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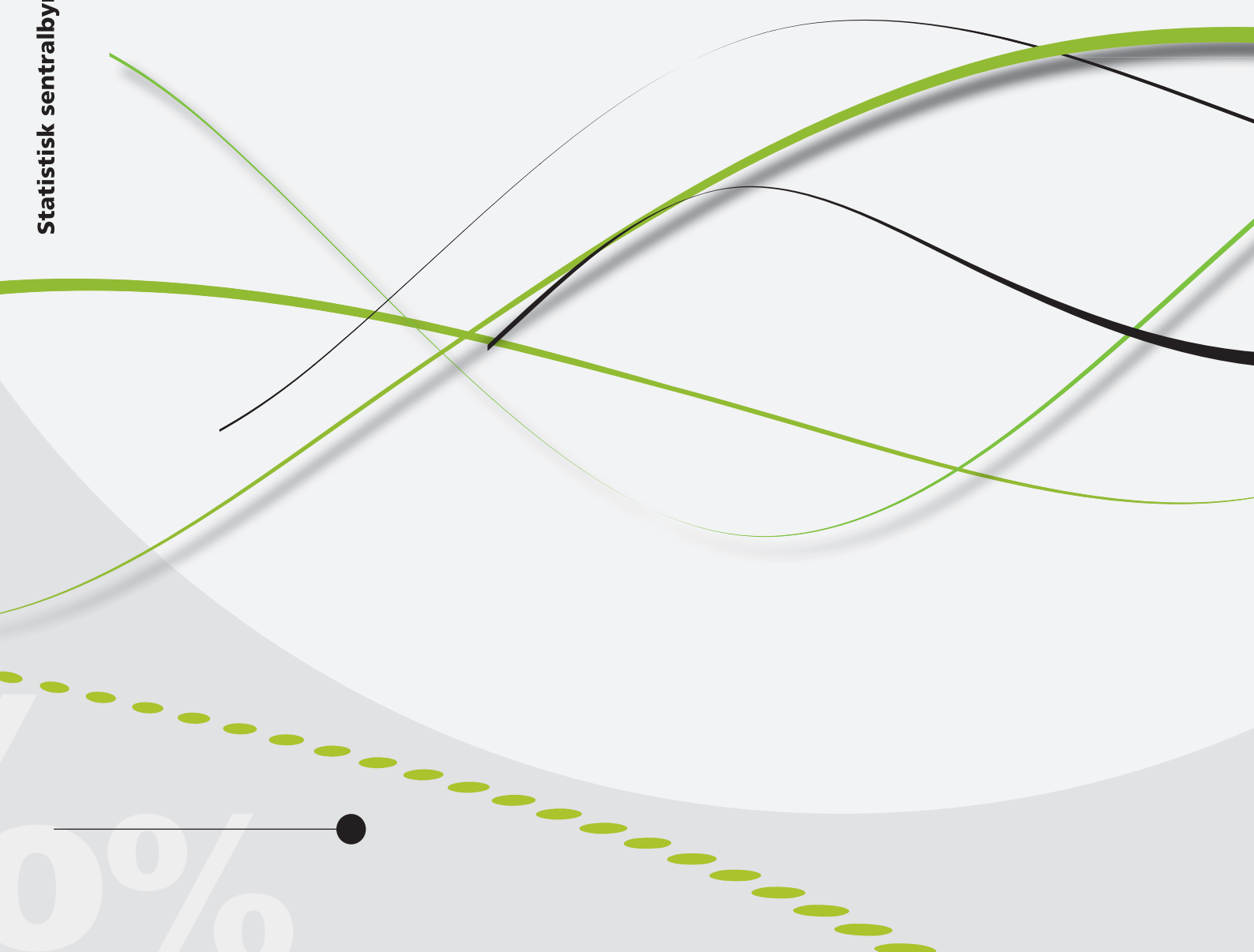
Evidence from a New Register-Based Data Source



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Preface

This report is a revised version of a paper presented at the 32nd General Conference of The International Association for Research in Income and Wealth (IARIW). The conference took place in Boston, USA, August 5-11, 2012.

Statistisk sentralbyrå, 22 September 2012

Hans Henrik Scheel

Abstract

It is widely recognised that in order to have a fuller picture of the economic well-being of households, one needs to take into account the wealth of households as well as income and consumption (e.g. OECD 2008, Stiglitz *et al*. 2009, Atkinson *et al*. 2010). Robust data on wealth are, however, difficult to collect due to non-response and sampling errors in household surveys. Statistics Norway's strategy has been to make extensive use of administrative data in the collection of income and wealth data. A milestone was passed in 2004 when the official data source for household income statistics shifted from a sample survey to a totally register-based data source covering all households in the country. A new milestone was passed in 2010 when new estimations on market values on own dwellings were introduced in household wealth statistics.

The aim of the report is to give a description of the build-up of a new register-based wealth statistics. Norway is one of the few countries that still collect wealth tax. All information on financial wealth is collected from tax registers, while data on non-financial wealth (private dwellings) are estimated on the basis of a model where information on characteristics of the dwelling is used to calculate the market value. Furthermore, we follow the Canberra-recommendations of confronting micro and macro data. Thus, estimates from the new micro data source on household wealth will be compared with National Accounts.

The results show that there is a substantial increase in the household's net wealth when the market value of the dwelling is included in the wealth concept. The average net wealth per household was NOK 1.6 million in 2009. The single most important asset is the value of own dwelling. This item constitutes 65 per cent of total wealth. Financial assets like bank deposits, shares etc. make up 28 per cent of total wealth, while total debt amount to 37 per cent of total assets.

The distribution of net wealth is highly skewed in Norway. While average net wealth for households is NOK 1.6 million, the median net wealth is NOK 900 000. Households in the highest 10 percent for net wealth own roughly 53 per cent of total net wealth, the richest 1 per cent control 21 per cent, while the top 0.1 per cent own 10 per cent of total net wealth.

There is sharp rise in net wealth by age. While households headed by someone younger than 30 years of age had a median net wealth close to zero, median net wealth for households where the main income earner is in the late 60s was NOK 1.9 million. Even the oldest households have a substantial net wealth.

When considering the joint distribution of income and wealth it turns out that many household with low income have a substantial net wealth. It is mainly older households that belong to this category. On the other hand, there are also many households that are at the top of the income distribution and at the bottom of the wealth distribution. These are typically younger, working-age couples without children. When both income and wealth is taken into consideration, this has a substantial impact on the proportion of poor households. In particular, there is a substantial reduction in the number of poor elderly people when traditional low-income measures are supported with data on wealth.

Sammendrag

Formue utgjer ein viktig del av hushaldas økonomiske ressursar, på lik line med inntekt. Men i motsetning til inntekt, har ein mangla gode data til å belyse formuesfordelinga. Det er mellom anna eit problem at ein ikkje har hatt realistiske verdiar for det viktigaste formuesobjektet til norske hushald, - bustadformuen. Statistisk sentralbyrå har nyleg utvikla ein modell der ein kjem nærare det som er den faktiske verdien på norske hushald sine bustadeigedommar. Dei nye bustadverdiane inngår no som del av realkapitalen til hushalda, til erstatning for dei gamle likningsverdiane.

I denne rapporten gjer vi greie for korleis den norske inntekts- og formuesstatistikken er bygd opp, mellom anna ved å kople saman data frå ei rekkje ulike register. Frå og med inntektsåret 2004 fekk ein for første gong ein heildekkjande inntektsstatistikk for alle hushald i landet. Frå og med inntektsåret 2009 er denne statistikken supplert med tilsvarande opplysningar om formue, der dei nye bustadverdiane inngår. Rapporten presenterer dei første resultata basert på den nye formuesstatistikken.

Resultata viser at når ein inkluderer dei nye bustadverdiane i formuesrekneskapen, så fører dette til ein kraftig auke i nettoformuen til norske hushald. I gjennomsnitt hadde hushalda ein nettoformue på 1,6 millionar kroner i 2009. Det klart viktigaste formuesobjektet er bustaden. Denne utgjorde aleine 65 prosent av bruttoformuen i 2009. Finanskapital (det vil seie bankinnskot, aksjar etc.) utgjorde 28 prosent, medan gjelda tilsvarte 37 prosent av bruttoformuen.

Til liks med mange andre land er formuesfordelinga svært skeiv i Noreg. Medan gjennomsnittleg nettoformue blant hushalda var på 1,6 millionar kroner, var median nettoformue på knapt 900 000 kroner. Tidelen av hushalda med høgast nettoformue eigde i 2009 om lag 53 prosent av all nettoformue, den rikaste 1 prosenten eigde 21 prosent, medan den rikaste 0,1 prosent (om lag 2000 hushald) eigde 10 prosent av nettoformuen.

Nettoformuen stig jamt med alderen på hovudinntektstakaren i hushaldet. Medan median nettoformue knapt er positiv for hushald yngre enn 30 år, stig median nettoformue til 1,9 millionar kroner for dei som er i slutten av 60 åra. Også dei aller eldste hushalda har ein betydeleg formue.

Ser ein inntekt og formue under eitt, viser det seg at mange hushald med låge inntekter likevel har ein betydeleg formue. Dette gjeld først og fremst for eldre hushald. På den andre sida så er det òg mange hushald med svært høge inntekter som mest ikkje har formue. Dette gjeld ofte for yngre par i yrkesaktiv alder, utan born. Når ein tek omsyn til formue fører dette til ein betydeleg nedgang talet på personar som har fattigdomsrisiko. Igjen så er det først og fremst blant dei eldste at utslaga er størst.

Contents

1. Introduction[1]

Wealth is today recognised as an important dimension of household economic resources, and it is recommended that one considers income and wealth together when assessing the economic well-being of households (OECD 2008, Stiglitz *et al*. 2009). It is, however, a challenging task in most countries to collect robust micro data on household wealth. Due to the specific nature of wealth data, e.g. the collection of information that many respondents consider sensitive, non-response is much more common in wealth surveys than in for example surveys that collect income data. According to Perez-Duarte *et al*. (2010), non-response rates in several European wealth surveys vary from 40 per cent to around 70 per cent. In addition, the negative implications of non-response may be larger in respect to wealth surveys than other surveys due to the particularly skewed distribution of wealth in most countries.

An alternative to sample survey is to use register data on wealth, where such data is available. Norway is one of the few countries that still collect wealth tax. Tax registers thus includes detailed information on most financial assets held by Norwegian households, as well as total liabilities. Tax data even includes information on non-financial assets, like the private dwelling. However, unlike financial assets the tax value of private homes grossly underestimate the real market value. In order to have appropriate market values even for private homes, a new model has been developed. The model combines information from a register with actual sales values of dwellings, and attributes and characteristics of all private dwellings in Norway from a Building Register, to estimate total market values. This new model-based market value on dwellings is thereupon linked to Statistics Norway's Household Income Statistics that covers all private households in the country.

The rest of the paper is structured as follows. Section 2 presents the build-up of a totally register-based income and wealth statistics for households. We first describe the statistical sources and methods used to provide a register of all private households in Norway, and then which administrative sources are used to compile income and wealth data for the very same households. The new model for estimating market value of the private dwelling is also described in this section. In section 3, some comparisons are made between the new wealth statistics and National Accounts aggregates. Section 4 presents the first results based on this new source of wealth statistics. We focus on composition of wealth as well as distribution. In addition, we look at the combination of income and wealth for households. Section 5 concludes.

[1] The authors wish to thank Mr. Torstein Bye for useful comments.

2. The build-up of a totally register-based household income and wealth statistics

2.1. Household definition

Up until 2004, household income statistics for Norway was based on a household survey. Information on household composition was collected through the survey while income and wealth data was collected from various administrative registers. The possibility to replace the survey with a totally register-based household income statistics was facilitated by Statistics Norway's decision to move from a question-naire-based census (2001) to a totally register-based census (2011). In order to do so, a household register would have to be established. In 2005 the first population figures were published based on this new register.

In this new household register, household composition is based on the legal address of each individual. All persons that according to the Central Population Register (CPR) are registered at the same address are considered members of the same household. This may be referred to as a 'formal' household definition. However, it has been recognized that this 'formal' household definition in some cases may deviate from what is the 'actual' household composition. In particular students and other adult children often have a household situation that is different from what is registered in the CPR, or more precise: They have moved out of their parent's household to establish their own household but without this (yet) being registered in the CPR. There are also other groups where the 'formal' household definition differs from what is the actual household situation, for instance people actually living in institutions.

In respect to household income statistics it is important to have information on the income sharing unit. Thus, it has been necessary to improve on the formal household definition in order to come closer to the actual household composition. There are several strategies that have been used to identify people that probably regularly live in a household that is different from the formal definition. In respect to *students*, the main administrative source used to identify those that *de facto* live away from their parents is the State Educational Loan Fund. One of the criteria for being eligible to receive a student grant (administered by the Loan Fund) is that you actually live by your own away from your parents. Students receiving this type of grant are therefore removed from their parents' household. However, not all students are entitled to a student grant. For example, "working" students with a substantial employee income are disqualified from receiving a grant. In order to identify these working students, register information on the employer (location of the work place) is used. If the place of work is situated at a distance far away from the parental dwelling it is presumed that the student *de facto* no longer belong to the parents' household. The same strategy is even used to identify and remove other young adults that, despite being formally registered as living with their parents, have a place of work located far away from their parental home. As can be seen from table 1, these two adjustments identified 103 000 new households in 2004, increasing the total number of households by 5 per cent.

The next adjustment is to identify people no longer living in private households. Many people living in institutions have already been excluded in the formal household definition. However, more people can be identified from administrative data. From the Labour and Welfare Administration there exist a register of the residents of old-age homes and long-stay hospitals. Other people living in institutions (e.g. child welfare institutions, prisons etc.) are identified by combining information on addresses, number of residents etc. The most visible effect of omitting the institutional population from the household register is a reduction in the number of older people.

Even other methods of identifying more *de facto* households are applied. One group that is particularly difficult to identify in registers are couples living in a consensual union, but without having common children. In Norway, as well as in many other countries, this is a common living arrangement, particularly among the young.[2] There is reason to believe that many adult children that according to the population register live with their parents actually live in a separate household as part of a consensual union. When a cohabiting couple is having their first common child they are immediately recorded as a couple household in the population registers. This information can be used to make presumption about previous household composition. When a couple has a common child, there is a strong reason to presume that they were in fact already living as a couple even before the birth of the child. By using this information an additional number of *de facto* household can be identified.

Even information from tax-records can be used to identify couples living together but without being married. Couples that are co-owners of a dwelling or who share a mortgage often report this to the Tax Authorities so that both partners may benefit from a tax deduction.

As can be seen from table 1, these adjustment reduce the number of households with 16 000, or 0.8 per cent. The reduction in the number of households is mainly explained by the 'merger' of many 'formal' single-person households into 'actual' couple households.

Table 1. Changes in the number of household after certain adjustments. 2004

	Households	Per cent
Formal household definition	2 010 000	100.0
students	87 000	4.3
young adult workers	16 000	0.8
people in institutions	-8 000	-0.4
cohabiting couples without children	-16 000	-0.8
Adjusted 'de facto' household definition	2 089 000	103.9

Source: Statistics Norway.

An important question to be addressed, is how well this new adjusted household definition compares with information on household composition collected from surveys? For the income year 2004 we are in the privileged position to have available both survey data from the Income Distribution Survey (IDS) and the new totally register-based household income statistics. In the IDS, the household composition is collected by a personal interview. Table 2 compares the household distribution of these two sources. In addition, the table shows the distribution based on the initial 'formal' household definition.

As the table shows, there is in general good overlap between the distribution of households types based on register data and the survey estimates. It is, however, apparent that the transformation from the 'formal' to the 'de facto' household definition for most household types enhances comparability to survey estimates. This is particularly noticeable in respect to the distribution of young singles and couples with adult children. When students and other young people have been removed from their 'formal' parental household to their 'de facto' household, we find a substantial rise in the proportion of single person household under 30 years of age. At the same time there is a clear reduction in the proportion of couples with adult children, many of which now turn up in the category 'couples without children, 45-66 years'.

[2] In Norway 49 per cent of all firstborns have parents living in a consensual union http://www.ssb.no/english/subjects/02/02/10/fodte_en/

Table 2. The distribution of households by household types in Norway. 2004. Register data and survey estimates. Per cent

	Register data			95% confidence interval	
	'Formal' household definition	'De facto' household definition	Survey Estimates[1]	Lowest	Highest
All households	100	100	100		
Singles < 30 years	7.0	10.7	9.9	9.1	10.7
Singles 30-44 years	8.6	8.0	8.5	7.7	9.3
Singles 45-66 years	10.7	10.5	10.1	9.3	10.9
Singles 67+ years	11.9	11.4	12.3	11.3	13.3
Couples without children < 30 years[2]	1.4	1.7	2.4	2.0	2.8
Couples without children 30-44 years	2.2	2.3	2.5	2.1	2.9
Couples without children 45-66 years	9.6	10.8	12.0	11.0	13.0
Couples without children 67+ years	7.8	7.5	7.7	6.9	8.5
Couples with children 0-5 years[3]	11.0	10.8	10.5	9.7	11.3
Couples with children 6-17 years	11.9	11.6	11.3	10.5	12.1
Couples with children 18+ years	6.3	4.5	3.6	3.0	4.2
Single with children 0-5 years[3]	1.6	1.3	1.8	1.4	2.2
Single with children 6-17 years	4.1	3.8	3.8	3.2	4.4
Single with children 18+ years	2.7	2.1	1.7	1.3	2.1
Other household types	3.1	2.8	2.1	1.7	2.5
Total number of households (1 000)	2 010	2 089	[4]2 135		

[1] The Income Distribution Survey 2004 (N = 13 000)
[2] Age of the oldest person in the household
[3] Age of youngest child in the household
[4] Weighted numbers
Source: Törmälehto and Epland (2007)

2.2. Income data

Statistics Norway has a long tradition of collecting income data from registers. Even the earliest Income Distribution Surveys from the 1970s and 1980s were based on register data, primarily data from tax registers[3]. With the computerization of public administration, increasingly more income data has become available in recent years.

Table 3. Overview of income concepts and corresponding administrative data sources in the Norwegian Income and Wealth Statistics for Households

Income concept	Administrative register
Employee income	Tax-return register,
'fringe benefits'	The Register for End-of-the-Year Certificates
Self-employment income	Tax-return register
Income from property	Tax-return register
Transfers received	
family related allowances	The Labour and Welfare Administration
housing allowances	The State Housing Bank
unemployment benefits	The Register for End-of-the-Year Certificates
sickness benefits	The Labour and Welfare Administration
student grants	The State Educational Loan Fund
old-age, survivor and disability benefits	The Labour and Welfare Administration
social assistance	Kostra (Municipality-State-Reporting)
child support received	The Labour and Welfare Administration
private pensions	Tax-return register
Taxes paid and social security contributions	Tax registers
Child support paid	The Register for End-of the-Year Certificates

[3] In the 1970s the household definition in the IDS was restricted to only cover the family unit (i.e. persons sharing the same address and having common family name). Persons living in a consensual union were, for instance, considered to be two households. Up until the 1979 survey, only taxable income was included in the survey. In 1982 a new household definition was introduced, based on interview, and some tax-free income items were included in the income definition.

Table 3 gives a crude overview of all the inputs of the register-based income statistics, in respect to income data. The main data providers are the Tax Authorities and the Norwegian Labour and Welfare Administration. The single most important source is the *Tax Return Register*. This register gives detailed information on all kinds of taxable income, e. g. wages and salaries, self-employment income, income from property and taxable pensions. Another important source is the *Tax Register*, where information on personal income taxes and social security contributions are collected. From the *Labour and Welfare Administration*, all types of tax-free transfers (e.g. family allowance, support to single parents) are collected as well as different types of pension income (e.g. old age and disability). In addition to tax registers and social security registers some minor income items are collected from other administrative registers, for example dwelling support (The State Housing Bank) and scholarships (The State Educational Loan Fund). It should also be noted that register data are even used to collect some biographical data for individuals, such as highest level of completed education, formal marital status, citizenship, immigrant status and municipality of residence.

All income data from these registers are thereupon linked to each individual in the population by the use of the unique Personal Identification Number.

2.3. Wealth data

In the same way as for income data, Statistics Norway publishes annual wealth statistics based on administrative records. In respect to wealth data, more or less the only administrative source is the Directorate of Taxes (the exception being Student Loans collected from the State Educational Loan Fund). Again, just like for income data, the statistics cover all Norwegian private households and give detailed information about taxable real capital, taxable gross financial capital and debt. However, Norwegian wealth statistics have one considerable weakness; the lack of information about market values on dwellings. The taxpayer's dwelling(s) are reported in the Tax Return, but at tax values which are considerable lower than the real market value. A number of studies of dwellings sold on the free market, show that reported tax values on average constitute only 20 per cent of the market values. In addition, the studies show that expensive dwellings have lower relative assessed tax values than less expensive dwellings. This is generally the case for all types of housing throughout Norway (Statistics Norway 2006, 2007 and 2009).

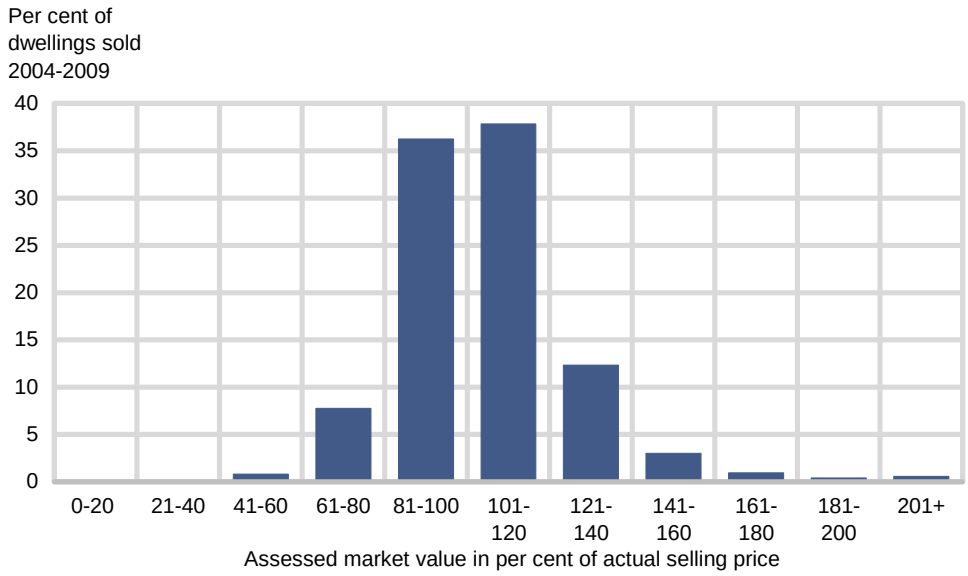
Statistics Norway has transferred micro data to Luxembourg Wealth Study (LWS), but Norwegian wealth data are often left out in cross-national studies of net wealth because of the inconsistency between the value of dwellings reported at tax values and debt reported at market prices (e.g. Sierminska, Brandolini and Smeeding 2006).

In an effort to include even market values on private homes, Statistics Norway has developed a model that estimates a market value on every single dwelling in the country based on information from about 390 000 sold properties in the period 2004-2009. This number corresponds to roughly one fifth of the total number of dwellings in the country in 2009. The explanatory variables applied in the model are type of dwelling, size of living floor space, location and age of the dwelling. The dwellings are divided into three categories: detached houses, row houses and multi-dwelling houses. Value functions are estimated separately for these three categories of dwellings in different regions in Norway (for further information about the model see Appendix A).

Figure 1 shows to what extent the model is able to estimate a market price that correspond to the observed selling price of all dwellings sold in the period 2004-2009. About 74 per cent of the dwellings have an assessed market value, according to the model, that differs +/- 20 per cent of what the dwelling actually was sold for

in the market, and 94 per cent of the dwellings have been given a market value by the model in the interval 60-140 per cent of the observed selling price.

Figure 1. The proportion of dwellings sold in the period 2004-2009. Assessed market value compared with actual selling price. Norway. 2009



Source: Kostøl og Holiløkk (2010).

In table 4, we compare the estimated market value with the selling price in different price ranges. The table covers all types of dwellings sold in 2009 at the market place www.finn.no, nearly 70 000 properties. 77 per cent of the properties were sold in the price range NOK 1-3 million. In this range, the average estimated market values differ from average selling prices by less than +/- 10 per cent.

The largest relative difference between estimated and observed market value, we find in the lower price ranges. Dwellings sold below NOK 1 million, have on average an estimated market value 28 per cent higher than actual selling price. These dwellings constitute 7 per cent of sold properties in 2009. For the expensive dwellings, selling prices of more than NOK 5 million, the average observed market values exceed the estimated values by about 20 per cent. However, these expensive dwellings only constitute 3 per cent of all sold properties in 2009 at the market place www.finn.no.

Table 4. Estimated and observed market values on sold dwellings in 2009[1]. All types of dwellings. Norway

Price range in NOK	Number of sold dwellings	Share of sold dwellings (per cent)	Average in NOK 1 000		
			Observed market value	Estimated market value	Ratio estimated/ observed
Total	69 945	100	2 162	2 107	0.97
- 1 000 000	4 593	7	792	1 011	1.28
1 000 000 - 1 499 999	14 448	21	1 289	1 395	1.08
1 500 000 - 1 999 999	20 608	29	1 731	1 820	1.05
2 000 000 - 2 499 999	11 718	17	2 221	2 182	0.98
2 500 000 - 2 999 999	7 198	10	2 713	2 539	0.94
3 000 000 - 3 499 999	4 115	6	3 215	2 904	0.90
3 500 000 - 3 999 999	2 637	4	3 710	3 278	0.88
4 000 000 - 4 499 999	1 545	2	4 207	3 654	0.87
4 500 000 - 4 999 999	1 033	1	4 696	4 018	0.86
5 000 000 + ...	2 050	3	6 535	5 289	0.81

[1] Dwellings sold at the marketplace Finn.no in 2009
Source: Statistics Norway

It may thus be concluded that the model seems to be robust in respect to estimating the actual market value for most homeowners in the country. However, for households with dwellings with an estimated market value in the outer price ranges (both at the bottom and at the top) deviations to the actual market price occur. This may have an impact on the wealth distribution, in particular in the upper tail of the distribution where the estimated values seem to underestimate the actual values.

Wealth statistics for Norwegian private households including assessed market value on own dwellings, are shown in Chapter 4 (results).

The model will be further refined and re-estimated with updated data about sold dwellings on the free market (after 2009), as well as reported information about the value of the dwellings (size of living floor space and age) reported by taxpayers and evaluated by the Directorate of Taxes. Statistics Norway also plans to extend the model to include market values on holiday houses in the future.

An overview of all the wealth concepts available from register data, including the estimated market value of dwellings, is given in table 5.

Table 5. Overview of wealth concepts and corresponding administrative data sources in the Norwegian Income and Wealth Statistics for Households

Wealth concept	Administrative register
Non-financial wealth	
private dwelling	Estimated values based on new model
holiday houses	Tax-return register
boats, cars and other vehicles	Tax-return register
forests, farms, plots and other real capital	Tax-return register
machinery and equipment	Tax-return register
house contents and movables	Tax-return register
real property owned abroad	Tax-return register
Financial wealth	
bank deposits and cash	Tax-return register
share of unit trusts	Tax-return register
shares, bonds and other securities	Tax-return register
private pension fund and value of repurchase of life insurance policy	Tax-return register
outstanding debit	Tax-return register
bank deposits in foreign banks	Tax-return register
Liabilities	
total debt	Tax-return register
student loans	The State Educational Loan Fund
debt to foreign banks	Tax-return register

3. Comparison with external sources

In order to assess the robustness of the micro data it is common practice to compare the estimates with their aggregated counterpart in the National Accounts. According to the Canberra report (United Nations Economic Commission for Europe 2011) regular micro-macro confrontations "is important for understanding the strengths and weaknesses of the respective datasets". However, it is well documented that in respect to wealth data this is a challenging task. Several studies have pointed at the fact that such comparisons are difficult to make because of conceptual differences (e.g. Jantti, Sierminska and Smeeding 2008, Kavonius and Törmäletho 2010).

Nevertheless, in table 6 we make an effort to confront the wealth data from the new register-based dataset (IWS) with National Accounts data. As can be seen from the table, the estimated value of non-financial assets is about 55 per cent higher in the new micro dataset, compared to the NA aggregates. Much of the difference is, however, explained by conceptual differences. The dominant wealth holding in this category is the value of dwellings, where the new estimated market values in the IWS lies about 51 per cent above the NA figures. In the NA the valuation of the dwelling is based on a definition that do not include the market value of the plot or the land on which the building is situated. Furthermore, the assessed value is based on the 'replacement value', where the original price, minus the "wear and tear" over the period, has been indexed using the production cost index. In a country with steep rise in housing prices, such as Norway, this method will not reflect actual market values. A similar conclusion was made in a recent Danish paper where estimated market prices on dwellings in Denmark are compared to National Account figures (Frej Knudsen 2012).

Another conceptual difference concerns the wealth accumulated from ownership of for instance boats, cars and other vehicles. In the NA these items are not considered wealth but rather consumer durables. In the IWS these are included, but at assessed tax value, which in many cases are well below the market value.

The category 'other non-financial wealth' is in the NA mainly machinery and vehicles related to own business. In the IWS 'other non-financial wealth' includes a much wider portfolio of wealth items such as plots, farms, forests and other fixed capital related to business. Again, despite being based on below-market tax values, the IWS data shows an aggregated sum about 19 per cent above the NA.

Turning next to financial assets, the table shows that the total sum of financial wealth in the IWS only corresponds to two-thirds of the NA aggregates. Again, much can be explained by conceptual differences. As expected, the amount of bank deposits compares well, where there is a 97 per cent overlap between the two sources.[4] Life insurance and pension wealth is a substantial part of the households' financial wealth, according to the NA. However, this item is not included in the wealth definition in the IWS, as it is not recorded in any tax registers. It might even be questioned whether insurance reserves should be part of a household wealth definition in micro data, since it is not liquid before old-age and cannot be bequeathed (Karvonius and Törmäletho 2010). In the IWS, only the value of some private premium funds is considered taxable wealth, but they do not constitute a substantial part of the households' net equity in life insurance or pension insurance reserves. 'Other financial assets' on the other hand, compares well, where the micro data from tax registers is about 12 per cent higher than the NA figure.

[4] It should be noted that all information on the values of bank deposits, shares, bonds and other securities are reported from banks and other financial institutions to the Tax Authorities for all people who own a bank account, shares, bonds etc.

This item includes the market value of shares and other financial assets.[5] In total, if pension wealth is excluded, there are only minor differences in the aggregates of financial wealth between the micro and macro data.

In respect to liabilities there is again relatively good overlap between the two sources, where the IWS reports about 93 percent of the NA figures. One explanation for why the NA aggregates report higher liabilities than the IWS is that the NA figures includes tax debt. This is not considered deductible debt for tax payers in the Tax Return, and thus not reported in the IWS.

Table 6. Comparison of Income and Wealth Statistics with National Accounts. Households[1]. Billion NOK. Norway. 2009

	National Accounts(NA)	Income and Wealth Statistics(IWS)	IWS as a percentage of NA
Non-financial wealth	2 536	3 923	155
thereof:			
dwellings	2 408	3 636	151
cars, other vehicles, boats etc.	-	135	
other non-financial wealth	128	152	119
Financial wealth	2 411	1 586	66
thereof:			
bank deposits etc.	732	710	97
insurance technical reserves	936	42	4
other financial assets	744	835	112
Financial wealth excluding insurance technical reserves	1 476	1 545	105
Debt	2 204	2 051	93
Net wealth	2 743	3 459	126

[1] The NA figures for non-financial wealth include Non-profit institutions serving households (NPISH), while the figures for financial wealth are excluding NPISH.
Source: Statistics Norway

To sum up table 6, there is a substantial difference in the aggregates of net wealth between NA and the corresponding micro data source. In respect to net wealth the IWS reports a value that is 26 per cent higher than the NA. It may come as a surprise that the micro data source report the largest amounts in household net worth. However, much can be explained by the difference in the assessment of private dwellings, where NA fails to report values close to the market values.

[5] In principle, both listed and unlisted shares and securities are registered in the tax return at a value corresponding to 100 per cent of the market value. However, many unlisted shares are in fact valued below their actual price. The reason is the non-inclusion of certain property items, e.g. the value of goodwill, and the fact that fixed property are valuated at below-market tax-values.

4. Some results

The wealth composition of Norwegian households: An overview

In 2009, the approx. 2.2 million private households in Norway possessed an estimated gross wealth of NOK 5 478 billion. These numbers exclude people living in institutions and people in student households, i.e. households where the main income source is student loans. The single most important asset is the value of own dwellings which are estimated to comprise a market value of NOK 3 534 billion - almost 65 per cent of gross wealth (see table 7). The tax-assessed value of own dwellings registered in the Tax Return, on the other hand, was 'only' NOK 664 billion in 2009 (about 19 per cent of the estimated market value). Thus, the model for assessing market value on dwellings (see chapter 2) increases the "visible" wealth of Norwegian households by NOK 2 870 billion this year. Almost 73 per cent of Norwegian households are homeowners.

Households' gross financial capital amounted to NOK 1 555 billion in 2009. Bank deposits alone constitute more than 44 per cent of total financial capital, while the part of shares and other securities was 37 per cent. Every fifth Norwegian household possessed shares and other securities in 2009. More than one third of all households had investments in unit trusts, bond and money market funds, but these financial assets only constitute 6 per cent of total gross financial capital.

Total debt of Norwegian private households was NOK 2 021 billion in 2009. Total net wealth amounted to NOK 3 457 billion. About 78 per cent of Norwegian households have a positive net wealth with an average of NOK 2.178 million. For households with debt exceeding total assets – average net wealth was minus NOK 491 000 in 2009.

Table 7. Property account for private households[1]. Norway. NOK. 2009

	NOK million	Share of gross wealth	Share of households with different property holdings	Average for households with different property holdings (NOK 1000)
Real capital	3 923 207	72	82.7	2 206
Own dwelling	3 534 527	65	72.7	2 260
Other real properties	211 783	4	30.3	325
Production capital and other properties	37 626	1	5.9	296
House contents and movables	139 272	3	56.9	114
Gross financial capital	1 555 075	28	98.7	732
Thereof:				
Bank deposits	688 445	13	98.5	325
Share of unit trusts, bond and money market funds	92 191	2	35.0	123
Foreign taxable wealth	35 504	1	5.8	287
Shares and other securities	570 139	10	21.7	1 218
Gross wealth	5 478 282	100	98.8	2 576
Debt	2 021 197	37	83.2	1 129
Thereof:				
Study debt	83 586	2	23.0	169
Net wealth	3 457 086	63	99.5	1 615
Positive net wealth	3 678 861	67	78.4	2 178
Negative net wealth	-221 775	-4	21.0	-491
Property taxes	11 535	0.2	23.2	23
Number of households	2 152 031		100.0	

[1] Students not included.

Source: Statistics Norway. Income and wealth statistics for households.

Distribution of net wealth

In most countries, household net wealth have a very uneven distribution (see Jantti, Sierminska and Smeeding 2008 for an overview of wealth distribution for countries participating in the Luxembourg Wealth Study). Norway is not an exception. Table 8 shows the distribution of household net wealth by deciles for all 2.2 million private households in Norway in 2009. Households in the lower part of the distribution (deciles 1 and 2) have a negative net wealth. Average net wealth in decile 1 is minus NOK 921 000, mainly due to high debt among these households. Deciles 3 and 4 have an insignificant proportion of total net wealth. In fact, if we collapse deciles 1-5, we find that these 1.1 million households had on average a negative net wealth in 2009.

Table 8. Distribution of net wealth for private households[1]. Norway. 2009. Per cent and NOK (1 000)

	Per cent	Mean values (NOK 1 000)	Pecentile cut-offs (NOK 1 000)
Total	100	1 606	
Decile 1	-5.7	-921	-257
Decile 2	-0.7	-109	-8
Decile 3	0.2	28	100
Decile 4	1.7	268	463
Decile 5	4.2	675	887
Decile 6	6.9	1 102	1 318
Decile 7	9.7	1 551	1 797
Decile 8	13.0	2 088	2 420
Decile 9	18.3	2 938	3 644
Decile 10	52.6	8 445	
Top 5 per cent	39.2	12 581	5 225
Top 1 per cent	21.2	34 074	11 806
Top 0.1 per cent	10.2	163 404	49 999
Gini	0.777		
Gini[2]	0.674		
Number of observations	2 152 031		

[1] Students not included.
[2] Negative amounts = 0
Source: Statistics Norway. Income and wealth statistics for households.

Among households in decile 10 we find more than half of total net wealth. The upper two deciles possess more than 70 per cent of household net wealth in Norway. Average net wealth in decile 10 was NOK 8.4 million in 2009.

The table, furthermore, confirms the skewed distribution of net wealth. There is a clear difference between the median and the mean value for net wealth, where the former only corresponds to 55 per cent of the latter.

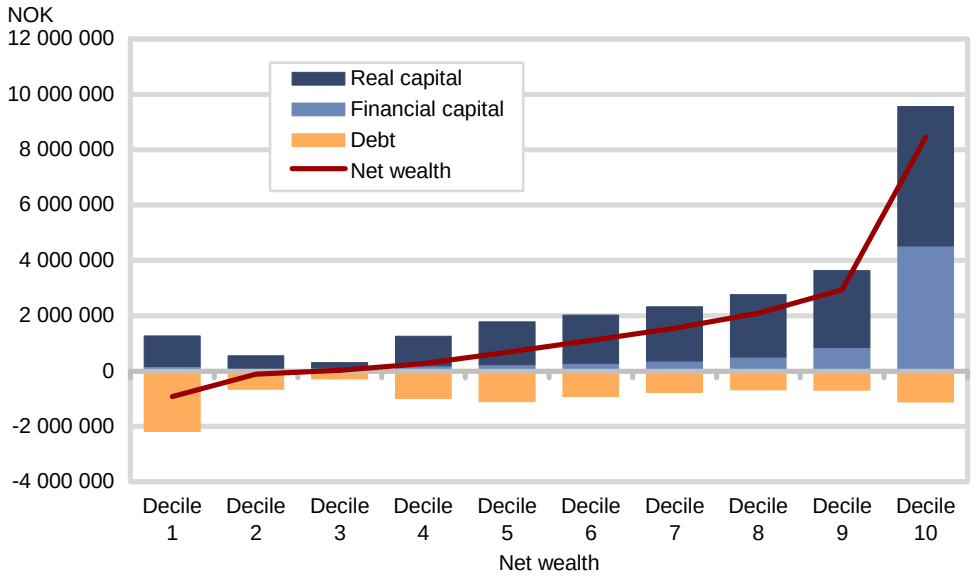
As would be expected, summary measures like for instance the Gini-coefficient also reflects the highly skewed distribution of net wealth in Norway. The Gini-coefficient is, however, strongly influenced by the large amount of negative net wealth at the bottom of the distribution. Not surprisingly, we find among households with negative net wealth a strong overrepresentation of young singles and couples with small children. These are typical households in a period of life with a high mortgage and often in combination with student debts (se Appendix B for details). If one neutrilises the effect of negative net worth (negative amount set to 0), the Gini for household net wealth is reduced from 0.777 to 0.674.

The availability of register data for the entire population, gives us the possibility to examine in detail the distribution at the top end of the wealth distribution. If we take a closer look at the very top of the net wealth distribution, we find that the top 1 per cent own 21 per cent of total net wealth (see table 8). The top 0.1 per cent, covering just about 2 000 households, possessed about 10 per cent of total net wealth in Norway in 2009. As can be seen from table 8, average net wealth among these very rich households was NOK 163 million.

Figures 2 and 3 show the composition of total wealth for households in various part of the wealth distribution. In figure 2 it is confirmed that households in the lowest decile for net wealth have liabilities that substantially exceeds their assets. For household in deciles 3-9 the dominant asset is non-financial wealth, while the wealth portfolio for households in decile 10 seem to be more mixed where financial wealth account for roughly 47 per cent of total wealth.

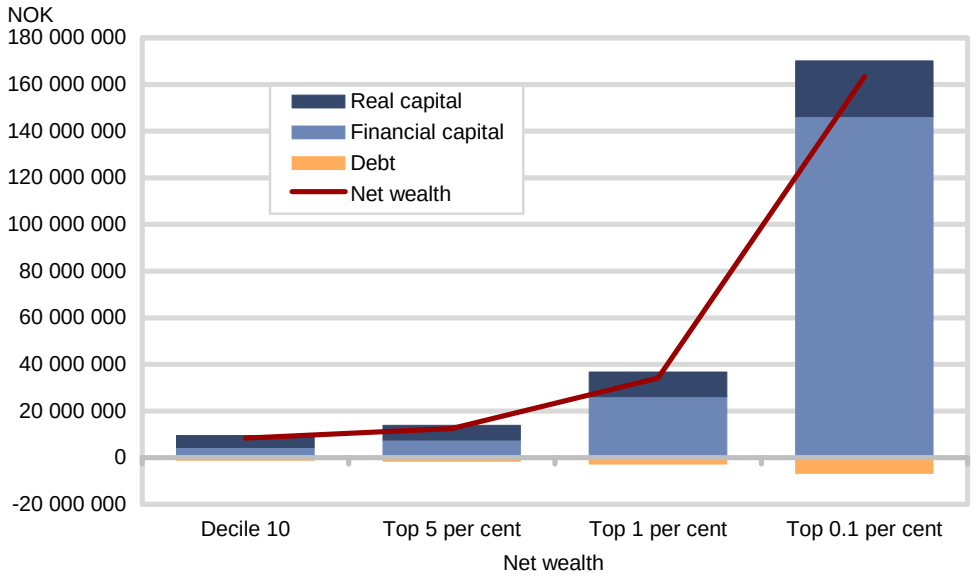
The importance of financial assets increases with the size of net wealth, as is shown in figure 3. For households belonging to the top 1 per cent in respect to net wealth, financial capital make up more than 70 per cent of total wealth, while this proportion increases to 86 per cent for households belonging to the top 0.1 per cent.

Figure 2. Average wealth and debt for households, by deciles for net wealth. Norway. 2009. NOK



Source: Statistics Norway. Income and wealth statistics for households.

Figure 3. Average wealth and debt for households at the top of the net wealth distribution. Norway. 2009. NOK

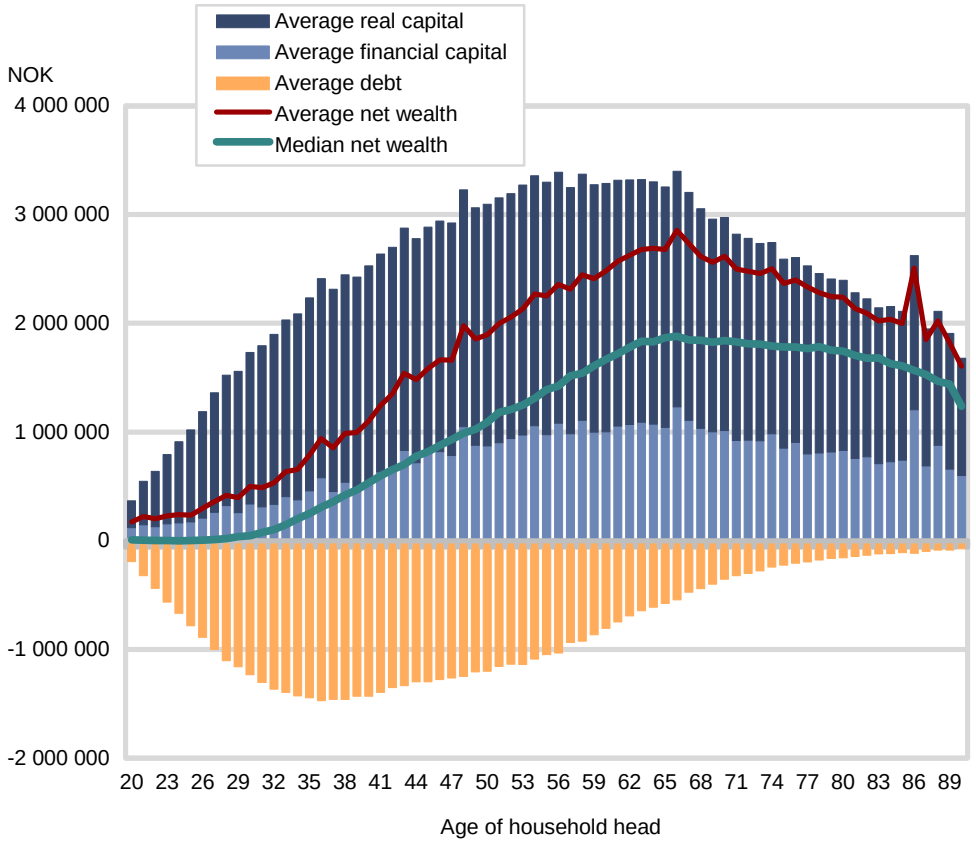


Source: Statistics Norway. Income and wealth statistics for households.

Net wealth by age groups

Figure 4 shows average financial and non-financial wealth, debt and net wealth of households, by the age of the main income earner in the household. Again, register data allow us to present fairly detailed statistics, for instance the wealth composition for each single age-group between the age of 20 and 90 years or more. In addition, the figure also shows median net wealth by age-groups. The gap between average and median further illustrate the skewed distribution of net wealth in Norway.

Figure 4. Average wealth and debt by age of household head. Norway. 2009. NOK



Source: Statistics Norway. Income and wealth statistics for households.

As would be expected, the level of average net wealth is relatively modest among the youngest households. The main asset for the young is their dwelling, and many still have a substantial mortgage, reducing their net worth. Median net wealth is close to zero for households where the main income earner is under the age of 30. By age, however, there is a sharp increase in net wealth. Average financial and non-financial wealth increases for each older age-group, while average debt is reduced. This trend continues till one reaches households where the head is in the late 60s. Both the highest average and median net wealth is found within households headed by someone aged 66 in 2009. This particular age-group had an average net wealth worth 2.8 million NOK, and a median net worth of nearly NOK 1.9 million. For older households there is a moderate decline in net wealth for each additional age-group.[6] The level of average and median net wealth is, nevertheless, substantial even for the oldest households.

[6] There is one notable exception to this trend. Households where the head is 86 years old have an average net wealth that is on a par with those in their late 60s. This is due to an extreme observation.

The joint distribution of income and wealth

To which extent do wealth and income coincide? In table 9, the population (students not included) is sorted by deciles after household equivalent income after tax and household equivalent net wealth. The equivalence scale used is the 'modified' OECD-scale. In order to simplify the interpretation of the table, we collapse deciles 2 to 9 into one single group (i.e. the 80 % of the population in the middle of the distribution). The table shows, to some extent, that wealth and income do correlate, but there is no clear picture. People in the upper wealth-decile (decile 10) are overrepresented in the upper income-decile, but at the same time people in the lowest wealth-decile (decile 1) are to some degree also overrepresented in the top income-decile.

Table 9. The proportion of the population in different deciles. Equivalent after-tax income and equivalent net wealth. EU-scale. Norway. 2009. Per cent

	Equivalent after-tax income			
Equivalent net wealth	Total	Decile 1	Decile 2 - 9	Decile 10
Persons				
Decile 1	470 498	36 412	380 980	53 106
Decile 2 - 9	3 763 964	405 104	3 081 978	276 882
Decile 10	470 499	28 985	301 006	140 508
Total	4 704 961	470 501	3 763 964	470 496
Per cent				
Decile 1	10.0	0.8	8.1	1.1
Decile 2 - 9	80.0	8.6	65.5	5.9
Decile 10	10.0	0.6	6.4	3.0
Total	100.0	10.0	80.0	10.0

Source: Statistics Norway. Income and wealth statistics for households.

If we take a closer look at the outer edges in table 9, we find that 0.8 per cent of the population belongs to decile 1 both in respect to income and wealth (36 000 individuals). Among these we find an overrepresentation of young people and often singles. Nearly 60 per cent are under 35 years of age (see Appendix C for details). Every fifth person has an immigrant background in this group, compared to every tenth person in the total population. There is also an overrepresentation of self-employed (main income earners) among those with both low wealth and low income.

Nearly 3 per cent of the total population belongs to decile 10 in respect to both net wealth and income (141 000 individuals). Not surprisingly, we find that this group is characterized by being middle-aged (36 per cent are in the age-group 55-66), having a non-immigrant background and belonging to household types like 'couples with older children' or 'couples without children'. The probability of belonging to a household headed by someone who is self-employed, is almost three times higher in this group compared to the population as a whole.

What characterize those 53 000 persons in households that are 'net wealth-poor' (decile 1) and 'income-rich' (decile 10)? Compared to the general population, we find an overrepresentation of people of working age, i.e. the age 25-55 years, with a non-immigrant background and often belonging to a household where the main income earner is self-employed. But people with socio-economic status as "employed' are also more likely to having low net wealth but high income, compared to the population as a whole. Young couples without children are particularly overrepresented in this group.

Among those 29 000 persons that are 'net wealth-rich' (decile 10) and 'income-poor' (decile 1), we find an overrepresentation of middle-aged and older people. More than six out of ten are aged 55 or higher. Almost four out of ten are 67 years or older. Looking at socio-economic status we find that more than half belong to a household with a pensioner as the main income earner. People with an immigrant background are also underrepresented by those with high wealth and low income, compared to the general population (see Appendix C).

Poor people with assets

The availability of both income and wealth data for the same individuals offers the possibility to have a fuller picture of the financial resources of those traditionally defined as poor. The importance of considering income and wealth together when assessing the economic well-being of households was also one of the recommendations made by the Stiglitz-Sen-Fitoussi Commision' Report, (2009), when they stated that "After all, a low-income household with above-average wealth is not necessarily worse-off than a median-income household with no wealth".

It is common practice, in Europe at least, to define those with a household income below a certain threshold, e.g. below 60 per cent of median equivalent income, to be at risk of poverty.[7] It is, however, a well known fact that some of those who are income poor may be in a financially better position when wealth is considered. For several of the countries included in the Luxembourg Wealth Study, including Norway, there was a substantially drop in poverty rates when financial wealth was taken into consideration (Brandolini, Margri and Smeeding 2010).

These results are confirmed in our national data when both gross financial wealth and net wealth are considered. Depending on where one wishes to draw the "poverty line" in respect to the size of wealth, there is a substantial reduction in the number of poor people when either financial wealth or net wealth is included in the definition of poverty. In figure 5 we use an equivalent household income below 60 per cent of the national median as a low-income threshold. In addition, we use this threshold as a reference point in order to assess the impact of financial wealth and net wealth in the number of people below the poverty line.

Just like the choice of 60 per cent of the median income as the low-income cut-off, all choices regarding the size of the wealth buffer are essentially arbitrary. Brandolini *et al.* (2010) concludes, with reference to several international studies, that a financial wealth buffer that is sufficiently large to keep the individuals above the poverty line for three months is a reasonable choice (i.e. 25 per cent of the poverty line).[8] In order to test the sensitivity in respect to the choice of the size of the wealth buffer, several alternative definitions will be presented in figure 5 for both financial wealth and net wealth.[9]

Our first definition combines the income-based poverty definition with different thresholds of financial wealth. The first definition considers all people to be poor if their equivalent income is below 60 per cent of the median and their financial wealth is less than two times the income-based poverty line. Both income and wealth is once more equalised using the 'modified' OECD-scale. The second definition reduces the wealth threshold to equal the poverty line, the third to 75 per cent of the poverty line, while the last threshold only requires a financial wealth less than 25 per cent of the poverty line to be considered poor. The same thresholds also apply to net wealth.

From figure 5 it is apparent that many income poor are in a position where they own some assets. When the strictest wealth threshold is applied, i.e. wealth at least

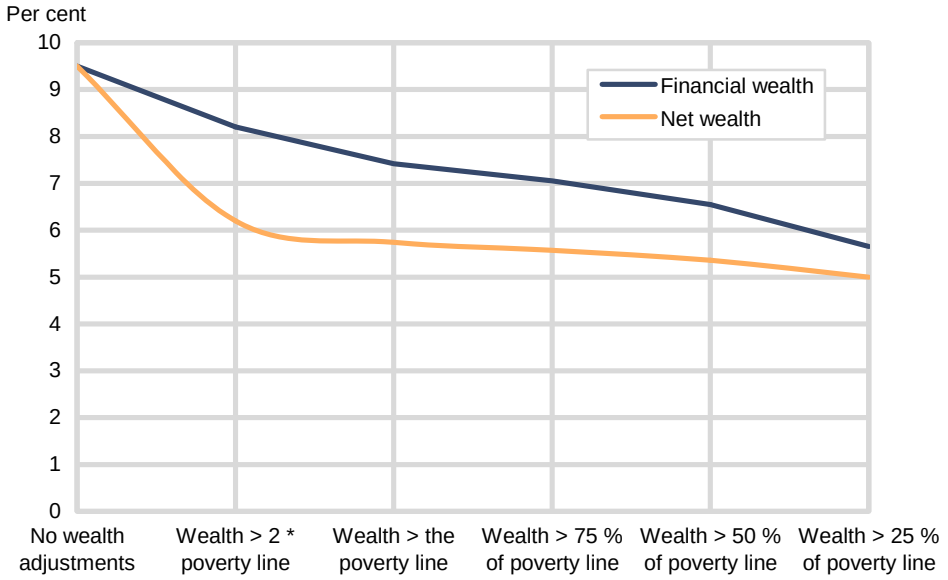
[7] Either annually or for a period of several years, so-called "at-persistent-risk of poverty".

[8] This conclusion is mainly based on the results from several studies of 'precautionary savings', i.e. the amount that individuals in a vulnerable situation, for example people that are about to loose their job or who are only temporary employees, have saved "for a rainy day".

[9] There is an obvious difference between financial wealth and net wealth in respect to the degree of 'liquidity'. While financial wealth generally can be easily monetized by the households, this may not always be the case in respect to net wealth, where a substantial part will be the value of their homes. Nevertheless, even the size of net wealth can be considered as an indicator of 'the long-run security of families' (Brandolini *et al*. (2010). In addition, new financial instruments allow households to cash in part of housing equity by means of home equity loans. This way of increasing the scope of consumption for homeowners has become increasingly more popular in Norway in recent years.

2 times the poverty line, the proportion of poor is reduced from 9.5 per cent (income-poor only) to about 8 per cent (financial wealth) and 6 per cent (net wealth). The number of poor is then successively reduced by falling wealth requirements. When the most lenient wealth threshold is used, i.e. wealth less than 25 per cent of the poverty line, the proportion of poor is just 5 per cent in respect to net wealth and 5.7 per cent in respect to financial wealth.

Figure 5. Reduction in the share of income and wealth poor, when different thresholds for wealth are used. Norway. 2009



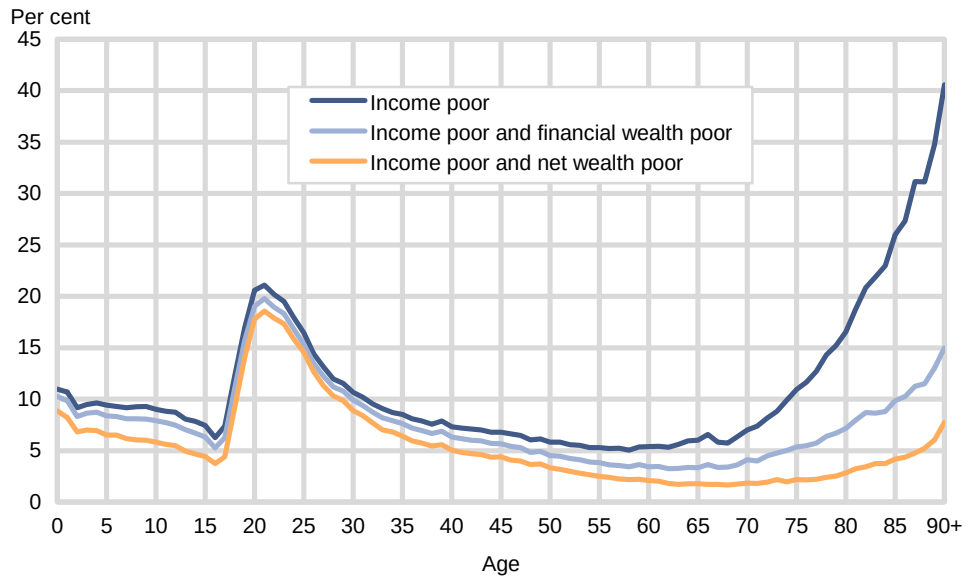
Source: Statistics Norway. Income and wealth statistics for households.

The importance of combining wealth with income is further investigated in figure 6. This graph shows the proportion of people in different age groups that are below the poverty line, when the poverty line is either income-based only or also includes financial wealth and net wealth. Any choice made in respect to picking the size of wealth that the income-poor should own, in order to be 'non-poor', is of course arbitrary as was discussed above. In this graph we have chosen a threshold for wealth that is equal to the income-based poverty line (i.e. the amount that corresponds to 60 per cent of median equivalent income). In respect to net wealth this may be seen as a reasonable choice (Brandolini *et al*. 2010), while in respect to financial wealth this buffer may be seen as relatively strict, cf. again the discussion above.

The graph shows that, based on income only, the poverty rate among children drops with the age of the child. However, when children turn 18 or 19 years old there is a dramatic increase in the poverty rate that culminates at age 20 and 21. These are the ages when most Norwegians adult children leave home to establish themselves in their own households. Obviously, this increases the risk of poverty. From the early 20s onwards, there is moderate reduction in the poverty rate all the way up to those that are in the late 50s, the age-group with the lowest income-based poverty rate. For older age-groups there is sharp increase in poverty, particularly for those in their 80s. The oldest age-group had for instance an income-based poverty rate as high as 40 per cent. The majority of the oldest population consists of single, elderly women with only a small pension income.

Turning next to financial wealth, there is a drop in poverty rates in all ages. The greatest reduction, however, takes place among those that are 60 years or older. It is now those in the mid-60s that have the lowest poverty rate, and the oldest age-group have now a poverty rate of only 15 per cent. This clearly suggests that many of the old with low income, in fact have financial assets that exceeds the poverty line.

Figure 6. Share of income poor and income and wealth poor. Age-groups. 2009



Source: Statistics Norway. Income and wealth statistics for households.

Our last definition, based on net wealth, shows that even low-income households with children have a substantial net wealth. This can most likely be explained by the high frequency of home-ownership in Norway. It is, however, once more in the older age groups that we find the strongest reduction in the poverty rate, based on this definition. The lowest poverty rate is now found among those in their late 60s, and even those in their 80s now have a smaller proportion below the poverty line than households with young children.

5. Conclusions

The aim of the report has been to present a new totally register-based dataset that combines information on income and wealth for the entire resident population of Norway. While totally register-based data on income has been used in official household income statistics since 2004, comprehensive wealth data only became available from the year 2009, and only after the introduction of a model that substitutes below-market tax-values on housing wealth with values closer to the actual market price.

This new data source of income and wealth opens up new possibilities, particularly for users with greater demand for accuracy, small domain analyses, and geographical data. In addition, the data benefit from being without non-response errors and the fact that it covers all households, even those at the very top of the wealth distribution. It will also – in the years to come - be a unique data source for longitudinal analyses, for instance in respect to studying trends in household savings or dissavings over the years. The new data set also fills a gap. An apparent weakness of older Norwegian wealth data transmitted to the Luxembourg Wealth Study, was the lack of realistic market values on non-financial assets. Consequently, Norwegian data has been left out of several cross-national studies on the distribution of (net) wealth. The new dataset should therefore make Norwegian data more comparable to other countries participating in LWS and other international studies that focus on wealth distribution.

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Appendix A: Re-estimating the model used to estimate dwelling value[10]

1. Preface

Statistics Norway has made a model used to estimate the market value of dwellings in Norway (Thomassen and Melby 2009). The estimates are used in the micro simulation model LOTTE to analyze the effects on tax proceeds and the income distribution due to changes of peoples' income taxes and property taxes. The same model is also used by the Norwegian Tax Administration to estimate new assessment values on dwellings. When used for specific dwellings, flaws have been detected tied to the chosen type of function, which in a few cases gave implausible estimates.

Because of this, the model has now been revised with a new type of price-function, chosen after testing various model specifications. Through the trials, price per square meter at level-form and at a logarithmic-form has been tested to see which is best suited, as well as how to specify the relation between living area and price per square meter. We have chosen to use the logarithm of the price per square meter as the dependent variable. As for the specifications concerning the living area, tests have shown that there is little to gain by using more complicated specifications other than to just include the logarithm of the living area as one of the independent variables.

Thus, the current model only differ from the previous model (Thomassen and Melby 2009) with the change of the dependent variable, now being the logarithm of the price per square meter and not the actual price per square meter. This change makes the model more robust for prediction purposes, and the estimates become less vulnerable to extreme observations.

The principles of the estimations, among other the criteria regarding classification of different zones, have not been changed, but the major cities have been extracted to form own regions. In the following, all the new price functions are presented, starting with detached dwellings, then row houses and multi-dwelling houses by region. An analysis showing the deviation between the estimated market value and the observed market value has also been included.

2. The Model

For each region and type of dwelling the following equation is used:

$$(1)\ \ln y = \alpha + \beta \ln x + \pi tett + \lambda aar + \theta alder + \delta sone + \varepsilon$$

In the equation, *y* represents the price per square meter, *x* is the living area of the given dwelling measured in square meters. We call the vector of the remaining explanatory variables *Z*, which includes *tett* (dense), an indicator variable equal to 1 if the dwelling is situated in a densely built area and otherwise equal to 0. *Aar* (year), *alder* (age) and *sone* (zone) are vectors of indicator variables concerning the year the dwelling was sold, the age of the dwelling at the time it was sold (with the intervals: <10 years, 10 – 19 years, 20 – 34 years, > 34 years), and zone within the region.

From the log-linear model (1), it is possible to estimate the anticipated dwelling value:

$$E(\hat{Y}|Z,x) = \exp(\hat{\alpha} + \hat{\delta}sone + \hat{\theta}alder + \hat{\lambda}aar + \hat{\pi}tett)x^{1+\hat{\beta}} \exp(\frac{\hat{\sigma}^2}{2})$$

[10] This appendix is a summary of Kostøl and Holiløkk (2010) translated into English by Mr. Rolf Sindre Ulfstein.

In the equation $\hat{\sigma}$ represents the estimated standard deviation of the residual of equation (1). Since the residual is log- normally distributed when we transform equation (1) to price per square meter, it has to be adjusted for when the anticipated price per square meter is estimated. By taking this into account the uncertainty associated with the estimates will hold as long as the residual of (1) keeps its normal distribution.

3. Data

The basis of the data consists of dwellings sold at the marketplace Finn.no within the period 2004-2009. From the data deliverance from Finn.no, Statistics Norway receives information regarding type of dwelling, living area, type of ownership, year of construction, dissemination amount, joint debt, municipality, land No.-title No. and section No.

4. Uncertainty

In the following four tables the percentage distribution of the relationship between the observed selling price and the estimated market value is shown. In table 1 the distribution for all types of dwellings are presented, whereas the following three tables show the distribution of the different types of dwellings.

Table 1. Percentage distribution of the relationship between estimated market value over observed market value. 2004-2009. All dwellings

Observed/estimated	Number of observations	Percentage	Cumulative percentage
0-20	2	0.00	0.00
21-40	266	0.07	0.07
41-60	3 221	0.82	0.89
61-80	30 446	7.76	8.65
81-100	142 198	36.23	44.87
101-120	148 500	37.83	82.71
121-140	48 436	12.34	95.05
141-160	11 842	3.02	98.07
161-180	3 697	0.94	99.01
181-200	1 570	0.40	99.41
201+	2 321	0.59	100.00
Total number of obs	392 499		

Table 2. Percentage distribution of the relationship between estimated market value over observed market value. 2004-2009. Detached dwellings

Observed/estimated	Number of observations	Percentage	Cumulative percentage
0-20	2	0.00	0.00
21-40	206	0.17	0.18
41-60	1 773	1.50	1.67
61-80	12 440	10.51	12.19
81-100	39 242	33.16	45.35
101-120	38 437	32.48	77.84
121-140	16 544	13.98	91.82
141-160	5 326	4.50	96.32
161-180	2 055	1.74	98.06
181-200	936	0.79	98.85
201+	1 363	1.15	100.00
Total number of obs	118 324		

Table 3. Percentage distribution of the relationship between estimated market value over observed market value. 2004-2009. Row houses

Observed/estimated	Number of observations	Percentage	Cumulative percentage
0-40	4	0.01	0.01
41-60	135	0.28	0.28
61-80	3 087	6.33	6.61
81-100	19 537	40.06	46.67
101-120	19 262	39.49	86.17
121-140	5 164	10.59	96.75
141-160	1 001	2.05	98.81
161-180	303	0.62	99.43
181-200	106	0.22	99.65
201+	173	0.35	100.00
Total number of obs	48 772		

Table 4. Percentage distribution of the relationship between estimated market value over observed market value. 2004-2009. Multidwelling houses/flats

Observed/estimated	Number of observations	Percentage	Cumulative percentage
0-40	56	0.02	0.02
41-60	1 313	0.58	0.61
61-80	14 919	6.62	7.23
81-100	83 419	37.01	44.23
101-120	90 801	40.28	84.52
121-140	26 728	11.86	96.38
141-160	5 515	2.45	98.82
161-180	1 339	0.59	99.42
181-200	528	0.23	99.65
201+	785	0.35	100.00
Total number of obs	225 403		

5. Results of the regression
Explanation of the variables used in the models:

Dependent variable:

Lnkvmpris Logarithm of the price per square meter

Independent variables

Lnareal Logarithm of primary area, all rooms accessible by stairs or doors (P-room)

Sone Price zones, see appendix 2. Zone 1 is used as the reference category

Aar Year of selling:
Aar1 – 2004
Aar 2 – 2005
Aar 3 – 2006
Aar 4 – 2007
Aar 5 – 2008
Aar 6 – 2009 reference category

Tett dense/scattred code, where scattered is the reference category

Alder Age of the dwelling:
Alder1- <10 years, reference category
Alder2- 10-19 years
Alder3- 20-34 years
Alder4- > 34 years

For each regression model the following values are listed; F-value, p-value, R^2 and R^2 adjusted, and for each variable in the model; parameter estimates, standard error, t-value and p-value.

The estimates are presented in the following sequence:

Detached dwellings (100)	**Row houses (200) and Multidwelling houses (300)**
101 – Finnmark	201 – Northern Norway
102 – Østfold	301 – Northern Norway
103 – Akershus	202 – Oslo
104 – Oslo	302 – Oslo
105 – Hedmark	203 – Akershus
106 – Oppland	303 – Akershus
107 – Buskerud	204 – Østfold, Buskerud, Vestfold og Telemark
108 – Vestfold	304 – Østfold, Buskerud, Vestfold og Telemark
109 – Telemark	205 – Hedmark og Oppland
110 – Aust-Agder	305 – Hedmark og Oppland
111 – Vest-Agder	206 – Agder og Rogaland
112 – Rogaland	306 – Agder og Rogaland
113 – Stavanger	207 – Stavanger
114 – Bergen	307 – Stavanger
115 – Hordaland	208 – Bergen
116 – Sogn og Fjordane	308 – Bergen
117 – Møre og Romsdal	209 – Vestlandet
118 – Sør Trøndelag	309 – Vestlandet
119 – Trondheim	210 – Trondheim
120 – Nord Trøndelag	310 – Trondheim
121 – Nordland	211 – Trøndelag
122 – Troms	311 – Trøndelag

Appendix B

Households with negative net wealth by various characteristics of main income earner. Norway. 2009. Per cent

	Percentage of households with negative net wealth	All households
Age	**100**	**100**
Under 25 years	10.3	5.3
25-34 years	32.1	16.9
35-44 years	28.1	20.8
45-54 years	17.3	18.9
55-66 years	9.6	19.3
67-79 years	2.3	11.9
80 years and older	0.3	7.1
Type of household	**100**	**100**
Singles under 30 years	15.7	7.8
Singles 30-44 years	14.2	8.5
Singles 45-66 years	11.6	12.2
Singles 67 years and older	1.8	11.0
Couples under 30 years without children	3.8	1.8
Couples 30-44 years without children	4.0	2.4
Couples 45-66 years without children	5.2	11.1
Couples 67 years and over without children	0.8	8.0
Couples with children 0-5 years	16.6	10.6
Couples with children 6-17 years	10.8	11.6
Single parent with children 0-5 years	2.8	1.3
Single parent with children 6-17 years	5.4	4.0
Couples with children 18 years and older	2.4	4.3
Single parent with children 18 years and older	1.7	2.2
Other	3.2	3.2
Immigrant background	**100**	**100**
First and second generation immigrants	13.9	11.5
Non-immigrant background	86.1	88.5
Socio-economic status	**100**	**100**
Self-employed	4.4	3.9
Employed	72.5	62.2
Pensioners	17.3	30.2
Other	5.8	3.7
Number of observations	451 470	2 152 031

Source: Statistics Norway. Income and wealth statistics for households.

Appendix C

Persons in different deciles of equivalent after-tax income and equivalent net wealth, by various characteristics. ('Modified' OECD-scale). Norway. 2009. Per cent

		Persons belonging to			
	Total	Decile 1 net wealth and decile 1 income	Decile 10 net wealth and decile 10 income	Decile 1 net wealth and decile 10 income	Decile 10 net wealth and decile 1 Income
Age	**100**	**100**	**100**	**100**	**100**
Under 25 years	31.0	32.0	18.0	25.2	15.0
25-34 years	12.8	24.9	4.7	20.2	3.9
35-44 years	15.4	19.7	10.2	22.7	7.3
45-54 years	13.8	14.0	21.2	19.5	11.7
55-66 years	14.5	7.8	35.8	11.4	22.4
67-79 years	8.5	1.4	9.1	1.0	17.8
80 years and older	4.0	0.3	1.1	0.1	22.0
Type of household	**100**	**100**	**100**	**100**	**100**
Singles under 30 years	3.6	14.6	0.2	1.7	1.5
Singles 30-44 years	3.9	14.9	2.0	6.1	2.5
Singles 45-66 years	5.6	13.2	5.7	4.5	14.0
Singles 67 years and older	5.0	1.1	1.7	0.2	33.8
Couples under 30 years without children	1.6	2.4	0.2	2.8	0.3
Couples 30-44 years without children	2.2	2.1	1.8	10.9	0.5
Couples 45-66 years without children	10.1	3.0	32.8	14.8	10.3
Couples 67 years and over without children	7.3	0.3	9.7	0.9	5.7
Couples with children 0-5 years	19.4	19.5	8.3	21.8	7.0
Couples with children 6-17 years	21.4	11.6	21.1	21.9	12.0
Single parent with children 0-5 years	1.6	3.6	0.1	0.3	0.7
Single parent with children 6-17 years	4.6	6.4	1.0	1.7	3.3
Couples with children 18 years and older	6.3	1.6	10.6	7.4	3.5
Single parent with children 18 years+	2.1	1.7	1.3	1.0	2.4
Other	5.2	3.8	3.4	4.3	2.6
Immigrant background	**100**	**100**	**100**	**100**	**100**
First and second generation immigrants	11.4	19.2	4.6	7.2	6.3
Non-immigrant background	88.6	80.8	95.4	92.8	93.7
Socio-economic status (main income earner)	**100**	**100**	**100**	**100**	**100**
Self-employed	4.9	8.9	12.2	14.0	5.2
Employed	71.3	43.6	76.7	84.5	26.6
Pensioners	21.4	23.4	10.3	1.3	53.5
Other	2.4	24.1	0.8	0.2	14.7
Number of observations	4 704 961	36 412	140 508	53 106	28 985

Source: Statistics Norway. Income and wealth statistics for households.

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