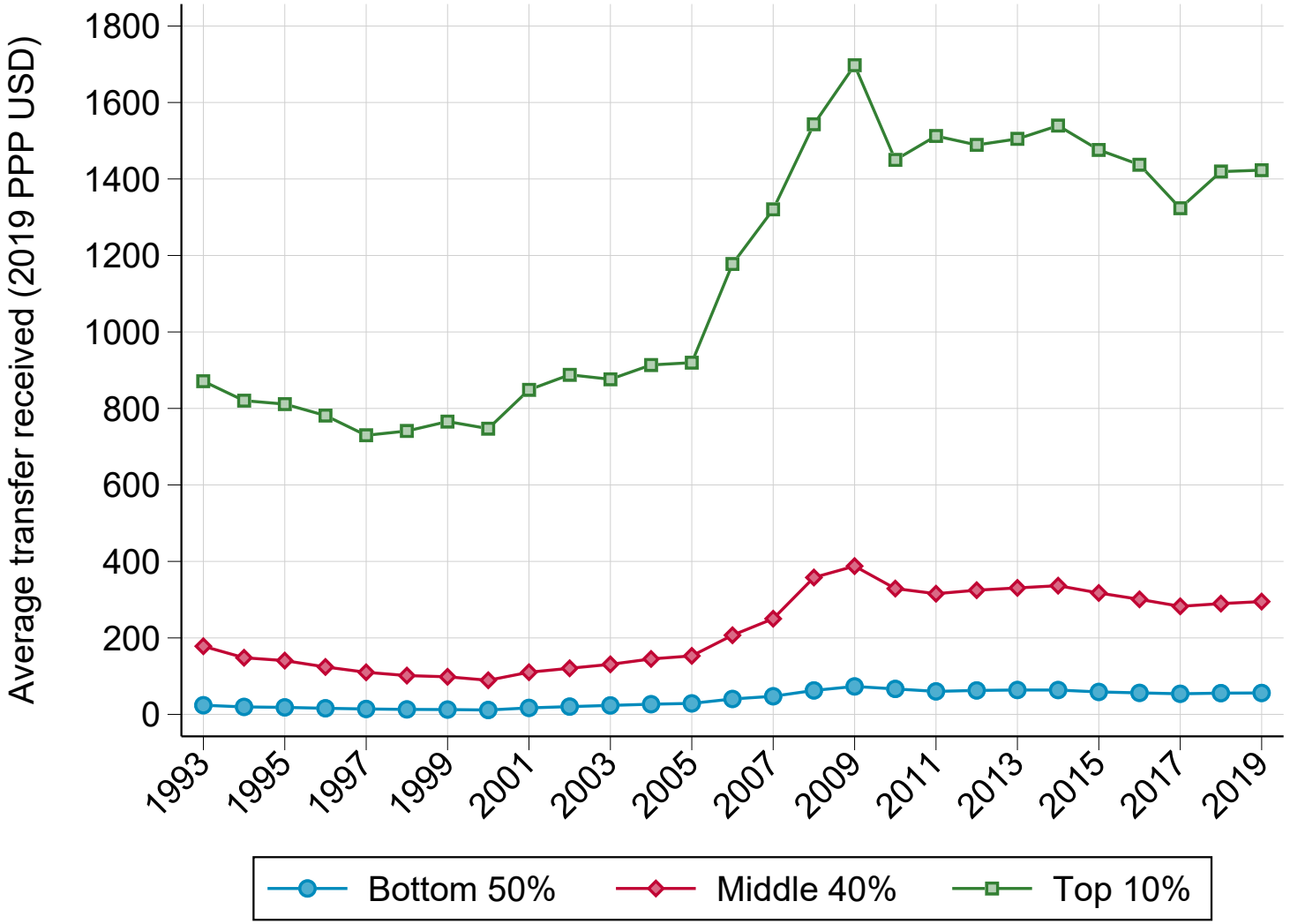
Notes. The figure plots the average number of bus trips made per week by pretax income quintile. Author's computations combining General Household Surveys.

Figure I4 – Public Transport Use Intensity by Income Quintile: Trains



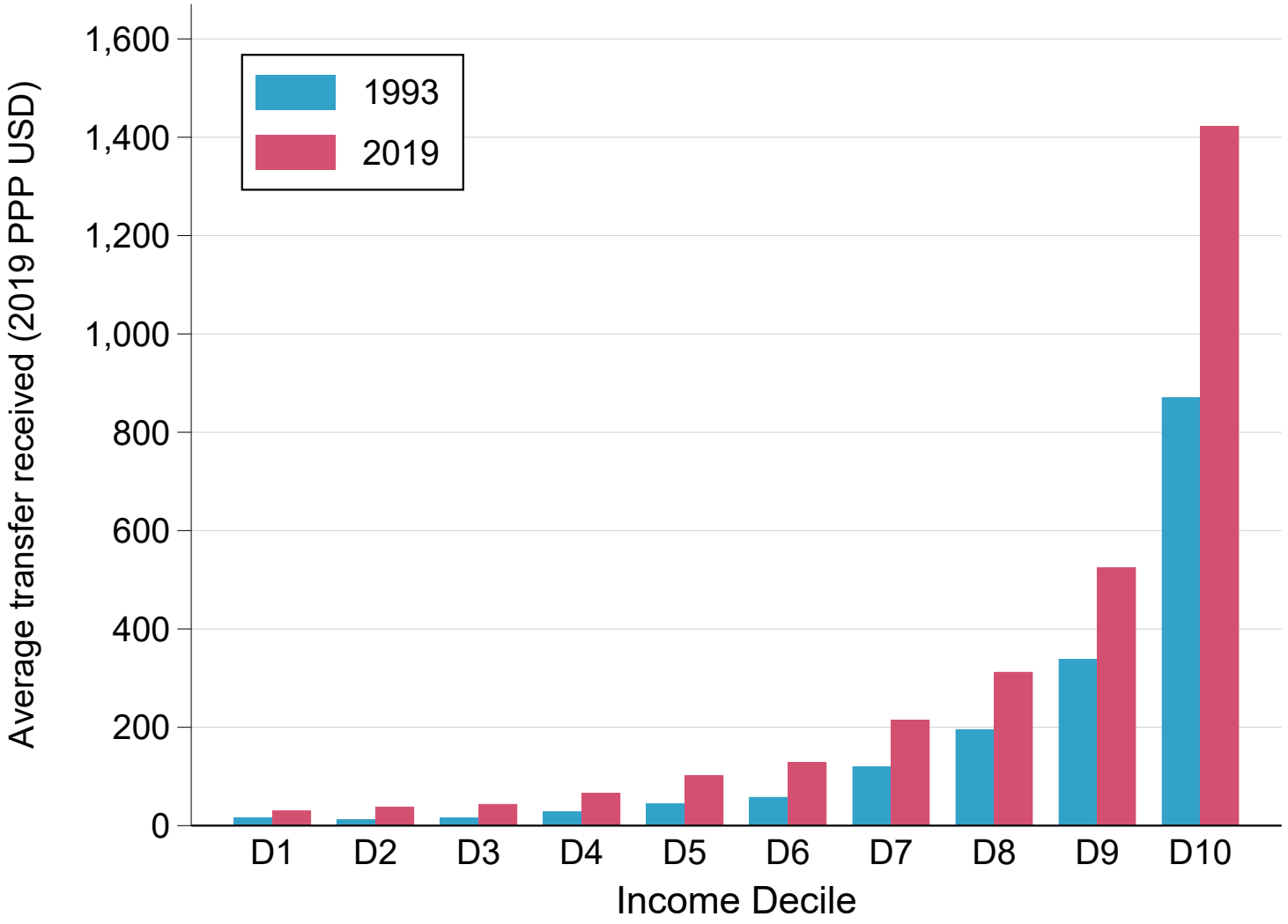
Notes. The figure plots the average number of train trips made per week by pretax income quintile. Author's computations combining General Household Surveys.

Figure I5 – Average Transport Transfer Received by Income Group, 1993-2019



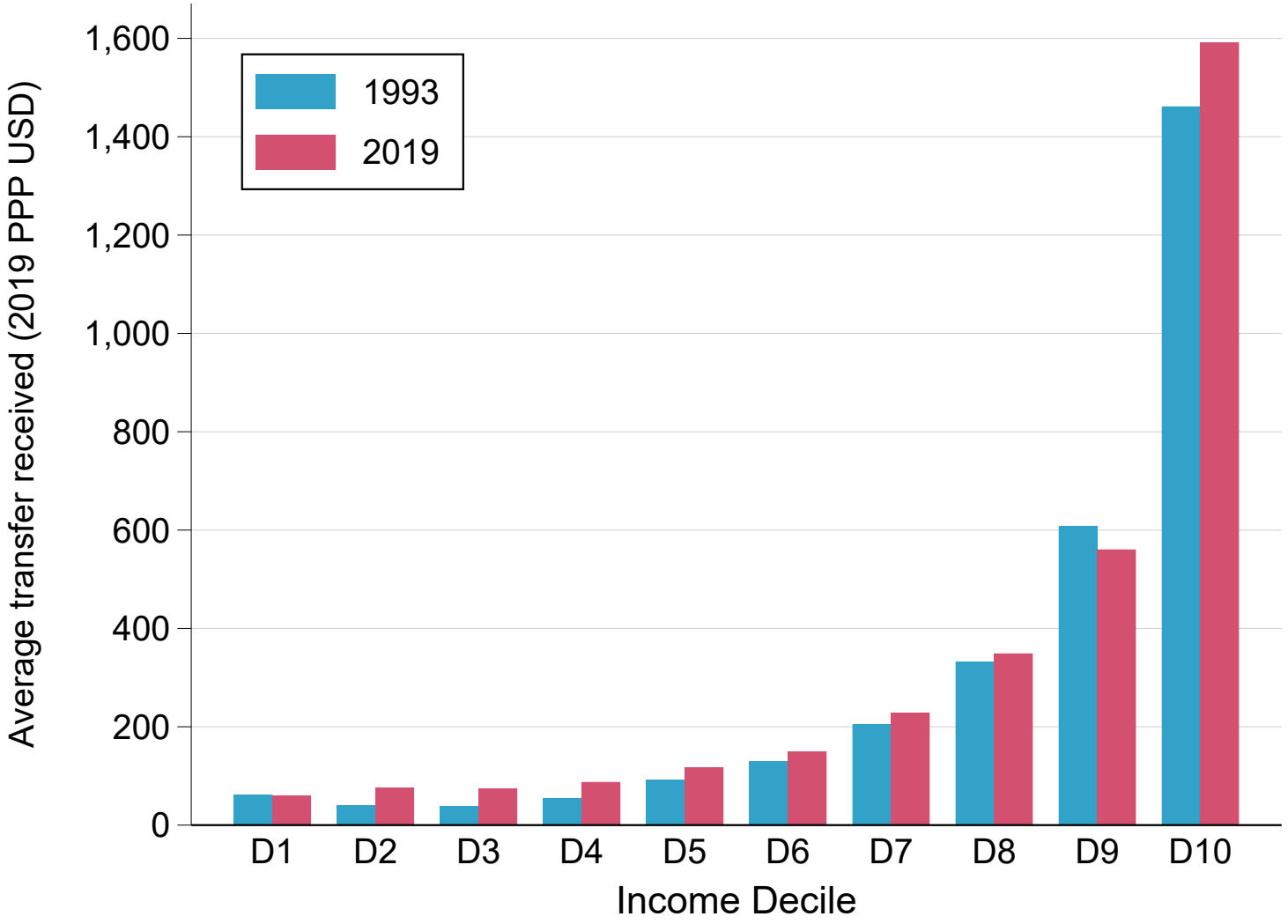
Notes. The figure plots the average transport transfer received by pretax income group from 1993 to 2019. Income and transfers are split equally between all household members.

Figure I6 – Average Transport Transfer Received by Income Decile, 1993-2019



Notes. The figure plots the average transport transfer received by pretax income decile in 1993 and 2019. Income and transfers are split equally between all household members.

Figure I7 – Average Transfer on Other Economic Affairs Received by Income Decile, 1993-2019



Notes. The figure plots the average transfer in terms of other economic affairs received by pretax income decile in 1993 and 2019. Public spending on economic affairs corresponds to expenditure on economic affairs other than transport, such as subsidies to agriculture, energy, manufacturing, and recreation and culture. Income and transfers are split equally between all household members.