

Thoresen, Thor Olav

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Income Mobility of Owners of Small Businesses when Boundaries between Occupations are Vague

THOR O. THORESEN

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Abstract

Ownership of small businesses can facilitate upward mobility through the income hierarchy and help individuals maintain a place at the higher end of the income distribution hierarchy. This paper compares the positional stability of owners of small businesses with that of wage earners, arguing that describing the relative position of different occupations faces definitional challenges. For instance, the Norwegian dual income tax system encourages owners of small businesses to establish widely held firms, with themselves as employees, because it reduces the tax burden and increases post-tax income. Descriptions of income distribution mobility of different occupations are therefore in danger of being misleading if such occupational measurement problems are not taken into account. I discuss in this paper the income mobility of owners of small firms in Norway 1993–2003 by estimating income transition models for different definitions of occupational status. Business ownership facilitates upward mobility and helps owners maintain a place at the top of the income distribution scale, and wider definitions of what counts as a small business owner enhance these correlations. However, as the paper shows, business owners are more mobile than wage earners and therefore overrepresented at the lower and higher ends of the income distribution ranking, irrespective of definition.

JEL Code: D31, H25, H30.

Keywords: income mobility, dual income tax, income of owners of small businesses, random effects model.

Thor O. Thoresen
Research Department
Statistics Norway
P.O. Box 8131
Norway - 0033 Oslo
thor.olav.thoresen@ssb.no

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1. Introduction

Policy-makers are paying increasing attention to the economic conditions under which owners of small firms operate, not least because small businesses are considered to be vital to economic growth, innovation and the dynamics of economic systems. This concern for the small business is reflected in tax policies. For instance, the low, flat-rate capital income tax that is common to the dual income tax systems of Norway and the other Nordic countries was designed to encourage entrepreneurial initiative and other business activities. In this paper we ask whether owners of small businesses have experienced any improvement in their position on the income scale (relative to wage earners) in the period from 1993 to 2003. This particular timeframe was chosen because the dual income tax system came into force in Norway in 1992.¹ Insofar as dual income tax systems are clearly of some considerable interest to policy-makers worldwide, it is desirable to obtain information about effects of such tax systems on, for instance, the performance of owners of small businesses.

A main point of this paper is that identifying business owners in the data is a significant challenge, a problem exacerbated by the dual income tax system. The present study uses income statistics for persons and families compiled by Statistics Norway (2006a). They include information obtained from income tax returns for the whole population for every year between 1993 and 2003. As the whole population is covered, it is a rich source of information. However, owners of incorporated businesses are categorized as employees in these data, whereas in most other respects they are classified as business owners, similar to the self-employed. This is a definitional measurement problem in many countries, including the US and the UK (Parker, 2004).

The Norwegian dual income tax system exacerbated the problem. It levied a flat 28 percent tax rate on corporate income, capital and labor income, and then imposed a progressive surtax schedule on labor income, taxing wage income at 49.5 percent at the margin.² While this system did away with the double taxation of dividends and gave tax-payers full credit for dividend payments at the corporate level, the capital gains taxation system introduced a valuation system to control for gains already paid for through retained firm profit. However, as these disparate schedules for capital and labor income threatened to increase the likelihood of income shifting, preventive regulations were enforced with the introduction under the tax reform of 1992 of what was known as the split model of taxation for the self-employed and closely held firms (i.e., firms in which more than two-thirds of the shares are held by one person). Under this model, business income was divided into a capital and a labor income tax base, the latter being subject to surtax. Owners of closely held firms are normally

¹ A reformed tax system was put in place in 2006, see Sørensen (2005).

² This is according to the schedule of 1993, in which the second tier of the surtax was applicable for incomes above NOK 230,000 (US\$ 32,500 according to exchange rates for 2003, 1USD=7.08 NOK, which we use in this paper).

categorized as wage earners. With the split model, owners of small businesses could incorporate as a widely held firm, with an ownership share of less than two-thirds. These active owners are classified as employees, but could still take advantage of the gap between capital and wage income taxation by being paid in terms of dividends instead of salary. Thoresen and Alstadsæter (2008) find that some of the features of the dual income tax work in combination with some of the features of human capital intensive businesses to facilitate organizational shifts, providing substantial income gains for the people involved. The evidence presented here substantiates some of the implications of these shifts with regard to the overall economic advancement of business owners.

Small business ownership can take one of three organizational forms: the owner can be denominated as self-employed (or sole proprietor); ownership can take the form of the closely held firm under the split model; or, finally, as the widely held firm. Business owners who incorporate as one of the two latter options are classified as wage earners, even though their activities are very similar to those of the self-employed. Under these circumstances, allowing the self-employed to represent owners of small businesses when discussing the effects of business ownership on income growth, we are in danger of seriously misleading our audience.

In exploring such definitional challenges, the paper shows that owners of small businesses do in fact operate under various organizational forms, and that different tax systems can affect the significance of this definitional problem. To identify owners of small businesses characterized as widely held firms, we compare data retrieved from the newly established Register of Shareholders with data from the End of the Year Certificate Register.³ This allows us to discuss the relationship between income gain and business ownership for different definitions of business owner, applying a wide definition that incorporates owners whose businesses are classified as widely held firms.

Previous contributions on mobility of business owners, see e.g., Holtz-Eakin et al. (2000), Fairlie (2004; 2005), note that running a business creates an opportunity for upward mobility for disadvantaged groups. Given the emphasis of the present study on business owners involved in tax avoiding organizational shifts and ownership of small businesses as a means of getting rich and staying rich, our focus is on the effect on the upper part of the income distribution. Of course, we could have used cross-sectional data to examine relationships, identifying the number of business owners in the upper part of the income distribution in repeated cross-sections over the period. However, by adopting a longitudinal perspective we get a better understanding the relationship between business ownership and income over time. The main approach of the present paper is to discuss income mobility by estimating transition rates, using various definitions of income hierarchy movement as the dependent variable and focusing on business ownership as an explanatory variable,

³ See Statistics Norway (2006b) and Statistics Norway (2006c) for documentation of the two registers, respectively.

also controlling for observed characteristics and unobserved individual effects. We want to know whether business ownership induces upward mobility in the income hierarchy and whether business ownership helps owners maintain a position at the high end of the income distribution.

The paper is organized as follows. Section 2 reviews earlier studies on the relationship between occupation and income mobility. Section 3 presents the register data used in this study. We also ask here whether the individual level data we have available for this study replicate household level trends in income inequality before discussing initial evidence from mobility tables. In Section 4 we probe deeper into correlations between business ownership and placement in the income distribution by estimating a random effects transition model. Section 5 closes the paper.

2. Discussions in the literature on the relationship between involvement in small businesses and income mobility

When analyzing the relationship between income and business activities, it is important to note that there is no obvious direction of causality; occupational choice and income will often be seen as simultaneous variables. In the occupational choice literature, incomes or yields in different states, e.g., in wage employment or self-employment, are used as explanatory variables.

The main ambition of the present study is to assess the effect of involvement in business activities on income development. In that respect the present study aligns itself with the literature on entrepreneurship and self-employment as a means of upward mobility in the income hierarchy. This means that the occupational choice variable crosses over to the explanatory variables. A number of papers by Fairlie discuss business ownership and entrepreneurship as a route out of poverty and unemployment for disadvantaged families. Two of them (Fairlie 2004; 2005), are based on estimations of earnings regressions, and employ panel data and fixed effect identification strategies. Both show some evidence of the claim that business ownership provides a route for economic advancement, balanced against opportunities in the wage/salary sector.⁴ Similarly, Holtz-Eakin et al. (2000) note that social climbing by dint of one's own business acumen, as personified by the successful protagonists of Horatio Alger's rags-to-riches novels, has a powerful hold on American society. They estimate a version of a Markov model by ordinary least squares, where the dependent variable is the percentile in year $t+1$, explained by the percentile in year t and a number of other explanatory variables. In order to allow for non-linearities in the relationship between present and past positions, a quadratic specification is employed. They find that self-employment is beneficial for individuals starting **out** at

⁴ However, there are differences between male and female groups, as the latter do not benefit from self-employment as business owners, according to Fairlie (2005).

the low end of the earnings distribution, whereas those who started up near the top of the distribution experienced a loss, compared to the wage earners.

It should be noted that the present study focuses more on the upper part of the income distribution, unlike many other studies of business ownership. The main issue here is business ownership as a means of ascending to and staying in the upper reaches of the income distribution, given that the business owners face “privileges” in terms a tax system which facilitates, if not encourages, tax avoidance.

There are other closely related analyses of distributional effects of business ownership: for instance, Hamilton (2000) discusses explanations to differences in earnings distributions for self-employed workers and paid employees, whereas Jenkins (1995) and Parker (1999) employ population sub-group inequality decomposition methods when discussing the relationship between income inequality and self-employment.

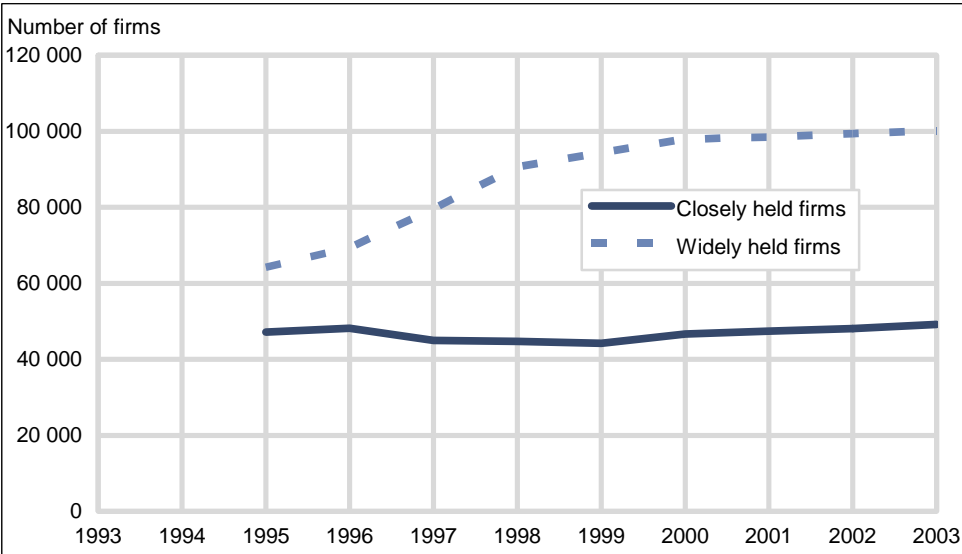
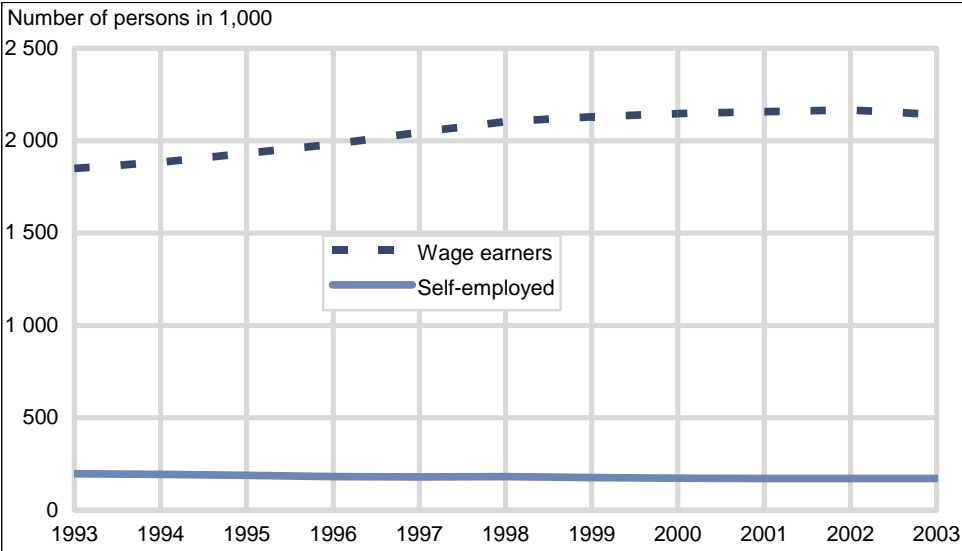
3. Some empirical preliminaries

3.1 Data

Identifying owners of small businesses is a challenging task, as noted by, e.g., Plesko (1995), Holtz-Eakin (2000) and Parker (2004). The data on small businesses come in corporate and individual level versions. This is illustrated in Figure 1, where we show developments at the personal level, the upper panel for the period 1993–2003, and at the corporate level, the lower panel for the period 1995–2003. In the upper panel we divide the individuals in work into wage earners and self-employed, based on information in the Norwegian national accounts (Skoglund, 2001), derived originally from the labour force survey. Among what are defined as the self-employed, some people organize their activities as sole proprietorships and partnerships. The lower panel shows the corporate level data, based on income statistics for limited companies (Statistics Norway, 2008). Corporations are either closely held or widely held firms. A closely held firm is defined by active owners (working more than 300 hours annually) holding more than two thirds of the shares. However, active owners in closely held and widely held firms will normally be defined as wage earners if they work in the business they own and hence be included in the wage earner category in the upper panel. However, as this paper argues, the category “owners of small businesses” should include self-employed and active owners of closely held firms. Moreover, and this is a main point here, many active owners of widely held firms should be placed in the small business category. The idea finds empirical support in the number of business owners who re-classified their business for tax reasons during the nineties, taking the opportunity encouraged by the Norwegian dual income tax system to reclassify the business as a widely held firm

(Thoresen and Alstadsæter, 2008). Descriptions in Figure 1 accord with this; we see a decrease in the number of self-employed, a stable number of closely held firms and a substantial increase in the number of widely held firms.

Figure 1. Number of wage earners and self-employed 1993–2003, number of widely held and closely held firms 1995–2005



Sources: Labour force survey, Income statistics for limited companies

The data on which this study is mainly based are from the Income Statistics on Persons and Families, see Statistics Norway (2006a). These statistics hold register-based information on the whole population, based primarily on income tax returns filed with the Directorate of Taxes' Register of Personal Tax-Payers. Other sources provide many of the demographic variables. Thus, as these data

cover the whole population, they are rich in information. 1993 was chosen as the first year of the analysis because that was when the register itself was established.

In terms of scope we restrict the analysis to individuals with a connection to the workforce; pensioners and students are therefore excluded. We did this by excluding all except prime aged individuals, i.e., persons aged 25–55 in the period 1993–2003, earning a wage or business income in excess of the Basic Pension Unit of the National Insurance Scheme in every year of the period. In 1993 the Basic Pension Unit was NOK 37,033 (USD 5,230), rising to NOK 55,964 (USD 7,900) in 2003. After these constraints, we were left with a sample of approximately 900,000 individuals, wage earners and self-employed. As data come from public records, the present analysis does not suffer from attrition problems, as frequently reported in other panel data analyses.

Farmers and fishermen are usually defined as self-employed.⁵ However, as Norwegian primary industries are heavily subsidized and regulated, we excluded these groups from the sample. Nor are they included in the categories “owners of small businesses” or “wage earners”.

As already noted, there are three categories of small business owner: self-employed; owners of closely held corporations under the split-model; and owners of widely held corporations. The self-employed are identified by reporting business income from self-employment (positive or negative). Owners of closely held corporations are recognized in that they report imputed labor income under the split model in combination with reporting wage income.⁶ The main problem, when addressing this issue empirically, is that it has previously been impossible to identify owners of small firms who run their business as a widely held firm. Income tax return data let us observe individuals who combine wage earning status with status as a recipient of dividends, but so far we have been unable to ascertain whether the wages and dividends come from the same firm. Obviously, this is essential for identifying owners of small businesses. However, the new Register of Shareholders has changed all this. By combining information from the Register of Shareholders and wage information from the End of the Year Certificate Register, which tells us which firm is paying the individual’s wages, it is **now** possible to find wage earners who are simultaneously employees and major shareholders of the same firm. However, 2004 was the first year for which the Register of Shareholders issued data, so we rely on data from 2004 to establish end-of-period status only. As we have a longitudinal perspective in this analysis, we need to make assumptions about status in previous years. We do this as follows. We let information on status in 2004 determine status in 2003. If subjects, according to the data, were likely wage earners before 2003, we assume it holds true for the preceding years. If they are identified as self-employed or owners of a closely held corporation in preceding years, the business will likely have

⁵ See Parker (2004) for more details on different definitions of firms.

changed organizational classification in the period. By placing further constraints on the size of the firm and degree of ownership or control, we can begin to identify small business owners who run their businesses as widely held firms.⁷

Thus, in discussing the relationship between income mobility and small business ownership, the study deploys two definitions of the latter. The first is a narrow definition which includes the self-employed and owners of closely held firms. The second is a wider definition which in addition to the categories just mentioned covers some owners of widely held firms. Table 1 presents the number of observations used in the present study, categorized into wage earners and the two definitions of small business owner. The wide definition gives us the figures for wage earners, as it places a number of “wage earners” in widely held firms in the business owner category. It shows that the wide definition increases the number of business owners substantially. As the years progress, the number of wage earners decreases and the number of owners of small businesses grows. However, behind this overall picture, individuals are switching occupations; an issue to which we return in Section 3.

Table 1. Number of observations, 1993–2003

	Wage earners (derived by the wide def. of small businesses)	Owners of small businesses, narrow definition	Owners of small businesses, wide definition
1993	769,088	102,178	128,428
1994	767,575	103,601	129,941
1995	765,279	106,604	132,237
1996	765,935	105,246	131,581
1997	765,951	105,456	131,565
1998	764,122	106,603	133,394
1999	764,437	105,892	133,079
2000	763,222	107,104	134,294
2001	762,137	108,736	135,379
2002	762,869	107,911	134,647
2003	764,341	106,196	133,175

3.2 Income inequality among business owners and wage earners: individual versus household data

In most countries, income inequality is higher among the self-employed than among wage earners (Parker, 2004), and even though we focus on a broader group of business owners, we expect this to

⁶ Some owners of closely held firms will not be identified as their income is too small to generate positive imputed labor income under the split model.

⁷ This method also implies that some owners of closely held firms will be correctly categorized as business owners, i.e. those who do not report imputed labor income under the split model. They are few compared to the business owners involved in organizational shifts.

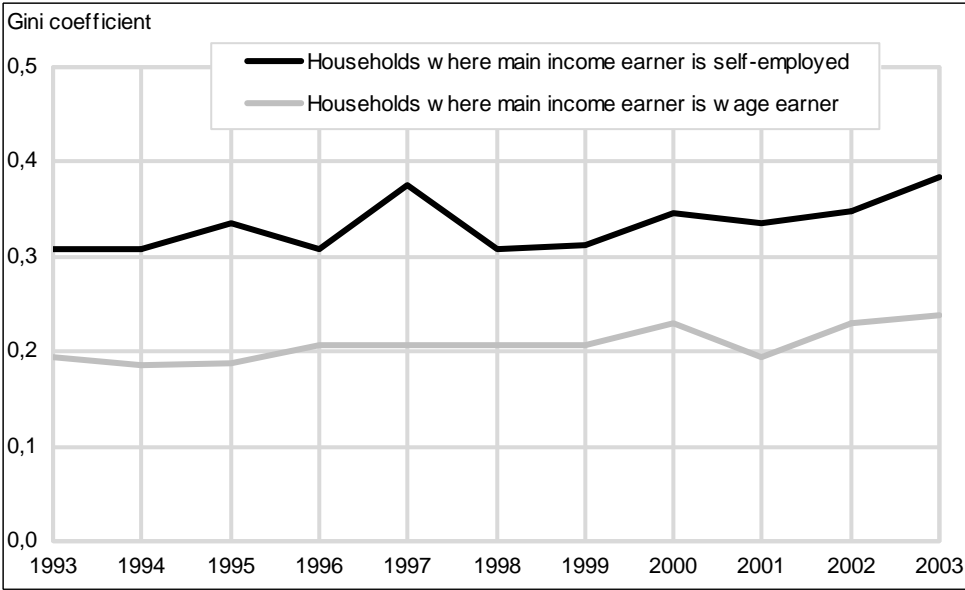
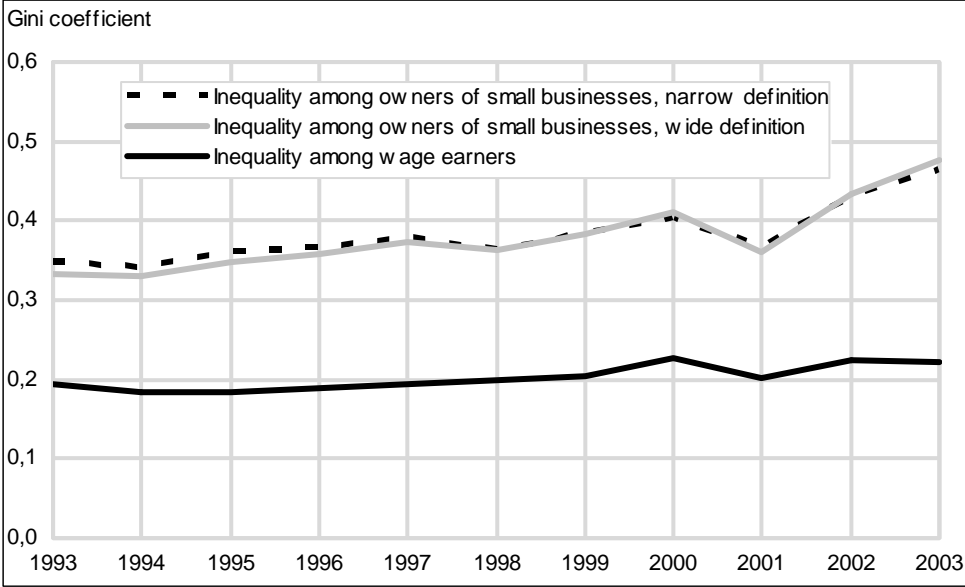
hold true in the present case as well. Moreover, as income mobility can be studied at the individual and household level, we ask how far the results obtained from the use of the individual data replicate results based on household data.

There is little theoretical guidance with regard to explaining the forces underlying the wider income inequality found among the self-employed (Parker, 2004). It is generally accepted that incomes from business ownership are more uncertain than wages, but causal links between these factors and income inequality are hard to establish.

Figure 2 contains two panels; the upper panel shows changes in income inequality for business owners and wage earners based on individual income, and the lower panel for wage earners and self-employed based on household category. The household data are taken into account by aggregating income over all household members, dividing the sum by an equivalence scale to allow for economies of scale,⁸ and letting each household be represented with as many persons as there are household members. The allocation of households between income earners and self-employed is based on the status of the main income earner. The results presented on Figure 2 are reassuring with regard to both of the questions posed by the study. First, they confirm higher inequality among business owners than among wage earners, both at the individual and household level. Second, we see that the individual data basically describe the period 1993–2003 in the same manner as when the household is used as the unit of analysis. We also see (upper panel) that using the narrow or the wider definition of owners of businesses does have effect on year-specific inequality measures. The wider definition gives more income inequality by the end of the period, which we expected, given Thoresen and Alstadsæter's (2008) finding that business owners shift organizational form to reduce the tax burden and increase post-tax income.

⁸ The equivalence scale is defined as the square root of the number of household members, children included.

Figure 2. Inequality of wage earners and self-employed 1993–2003, individual data and household data



3.3 The link between business ownership and mobility. Evidence from the transition matrices

A transition matrix forms the natural starting point for studies of income mobility. In this section mobility evidence from transition matrices will be discussed, whereas the next section will look at the relationship between occupations (on varying definitions) and income mobility in terms of a dynamic process.

However, let us first see how the owners of small businesses distribute on different quintiles in the period under consideration. Table 2 describes the location of wage earners and the owners of small businesses on the distribution scale of post-tax incomes on the two definitions of small business owner. Table 2 shows the distribution of wage earners and business owners in the overall distributions of post-tax income, but where percentage shares for each occupation group sum to 100. The results of Table 2 reflect the wider dispersion of incomes among business owners. Whereas wage earners are more or less equally distributed on quintiles, owners of small businesses are much more likely to be found in quintiles 1 and 5. For instance, 25 percent of all owners of small businesses were in quintile 1 in 1993, according to the wide definition. It is also important to note how the wide definition increases the share of owners ending up in quintile 5, especially at the end of the period, which is in accordance with expectations. However, the difference is small.

Table 2. Distributions of wage earners and owners of small businesses, according to two definitions. Distributions on quintiles for each group, 1993-2003

Year	Wage earners					Owners of small businesses, narrow definition					Owners of small businesses, wide definition				
	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
-93	19.1	21.0	21.2	20.7	18.0	28.6	13.8	12.1	14.5	31.0	25.1	13.8	13.1	15.8	32.1
-94	19.1	21.1	21.2	20.7	17.9	29.2	13.2	11.9	14.5	31.2	25.6	13.3	12.8	15.8	32.6
-95	18.9	21.2	21.3	20.7	17.8	30.2	12.9	11.6	14.5	30.8	26.5	12.9	12.3	15.7	32.6
-96	18.9	21.2	21.3	20.7	17.9	30.3	13.2	12.0	14.5	30.0	26.3	13.0	12.6	15.8	32.4
-97	18.9	21.2	21.3	20.7	17.9	30.3	13.5	12.0	14.8	29.5	26.2	13.1	12.5	15.9	32.3
-98	19.1	21.3	21.3	20.6	17.8	28.9	13.2	12.4	15.6	30.0	25.1	12.7	12.8	16.7	32.8
-99	19.0	21.3	21.3	20.6	17.9	29.9	12.9	12.3	15.6	29.3	25.9	12.5	12.7	16.6	32.3
-00	19.3	21.4	21.3	20.5	17.6	27.9	12.5	12.6	16.3	30.7	24.2	12.1	12.8	17.1	33.8
-01	19.1	21.4	21.3	20.5	17.7	28.1	12.5	12.4	16.1	30.8	24.9	12.3	12.8	17.2	32.8
-02	19.3	21.4	21.2	20.5	17.5	27.0	12.6	12.7	16.3	31.5	23.8	12.3	12.9	16.9	34.0
-03	18.6	21.4	21.4	20.8	17.8	32.1	12.2	11.9	14.3	29.5	27.9	11.9	12.1	15.1	32.9

Another way of addressing the distribution of small business owners across quintiles is to calculate the proportion of owners in different quintiles. This is done in Table 3, where we compare the narrow and the wider definitions. In contrast to Table 2, the figures in Table 2 reflect the size of the business owner sector relative to the wage earner sector across quintiles. For instance, in 1993, in the lowest quintile of the income hierarchy, 16.3 percent were owners of small businesses, whereas the corresponding estimate for the 20 percent richest was 17.6 percent.

Table 3. Percentage share of owners of small businesses in quintiles (according to two definitions), 1993-2003

Year	Owners of small businesses, narrow definition					Owners of small businesses, wide definition				
	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
-93	16.3	7.9	6.9	8.3	17.6	18.0	9.9	9.4	11.3	23.0
-94	16.9	7.6	6.9	8.4	18.0	18.5	9.6	9.2	11.4	23.6
-95	18.0	7.7	6.9	8.6	18.3	19.5	9.5	9.1	11.5	24.0
-96	17.8	7.7	7.0	8.5	17.6	19.3	9.5	9.2	11.5	23.8
-97	17.8	7.9	7.0	8.7	17.4	19.2	9.6	9.1	11.7	23.7
-98	17.1	7.8	7.4	9.2	17.8	18.6	9.5	9.5	12.4	24.3
-99	17.7	7.6	7.3	9.2	17.3	19.2	9.3	9.4	12.3	24.0
-00	16.6	7.5	7.5	9.7	18.3	18.1	9.1	9.6	12.8	25.3
-01	17.0	7.6	7.5	9.8	18.7	18.7	9.3	9.7	13.0	24.8
-02	16.2	7.5	7.6	9.8	18.9	17.9	9.2	9.7	12.7	25.5
-03	19.0	7.2	7.0	8.5	17.4	20.7	9.0	9.0	11.2	24.4

Turning to mobility tables, we can identify how the same individuals move from one point in time to the next, the main hypotheses being that business ownership covaries with upward movements along the income distribution hierarchy and secures positions at the high end of the scale. In this perspective, the income gains from business ownership may follow from different combinations of connections to business ownership over time: e.g., individuals are business owners for the whole period, or they shift from wage earner to business owner, or, not at least given the issue raised in this paper, they may be involved in organizational shifts as a business owner.

The timeframe of the analysis is important. For instance, it is well known that mobility patterns depend on the length of the transition period (Atkinson et al., 1992; Holtz-Eakin et al., 2000). The period is important both with respect to the measurement of income, occupational categorization and measurement of shift. Here the main focus is on year-on-year transitions, but we also give the results for income measures based on aggregations for several calendar years. Moreover, as mobility patterns may change during the period to which the data refer (1993–2003), separate estimates for transitions early and late in the period will be presented. However, the main focus here is on mobility according to the two definitions of business owner, the narrow and the wide definition.

Table 4. Percentage of owners of small firms for combinations of period $t-1$ and period t quintiles. Yearly transitions, 1993–1994, 1997–1998, and 2002–2003 for two definitions of business owners.

Transitions 1993–1994, owners of small businesses in both periods													
Narrow def.: self-employed, owners of closely held firms (87,666 obs)							Wide def.: self-employed, owners of closely held and widely held firms (116,417 obs)						
From quintile	To quintile					Total	From quintile	To quintile					Total
	1	2	3	4	5			1	2	3	4	5	
1	21.6	3.6	1.6	1.0	1.0	28.8	1	18.0	3.3	1.4	1.0	0.9	24.6
2	4.7	4.5	2.5	1.4	0.9	14.0	2	4.1	5.0	2.6	1.4	0.8	13.9
3	1.7	2.6	3.5	2.6	1.5	11.9	3	1.5	2.8	4.5	2.9	1.4	13.0
4	1.0	1.5	2.8	5.1	3.9	14.3	4	0.9	1.4	3.0	6.5	4.1	15.8
5	0.8	0.8	1.3	4.0	24.2	31.1	5	0.7	0.7	1.2	4.0	26.1	32.7
Total	29.8	13.0	11.6	14.2	31.4	100.0	Total	25.3	13.1	12.7	15.7	33.2	100.0

Transitions 1997–1998, owners of small businesses in both periods													
Narrow def.: self-employed, owners of closely held firms (89,754 obs)							Wide def.: self-employed, owners of closely held and widely held firms (118,996 obs)						
From quintile	To quintile					Total	From quintile	To quintile					Total
	1	2	3	4	5			1	2	3	4	5	
1	22.9	4.3	2.0	1.3	0.9	31.4	1	18.8	3.7	1.7	1.1	0.8	24.6
2	3.7	4.4	2.7	1.8	0.9	13.5	2	3.3	4.6	2.7	1.6	0.8	13.9
3	1.5	2.5	3.6	2.9	1.3	11.7	3	1.3	2.4	4.2	3.1	1.3	13.0
4	0.9	1.3	2.6	5.7	4.0	14.4	4	0.8	1.2	2.8	6.8	4.3	15.8
5	0.9	0.7	1.1	3.5	22.8	29.0	5	0.9	0.7	1.2	3.9	26.2	32.7
Total	29.9	13.1	12.0	15.1	29.9	100.0	Total	25.1	12.6	12.5	16.4	33.4	100.0

Transitions 2002–2003, owners of small businesses in both periods													
Narrow def.: self-employed, owners of closely held firms (90,957 obs)							Wide def.: self-employed, owners of closely held and widely held firms (121,041 obs)						
From quintile	To quintile					Total	From quintile	To quintile					Total
	1	2	3	4	5			1	2	3	4	5	
1	22.0	2.9	1.3	0.7	1.0	27.8	1	18.1	2.6	1.2	0.7	1.1	23.7
2	5.2	3.6	2.0	1.0	0.6	12.4	2	4.4	3.8	2.1	1.0	0.7	12.1
3	3.1	2.5	3.5	2.2	1.0	12.4	3	2.6	2.4	3.9	2.4	1.3	12.6
4	2.1	2.0	3.0	5.7	3.1	15.9	4	1.8	1.8	3.0	6.3	3.8	16.7
5	1.5	1.1	1.6	4.1	23.2	31.5	5	1.4	1.0	1.6	4.3	26.5	34.9
Total	33.8	12.1	11.5	13.7	28.9	100.0	Total	28.3	11.7	11.8	14.8	33.4	100.0

Let us first address information on yearly transitions for owners of small business in period $t-1$ and period t . Table 4 presents mobility tables, based on quintiles, for three periods, 1993–1994, 1997–1998, and 2002–2003, and for the two definitions. Results are presented in terms of (unconditional) percentages in each cell, showing the percentage of owners of small businesses combining being in quintile r in period $t-1$ and quintile s in period t . For instance, Table 4 shows that of all the owners of small businesses, according to the narrow definition, 21.6 of them were in quintile 1 both at time $t-1$ and at time t .

Upward mobility will be reflected by a larger percentage in higher quintiles in period t , compared to period $t-1$, see Table 4. We also expect the wider definition to show higher upward mobility than the narrow definition, probably towards the end of the period, i.e., 1997–1998 and 2002–2003 compared to 1993–94.

Table 4 does not indicate substantial upward mobility of owners of small businesses. The share of owners of small firms in quintile 5 in year $t-1$ is little different from the share in year t ; compare column totals and row totals for quintile 5. As expected, the wider definition results in better performance for owners of small businesses, but we do not observe increased upwards movement in the period. In fact, there were fewer owners in quintile 5 in 2003 than in 2002. If we extend the income measurement period, i.e., transitions when rankings (in both $t-1$ and t) are determined by aggregate post-tax income for several years (aggregate incomes for period 1993–1998 and period 1998–2003), the pattern (not shown) is basically the same as seen in Table 4. Similar results are also seen for a longer transition period, e.g., comparing transitions between 1993 ($t-1$) and 2003 (t).

Such tables can straightforwardly be turned into indices of overall mobility. Let us therefore first consider what estimates of indices of mobility say about overall mobility of business owners and wage earners. Table 5 presents estimates of overall mobility over the three periods for the three subgroups, for two measures of income mobility. The two mobility measures are defined in terms of conditional transition probabilities, p_{jk} , the probability that an individual moves to class k given that he/she was initially in class j . The mapping of the probabilities into indices of mobility follows suggestions by Prais (1955)/Shorrocks (1978) (PS) and Bartholomew (1982) (B), seen as

$$(1) \quad PS = \frac{m - \sum_{j=1}^m p_{jj}}{m-1}$$

and

$$(2) \quad B = \frac{1}{m-1} \sum_{j=1}^m \sum_{k=1}^m \pi_j p_{jk} |j-k|,$$

respectively, where m is the number of income classes and π_j is the initial income distribution. PS measures the average probability across all income classes that a person leaves the initial class in the succeeding period, whereas B measures the average number of income classes crossed by all individuals; see e.g., Formby et al. (2004) for more details.

The results of Table 5 confirm the substantially higher income mobility of small business owners than wage earners. Both measures of income mobility show this across all three time periods.⁹

Table 4. Income mobility of wage earners and owners of small businesses, 1993–1994, 1997–1998, and 2002–2003

Period	Mobility indices	Occupational status		
		Wage earner	Owners of small businesses, narrow definition	Owners of small businesses, wide definition
1993-94	<i>PS</i>	0.423	0.538	0.516
	<i>B</i>	0.415	0.556	0.536
1997-98	<i>PS</i>	0.408	0.534	0.516
	<i>B</i>	0.390	0.554	0.537
2002-03	<i>PS</i>	0.369	0.558	0.553
	<i>B</i>	0.357	0.594	0.587

Improvements in the relative positions of owners of small firms may also be reflected by this occupational group's overrepresentation at the high end of the income distribution: firm owners are immobile at the top of the income distribution. To test this hypothesis, we compared results from Table 4 to similar mobility tables for wage earners. The result for wage earners is presented in Table 6. The relevant comparison is the probability of staying in quintile 5 (quintile 5 both at $t-1$ and at t) over the probability of being in quintile 5 in period $t-1$ for owners of small businesses (Table 4) and wage earners (Table 6). Both tables generate probabilities for staying in quintile 5 around 0.8. In other words, staying rich does not appear to be affected by business ownership, according to the mobility tables.

⁹ There are probably effects from ageing in the panel, which may account for some of the reduction in mobility for wage earners.

Table 6. Percentage of wage earners for combinations of period $t-1$ and period t quintiles. Yearly transitions, 1993–1994 and 2002–2003.

Wage earner mobility, 1993–1994 (755,564 obs)							Wage earner mobility, 2002–2003 (750,735 obs)						
From quintile	To quintile					Total	From quintile	To quintile					Total
	1	2	3	4	5			1	2	3	4	5	
1	14.1	3.2	1.0	0.5	0.2	19.0	1	14.9	3.5	0.5	0.2	0.2	19.2
2	3.8	12.7	3.5	0.8	0.2	21.1	2	2.6	14.1	4.1	0.6	0.1	21.5
3	0.6	4.4	12.2	3.6	0.4	21.3	3	0.5	3.2	13.3	4.0	0.3	21.3
4	0.3	0.7	4.2	13.1	2.6	20.8	4	0.3	0.6	3.3	13.9	2.5	20.6
5	0.1	0.1	0.3	2.9	14.3	17.9	5	0.2	0.2	0.3	2.2	14.5	17.4
Total	18.9	21.2	21.3	20.8	17.8	100.0	Total	18.4	21.5	21.5	20.9	17.7	100.0

The mobility matrices presented in Table 4 and Table 6 are based on individuals whose occupational status remains unchanged throughout the period. It is interesting to see to whether occupational shifts do in fact covary with upward movements. In Table 7 mobility matrices for two types of change from period t to period $t-1$ are presented: shift from wage earner to small business owner and from self-employment or closely held firm to owner of widely held firm. The latter shift captures the effect of changing the organizational form of the business, whereas the former captures the more traditional effect of leaving employment to run a business. Ideally, one should also explore the shift from being a (real) wage earner to running a business through a widely held firm. However, our data are not perfect, and we base our identification of owners of widely held firms on information from the end of the period; categorizations in preceding years are based on imputations (see Section 3.1).

The mobility matrices of Table 7 indicate a benefit from shifting occupation from wage earner to small business owner in terms of position in the income hierarchy; see the left hand side of the table. The proportion of “shifters” in quintile 5 at time t , for instance, is larger than the proportion in quintile 5 in period $t-1$ for all three transitions presented in Table 7.

With respect to the organizational shift of owners of small businesses (from self-employment and closely held firm to widely held firm), these individuals, crucially, are overrepresented in quintile 5 both before and after the organizational shift (see the right hand side of Table 6), and income positions are less influenced by the transition; if anything, we can observe a small decrease in proportions in quintile 5 (especially for the 1998–1999 transitions).

Table 7. Shifts from wage earner to owner of small business and shift from self-employment and closely held firm to widely held firm. Percentage of “shifters” for combinations of period $t-1$ and period t quintiles. Yearly transitions, 1993–1994, 1997–1998, and 2002–2003.

Transitions 1993–1994													
From wage earner to owner of small business (13,524 obs)							From self-employment and closely held firm to widely held firm (2,501 obs)						
From quintile	To quintile					Total	From quintile	To quintile					Total
	1	2	3	4	5			1	2	3	4	5	
1	19.5	4.6	2.1	1.7	1.7	29.5	1	6.9	2.8	1.2	1.1	1.6	13.6
2	4.9	5.5	3.2	2.0	1.4	17.1	2	1.8	3.8	1.8	1.7	0.6	9.7
3	2.1	2.8	4.9	3.4	1.7	14.8	3	1.1	2.8	4.2	3.2	1.6	12.8
4	0.9	1.3	2.6	6.5	4.4	15.7	4	0.8	1.0	2.7	7.3	5.2	17.0
5	0.7	0.5	0.9	2.8	18.0	22.9	5	1.3	1.2	2.2	4.8	37.4	46.9
Total	28.1	14.7	13.7	16.4	27.2	100.0	Total	11.8	11.6	12.2	18.0	46.5	100.0

Transitions 1998–1999													
From wage earner to owner of small business (14,398 obs)							From self-employment and closely held firm to widely held firm (3,133 obs)						
From quintile	To quintile					Total	From quintile	To quintile					Total
	1	2	3	4	5			1	2	3	4	5	
1	17.4	4.2	2.3	1.3	1.1	26.2	1	4.6	1.7	1.1	1.2	1.1	9.6
2	4.1	5.6	3.3	2.0	1.1	16.1	2	1.6	2.8	1.9	1.3	0.9	8.5
3	1.8	2.4	5.6	4.0	1.5	15.3	3	1.2	1.9	2.8	2.6	1.6	10.1
4	1.0	1.1	3.1	8.4	4.5	18.1	4	0.8	1.3	2.4	7.0	5.3	16.8
5	0.9	0.4	0.8	2.8	19.4	24.3	5	2.7	1.5	2.8	7.1	40.9	55.0
Total	25.2	13.7	15.2	18.5	27.5	100.0	Total	10.9	9.2	11.1	19.2	49.7	100.0

Transitions 2002–2003													
From wage earner to owner of small business (12,134 obs)							From self-employment and closely held firm to widely held firm (3,348 obs)						
From quintile	To quintile					Total	From quintile	To quintile					Total
	1	2	3	4	5			1	2	3	4	5	
1	15.9	3.9	1.9	1.3	1.3	24.3	1	6.2	2.3	1.1	1.2	2.1	12.9
2	4.0	5.2	3.5	1.8	0.9	15.4	2	1.8	3.3	2.2	1.0	1.3	9.5
3	1.9	2.6	6.0	4.5	1.6	16.6	3	1.4	1.6	3.3	2.3	2.1	10.7
4	1.6	1.5	2.7	8.0	4.8	18.5	4	1.1	1.3	2.5	5.4	5.2	15.5
5	1.2	0.6	0.9	3.0	19.5	25.2	5	2.5	1.5	2.6	6.7	38.1	51.4
Total	24.6	13.8	15.0	18.6	28.0	100.0	Total	13.1	9.9	11.7	16.6	48.7	100.0

This latter result does not coincide with Thoresen and Alstadsæter’s (2008), referred to earlier, who found that business owners benefitted from organizational moves. Therefore, in order to assess the effect of employing income measures for longer time periods, which would align the present approach with that followed by Thoresen and Alstadsæter (2008), incomes are aggregated over five-year periods (letting occupation of the last year of each period define occupational categories).¹⁰ As shown in Table 8, organizational shifts now go together with upward movement in income rankings for five-year income measures. There may be various explanations for the dependency on the timeframe. The five-year specification, compared to the calendar year approach, captures lagged effects of organizational shifts. “Smoothing” of incomes over time may also affect business owners and wage earners differently, given the wider income variation among the former group (as seen in Table 3). Five-year aggregations may therefore moderate the effect of one or two less profitable years. We return to this periodization issue in the next section.

Table 8. Shifts from wage earner to owner of small business and shift from self-employment and closely held firm to widely held firm. Percentage of “shifters” for combinations of period $t-1$ and period t quintiles. Transitions between five-year periods, 1993–1998 and 1998–2003.

From wage earner to owner of small business (29,468 obs)							From self-employment and closely held firm to widely held firm (5,878 obs)						
From quintile	To quintile					Total	From quintile	To quintile					Total
	1	2	3	4	5			1	2	3	4	5	
1	13.9	3.4	1.5	0.7	0.6	20.1	1	6.6	2.8	1.9	1.2	1.8	14.3
2	5.2	5.9	3.7	1.5	0.6	16.9	2	1.5	3.1	2.3	1.9	1.8	10.5
3	2.4	4.0	5.9	4.5	1.3	18.1	3	0.6	1.4	3.1	3.1	2.7	11.0
4	1.1	2.0	4.2	8.5	4.3	20.2	4	0.4	1.0	2.4	5.7	6.3	15.7
5	0.3	0.6	1.0	4.0	18.9	24.8	5	0.3	0.6	1.3	5.5	40.7	48.4
Total	22.8	15.9	16.3	19.2	25.7	100.0	Total	9.3	9.0	11.0	17.4	53.3	100.0

4. Further description of the correlation between business ownership and income movements

4.1 Specification of a transition equation

The relationship between business ownership and position in the income hierarchy is further explored by a multivariate approach. The main advantage of a multivariate approach is that other observed

¹⁰ The empirical approach in Thoresen and Alstadsæter (2008) is also based on aggregated incomes, but not the same aggregation as used here.

influences can be controlled for when establishing a relationship between business ownership and income movement. Moreover, the panel data that are available for this study are not only useful as information on the movement of the same individuals over time, they help us address the effect of unobserved factors. In the following we estimate conditional equations, dependent on statuses in period $t-1$ and t , to assess the correlation between small business ownership, upward income mobility and high income persistence, when other observable and unobservable effects are addressed.

Before presenting the multivariate approach, we should note the emphasis here on non-causal interpretation of results. Owners of small businesses obviously self-select into the group, so that interpreting the results in terms of causal effects require methods that control for group allocation mechanisms. The main objective of the present study is to describe the achievements of owners of small businesses during a period with a dual income tax system in place, and not for a randomly selected person choosing business ownership. This is in accordance with assumptions implicitly or explicitly made by other studies closely related to the present study; see the review of literature in Section 2.

We address multivariate evidence through estimations of transition rates, which is a logical extension of the mobility matrices approach seen in the previous section. In the following, the approach is presented with reference to the relationship between business ownership and upward movement, but the same type of approach may be used for the analysis of high-income persistence.

The latent probability for individual i belonging to state “non-rich” at time $t-1$, y_{it-1}^* , can be seen as depending on a vector of explanatory variables, x_{it-1} , and individual effect α_i , and an error term, τ_{it-1} ,

$$(3) \quad y_{it-1}^* = x_{it-1}'\beta + \alpha_i + \tau_{it-1}.$$

The observed outcome, y_{it-1} , can be seen as taking values 0 or 1 dependent on the latent probability of being non-rich, as defined by a cut-off point, λ . Let us reserve 1 for being rich. Then we have

$$y_{it} = \begin{cases} 1 & \text{if } y_{it}^* \geq \lambda_{it} \\ 0 & \text{else} \end{cases}$$

Assuming that $\tau_{it-1} : N(0, \sigma_u^2)$, such a model can be estimated as

$$(4) \quad P[y_{it-1} = 0] = \Phi(-x_{it-1}'\beta - \alpha_i),$$

where Φ is the standard normal cumulative distribution function. Similarly, we can also see the placement in period t for individuals who are non-rich in period $t-1$ as following from the same type of modeling:

$$(5) \quad y_{it}^* = z_{it}'\gamma + \alpha_i + \xi_{it},$$

where z_{it}' is a vector of explanatory variables explaining outcome in t , given that the individual is non-rich at $t-1$, and ξ_{it} is an normally distributed error term. This leads to a joint probability for observing both being rich in period t and being non-rich in period $t-1$:

$$(6) \quad P[y_{it} = 1, y_{it-1} = 0] = \Phi_2(z_{it-1}'\gamma + \alpha_i, -x_{it-1}'\beta - \alpha_i),$$

where Φ_2 is the cumulative distribution function of the bivariate standard normal. Unobserved heterogeneity in equations (3) and (4) is represented by individual specific time invariant effects, α_i , plus error terms, τ_{it-1} and ξ_{it} in the two equations, respectively. Letting $u_{it-1} = \alpha_i + \tau_{it-1}$ and $\varepsilon_{it} = \alpha_i + \xi_{it}$, the approach taken in this study, i.e., focusing on non-causal results, means that the relationship between error terms, (τ_{it-1}, ξ_{it}) , is not explicitly addressed. Obviously, unobservables determining the base year probability to be non-rich are correlated with the unobservables determining the conditional transfer into being rich in period t . This is a version of the initial condition problem of dynamic discrete choice models, see Heckman (1981). However, endogeneity problems in this analysis are also due to the key explanatory variable, business ownership, being clearly endogenous with the income hierarchy placement in period $t-1$ and with the placement in period t . Thus, given these measurement problems, we interpret results in terms of non-causal relationships, focusing on correlations between income hierarchy movements and business ownership. If we neglect the dependency between error terms, the conditional probability can be seen as,

$$(7) \quad P[y_{it} = 1 | y_{it-1} = 0] = \frac{\Phi_2(-x_{it-1}'\beta - \alpha_i, z_{it}'\gamma + \alpha_i)}{\Phi(-x_{it-1}'\beta - \alpha_i)} = \Phi(z_{it}'\gamma + \alpha_i).$$

Equation (7) defines the probability of being rich in at t , conditional on being non-rich at $t-1$, as related to a number of explanatory variables, including being an owner of a small business. With information from 10 waves of transitions, $\{1993/94, 1994/95, \dots, 2002/2003\}$, we estimate an average correlation between business ownership and transitions into “rich” for the period 1993–2003, when the dual income tax system was in force. A similar type of reasoning generates a corresponding equation for the probability of staying rich, given that the individual was rich in period $t-1$. We use an identical set

of explanatory variables for the two equations (identical z -vectors). Estimations of conditional probabilities or transition rates have, for example, recently been seen in the literature focusing on the low end of the income distribution, explaining low pay dynamics, low income dynamics and poverty dynamics; see for instance Stewart and Swaffield (1999) and Cappellari and Jenkins (2002; 2004).

As seen in Equation (7), the empirical approach allows us to take an individual specific time invariant effect into account when describing the transitions, represented by α_i . We will treat this as a random effect and estimate equation (7) by the random effects probit model. This means, see e.g., Wooldridge (2002), there is no correlation between observed explanatory variables and the individual effect, $E(\alpha_i | z_i) = 0$, where $z_i \equiv (z_{i1993}, z_{i1994}, \dots, z_{i2003})$. However, note how the estimation of Equation (7) in effect turns the panel into an unbalanced panel, which implies that random effects estimations are only carried out for individuals observed more than one time. This selection may be non-innocent, and is the main reason for also referring to pooled probit estimates (in the Appendix).

4.2 Descriptive statistics

Table 9 presents descriptive statistics for the two estimated equations: one for becoming rich and one for staying rich. All figures are averages across the 10 waves that we have information for: $\{1993/94, 1994/95, \dots, 2002/2003\}$. Estimations are carried out both for quintile and decile specifications.

There is a large degree of permanence at the high end on the income distribution; on average approximately 80 percent of the people at the upper quintile at year t were there in year $t-1$, whereas as the corresponding figure for the decile specification is 76 percent, see the “Stay rich” columns. Correspondingly, people do not move as frequently into the upper quintile and upper decile, see the “Upward mobility” columns, only 4.9 percent and 2.6 percent on average.

Table 9. Descriptive statistics for variables used to describe relationships to upward mobility and staying rich, quintile and decile specifications. Average measures for 10 yearly waves, standard deviations in parentheses

	Upward mobility: non-rich at time $t-1$		Stay rich: rich at time $t-1$	
	Quintile specification (quintiles 1-4)	Decile specification (deciles 1-9)	Quintile specification (quintile 5)	Decile specification (decile 10)
Move into high end	0.049 (0.216)	0.026 (0.160)	-	-
Stay at high end	-	-	0.804 (0.397)	0.764 (0.425)
Ownership small business, narrow def.	0.104 (0.305)	0.107 (0.309)	0.177 (0.382)	0.226 (0.418)
Ownership small business, wide def.	0.119 (0.324)	0.124 (0.329)	0.222 (0.415)	0.284 (0.451)
Age	40.4 (6.8)	40.5 (6.7)	41.2 (6.0)	41.8 (5.8)
Male	0.51 (0.50)	0.54 (0.50)	0.79 (0.41)	0.84 (0.36)
Married	0.60 (0.49)	0.60 (0.49)	0.66 (0.47)	0.71 (0.46)
Dummy for children	0.72 (0.45)	0.73 (0.44)	0.80 (0.40)	0.81 (0.39)
Urban areas	0.32 (0.47)	0.33 (0.47)	0.46 (0.50)	0.50 (0.50)
Not born W-Europe, N-Amer., Oceania	0.02 (0.14)	0.02 (0.14)	0.01 (0.12)	0.01 (0.12)
Length of education	11.5 (2.2)	11.7 (2.3)	13.0 (2.7)	13.3 (2.8)
Fields of education:				
General programs	0.12 (0.32)	0.12 (0.32)	0.08 (0.27)	0.08 (0.27)
Humanities and arts	0.14 (0.35)	0.14 (0.34)	0.10 (0.30)	0.09 (0.29)
Teacher training and pedagogy	0.05 (0.22)	0.05 (0.22)	0.03 (0.18)	0.03 (0.16)
Social sciences and law	0.04 (0.20)	0.04 (0.21)	0.04 (0.20)	0.04 (0.19)
Business and administration	0.18 (0.38)	0.18 (0.38)	0.20 (0.40)	0.22 (0.42)
Natural sciences	0.26 (0.44)	0.27 (0.45)	0.37 (0.48)	0.36 (0.48)
Health, welfare and sports	0.08 (0.28)	0.08 (0.27)	0.06 (0.23)	0.07 (0.25)
Primary industries	0.05 (0.23)	0.05 (0.22)	0.05 (0.21)	0.05 (0.22)
Transport and communication	0.03 (0.18)	0.03 (0.18)	0.04 (0.20)	0.04 (0.20)
Unspecified	0.04 (0.19)	0.04 (0.19)	0.02 (0.16)	0.02 (0.14)
Number of observations	7,180,154	8,077,658	1,795,006	897,502

4.3 Estimation results

4.3.1 Ownership of small businesses and upward mobility

Let us first address the effect of being an owner of a small business on upward mobility. As estimations are based on a random effect probit model and as the key explanatory variable is a dummy variable, we need to describe the procedures by which we identify the effects of the explanatory variables. In the tables we report marginal effects, calculated for predicted probabilities of positive outcomes.¹¹ The effect of the discrete variable representing business ownership or not is calculated for a discrete change from 0 to 1 in this dummy variable, holding the other covariates at their means. The estimations also involve time dummies, the coefficients of which are not reported.¹²

Table 10 shows results for two specifications of conditional probabilities or transitions rates: one based on quintiles, transition into the upper quintile (quintile 5) in year t if located in quintile 1-4 in year $t-1$, and one based on deciles, transition into decile 10 in year t if placed in deciles 1-9 in year $t-1$. Independent of specification, and as expected, there is a positive relationship between business ownership and income advancement; using the wider definition of business owners enhances this positive relationship. However, the effect of business ownership and of the wider definition are modest: being a business owner increases the probability for moving into quintile 5 by 3.3 percent on the narrow definition and 3.8 percent on the wide definition. The corresponding estimates for moving upward to decile 10 are 1.3 percent and 1.6 percent on the narrow and wide definition, respectively.

As noted when discussing the mobility tables of Section 3, we may expect to find a stronger relationship between business ownership and upward mobility later in the period 1993–2003. Indeed, estimations restricted to transitions in 2001, 2002 and 2003 do show somewhat stronger effects, 4.8 percent according to the quintile specification for the wide definition of business owners.

¹¹ The `xtprobit` routine of Stata is used.

¹² All tables report estimates for the proportion of the total variance contributed by the person level variance, ρ . When ρ is zero, a panel model, such as the random effects model, is not a significant improvement.

Table 10. Relationship between upward mobility and business ownership. Results for marginal effects based on random effects probit estimations of yearly transitions, for two definitions of owners of small businesses. Quintile and decile specifications, standard errors in parentheses

	Quintile specification		Decile specification	
	Owners of small businesses, narrow definition	Owners of small businesses, wide definition	Owners of small businesses, narrow definition	Owners of small businesses, wide definition
Ownership of small business	0.033 (3.4×10 ⁻⁴)	0.038 (3.4×10 ⁻⁴)	0.013 (1.6×10 ⁻⁴)	0.016 (1.7×10 ⁻⁴)
Age	-2.0×10 ⁻⁴ (1.0×10 ⁻⁵)	-2.0×10 ⁻⁴ (1.0×10 ⁻⁵)	3.7×10 ⁻⁵ (1.0×10 ⁻⁶)	3.7×10 ⁻⁵ (1.0×10 ⁻⁶)
Male	0.029 (1.7×10 ⁻⁴)	0.028 (1.7×10 ⁻⁴)	0.009 (7.0×10 ⁻⁵)	0.008 (7.0×10 ⁻⁵)
Married	-0.006 (1.2×10 ⁻⁴)	-0.006 (1.2×10 ⁻⁴)	-3.3×10 ⁻⁴ (4.0×10 ⁻⁵)	-3.8×10 ⁻⁴ (4.0×10 ⁻⁵)
Dummy for children	0.011 (1.0×10 ⁻⁴)	0.011 (1.0×10 ⁻⁴)	0.002 (3.0×10 ⁻⁵)	0.002 (3.0×10 ⁻⁵)
Urban areas	0.011 (1.5×10 ⁻⁴)	0.011 (1.5×10 ⁻⁴)	0.004 (5.0×10 ⁻⁵)	0.004 (5.0×10 ⁻⁵)
Not born W-Europe, N-Amer., Oceania	-0.006 (2.4×10 ⁻⁴)	-0.006 (2.4×10 ⁻⁴)	-0.002 (6.0×10 ⁻⁵)	-0.002 (6.0×10 ⁻⁵)
Length of education	0.005 (3.0×10 ⁻⁵)	0.005 (3.0×10 ⁻⁵)	0.001 (1.0×10 ⁻⁵)	0.001 (1.0×10 ⁻⁵)
Dummies for fields of education:				
General progr.	0.003 (3.3×10 ⁻⁴)	0.003 (3.3×10 ⁻⁴)	0.002 (1.3×10 ⁻⁴)	0.002 (1.3×10 ⁻⁴)
Humanities and arts	2.0×10 ⁻⁵ (2.8×10 ⁻⁴)	-3.9×10 ⁻⁵ (2.8×10 ⁻⁴)	3.6×10 ⁻⁴ (1.0×10 ⁻⁴)	3.2×10 ⁻⁴ (1.0×10 ⁻⁴)
Teacher training and pedagogy	-0.009 (1.7×10 ⁻⁴)	-0.009 (1.7×10 ⁻⁴)	-0.002 (5.0×10 ⁻⁵)	-0.002 (5.0×10 ⁻⁵)
Social sciences and law	-0.007 (1.9×10 ⁻⁴)	-0.007 (2.0×10 ⁻⁴)	-0.002 (6.0×10 ⁻⁵)	-0.002 (6.0×10 ⁻⁵)
Business and administration	0.006 (3.4×10 ⁻⁴)	0.005 (3.3×10 ⁻⁴)	0.003 (1.4×10 ⁻⁴)	0.003 (1.3×10 ⁻⁴)
Natural sciences	0.002 (2.8×10 ⁻⁴)	0.002 (2.8×10 ⁻⁴)	7.7×10 ⁻⁴ (1.0×10 ⁻⁴)	7.4×10 ⁻⁴ (1.0×10 ⁻⁴)
Health, welfare and sports	-0.003 (2.5×10 ⁻⁴)	-0.003 (2.5×10 ⁻⁴)	-1.5×10 ⁻⁴ (1.0×10 ⁻⁴)	-1.3×10 ⁻⁴ (1.0×10 ⁻⁴)
Primary industries	-0.002 (2.7×10 ⁻⁵)	-0.002 (2.7×10 ⁻⁵)	-1.0×10 ⁻⁴ (1.0×10 ⁻⁴)	-1.2×10 ⁻⁴ (1.0×10 ⁻⁴)
Transport and communication	0.002 (3.3×10 ⁻⁵)	0.002 (3.3×10 ⁻⁵)	7.5×10 ⁻⁴ (1.2×10 ⁻⁴)	7.4×10 ⁻⁴ (1.2×10 ⁻⁴)
Rho	0.453 (0.001)	0.446 (0.001)	0.449 (0.002)	0.463 (0.001)
LR-test of rho=0	Prob>=0.000	Prob>=0.000	Prob>=0.000	Prob>=0.000

Regarding the relationship to other variables, we see that being male, having children, living in an urban area, and length of education are positively correlated with upward mobility, whereas age, being married and birth outside Western Europe, North-America and Oceania are not. The dummy variables for field of education are defined in relation to the omitted reference category, an unspecified broad field of education. Note also that the likelihood ratio test of a non-significant random effect is clearly rejected; the random effects model is therefore preferable to alternatives without individual effects, such as pooled probit. However, as noted earlier, the random effects estimation involves non-trivial restrictions in the sample employed in the estimations, i.e. restricting to individuals represented in more than one wave. Results from pooled probit estimations are shown in Table A1 in the Appendix.

As we see, the parameter estimates for “male” are just below the parameter estimates for small business ownership. Another way of setting parameter estimates for business ownership into perspective is to compare them to a similar random effects estimation of downward mobility, i.e., using the same explanatory variables for transitions from quintiles 2-5 down to quintile 1. Such estimation generates (positive) parameter values for business ownership of approximately the same size as those featured in Table 10. The present analysis can therefore be said to confirm the uncertain character of income from business ownership, leading to overrepresentation of owners of small businesses at the low and high ends of the income distribution scale, see Table 2 and Table 3.

4.3.2 The relationship to staying rich

The next question concerns the extent to which involvement in business ownership increases the probability of staying at the high end of the income distribution scale. Table 11 shows results of random effects probit estimations based on conditional probabilities for staying in the upper quintile or in the upper decile in year t , given that the persons were in the same position in year $t-1$. As we see, the relationship is negative according to the quintile specification and positive only after restricting to rich in terms as defined by the decile specification. However, again the parameter estimates are small. The probability of staying rich is higher if the subject is male, married, has children, lives in an urban setting, was born in Western Europe, North America or Oceania, and is well educated. Most importantly, the wider definition of income strengthens the positive relationship for the decile specification and reduces the negative effect according to the quintile alternative.

As measures of upward mobility were compared to downward mobility in the previous section, it is illustrative to compare the estimates of Table 11 to similar estimates from “stay-poor” estimations. Such comparisons reveal that business ownership is positively related to staying at the low end of the income distribution, again confirming the symmetry of relationships to business ownership at both tails of the income distribution.

Table 11. Relationship between staying rich and business ownership. Results for marginal effects based on random effects probit estimations of yearly transitions, for two definitions of owners of small businesses. Quintile and decile specifications, standard errors in parentheses

	Quintile specification		Decile specification	
	Owners of small businesses, narrow definition	Owners of small businesses, wide definition	Owners of small businesses, narrow definition	Owners of small businesses, wide definition
Ownership of small business	-0.011 (0.001)	-0.004 (0.001)	0.011 (0.002)	0.016 (0.002)
Age	0.002 (1.0×10^{-4})	0.002 (1.0×10^{-4})	0.003 (1.6×10^{-4})	0.003 (1.6×10^{-4})
Male	0.150 (0.002)	0.150 (0.002)	0.173 (0.003)	0.172 (0.003)
Married	0.018 (0.001)	0.018 (0.001)	0.046 (0.002)	0.045 (0.002)
Dummy for children	0.072 (0.001)	0.072 (0.001)	0.071 (0.002)	0.071 (0.002)
Urban areas	0.077 (0.001)	0.077 (0.001)	0.080 (0.002)	0.081 (0.002)
Not born W-Europe, N-Amer., Oceania	-0.122 (0.005)	-0.122 (0.005)	-0.109 (0.008)	-0.109 (0.008)
Length of education	0.035 (2.3×10^{-4})	0.035 (2.3×10^{-4})	0.036 (3.7×10^{-4})	0.036 (3.7×10^{-4})
Dummies for fields of education:				
General progr.	0.057 (0.003)	0.057 (0.003)	0.078 (0.005)	0.078 (0.005)
Humanities and arts	0.048 (0.003)	0.048 (0.003)	0.068 (0.005)	0.068 (0.005)
Teacher training and pedagogy	-0.038 (0.004)	-0.038 (0.004)	-0.015 (0.006)	-0.016 (0.006)
Social sciences and law	-0.033 (0.004)	-0.034 (0.004)	0.018 (0.006)	0.018 (0.006)
Business and administration	0.072 (0.002)	0.072 (0.002)	0.101 (0.004)	0.101 (0.004)
Natural sciences	0.048 (0.003)	0.048 (0.003)	0.045 (0.005)	0.045 (0.005)
Health, welfare and sports	0.052 (0.003)	0.051 (0.003)	0.099 (0.004)	0.098 (0.004)
Primary industries	0.016 (0.003)	0.015 (0.003)	0.046 (0.005)	0.046 (0.005)
Transport and communication	0.021 (0.003)	0.020 (0.003)	0.024 (0.005)	0.024 (0.005)
Rho	0.405 (0.002)	0.446 (0.001)	0.416 (0.002)	0.416 (0.002)
LR-test of rho=0	Prob>=0.000	Prob>=0.000	Prob>=0.000	Prob>=0.000

4.3.2 Alternative categorizations of time periods

So far, it has been established that business ownership increases the likelihood of upward mobility and stability at the high end of the income distribution scale (the latter only established for the decile

specification, though). Moreover, employing a wider definition of business owners is found to enhance relationships.

Given indications of an effect of the time frame for measuring incomes on results, see Section 3.3 and Holtz-Eakin et al. (2000), estimations for alternative time period specifications may be illuminating. Table 12 shows the results of an estimation of transition models for a three period specification, transitions between 1993–1996 and 1997–1999 and between 1997–1999 and 2000–2003. Placements in the income hierarchies are based on aggregated post-tax incomes for these three time periods. With fewer transitions available, a pooled probit estimation is preferred, i.e., no random effects estimation. Thus, the relevant comparisons (in terms of estimates from yearly transitions) for the estimates of Table 12 are estimates presented in table A1 and A2 in the Appendix.

Echoing the results of Table 8, estimates presented in Table 12 show larger differences between correlations according to both the narrow and the wide definitions of business ownership. For instance, for upward mobility, being a business owner now increases the probability for moving into quintile 5 by 4.7 percent according to the narrow definition and by 6.1 percent according to the wide definition. As noted in Section 3.3, the difference between estimates derived from yearly transitions and estimates based on data of longer periods may follow from lagged effects, and pooling of incomes over years may affect incomes of wage earners and business owners differently, especially owners of small businesses who have been involved in shifting the form of the organization. However, the contribution of business ownership to mobility mainly shows that parameter estimates tend to reflect the uncertain character of income from business ownership. As for the yearly specification, the relationship to downward mobility and “staying-poor” have been calculated, and business ownership is correlated to downward mobility and “staying poor” approximately in the same manner as upward mobility and “staying rich” shown in Table 12.

Table 12. The contribution from business ownership to upward mobility and staying rich. Results for marginal effects based on pooled probit estimations for transitions between three periods: 1993–1996, 1997–2000, 2001–2003. Two definitions of owners of small businesses, quintile and decile specifications, standard errors in parentheses

	Upward mobility		Staying rich	
	Quintile specification	Decile specification	Quintile specification	Decile specification
Ownership of small business, narrow def.	0.047 (0.001)	0.031 (0.001)	0.035 (0.002)	0.045 (0.003)
Ownership of small business, wide def.	0.061 (0.001)	0.043 (0.001)	0.053 (0.002)	0.054 (0.001)
Number of observations	1,436,026	1,615,530	359,006	179,502

Summary

The objective of the present study was to discuss solutions to a measurement problem which occurs when the relationship between business ownership and income mobility is explored: as occupational boundaries between wage earners and business owners are vague, it may influence results. In particular, the introduction of a dual income tax system in 1992 accentuated this problem in the Norwegian context, by giving incentives to owners of small businesses to establish widely held firms, thereby shifting occupational status from self-employed (or other types of small businesses) to wage earner. Since Thoresen and Alstadsæter (2008) found that certain features of the dual income tax system in combination with certain features of human capital intensive businesses generated organizational shifting, generating substantial income gains for the people involved, we expected different definitions of business owner, with and without the tax-payers who shifted organizational form, to influence results.

Our main finding is that definitions do influence results. Estimations of random effects transition models for upward mobility and staying rich reveal stronger correlation between business ownership, advancement and maintenance of positions at the top of the income distribution scale (only for the decile specification) on the wide definition, which includes small businesses involved in organizational shifting. Also, the effect from business ownership is found to be stronger for transitions between longer time periods.

However, the positive relationship between business ownership and mobility should not be interpreted as implying that business owners have improved their relative positions over the time period. It mainly reflects higher income mobility of business owners, moving towards and staying at either end of the income distribution. Even though the income positions of owners of small firms are seen as more advantageous under the wide definition of income, the overall results mainly echo the uncertain character of income from small businesses.

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Appendix

Table A1. Relationship between upward mobility and business ownership. Results for marginal effects based on pooled probit estimations of yearly transitions, for two definitions of owners of small businesses. Quintile and decile specifications, standard errors in parentheses

	Quintile specification		Decile specification	
	Owners of small businesses, narrow definition	Owners of small businesses, wide definition	Owners of small businesses, narrow definition	Owners of small businesses, wide definition
Ownership of small business	0.051 (4.1×10 ⁻⁴)	0.055 (4.0×10 ⁻⁴)	0.035 (2.9×10 ⁻⁴)	0.038 (2.8×10 ⁻⁴)
Age	-3.3×10 ⁻⁴ (1.0×10 ⁻⁵)	-3.1×10 ⁻⁴ (1.0×10 ⁻⁵)	7.2×10 ⁻⁵ (9.3×10 ⁻⁶)	7.7×10 ⁻⁵ (9.1×10 ⁻⁶)
Male	0.039 (2.1×10 ⁻⁴)	0.037 (2.1×10 ⁻⁴)	0.023 (1.3×10 ⁻⁴)	0.021 (1.3×10 ⁻⁴)
Married	-0.008 (2.1×10 ⁻⁴)	-0.008 (2.0×10 ⁻⁴)	-3.6×10 ⁻⁴ (1.3×10 ⁻⁴)	-5.6×10 ⁻⁴ (1.2×10 ⁻⁴)
Dummy for children	0.018 (1.0×10 ⁻⁴)	0.018 (1.0×10 ⁻⁴)	0.007 (1.2×10 ⁻⁴)	0.006 (1.2×10 ⁻⁴)
Urban areas	0.016 (2.1×10 ⁻⁴)	0.016 (2.0×10 ⁻⁴)	0.010 (1.3×10 ⁻⁴)	0.010 (1.3×10 ⁻⁴)
Not born W-Europe, N-Amer., Oceania	-0.012 (4.7×10 ⁻⁴)	-0.012 (4.7×10 ⁻⁴)	-0.008 (2.6×10 ⁻⁴)	-0.008 (2.6×10 ⁻⁴)
Length of education	0.009 (4.2×10 ⁻⁵)	0.009 (4.2×10 ⁻⁵)	0.005 (2.4×10 ⁻⁵)	0.005 (2.5×10 ⁻⁵)
Dummies for fields of education:				
General progr.	0.007 (5.6×10 ⁻⁴)	0.007 (5.5×10 ⁻⁴)	0.007 (4.2×10 ⁻⁴)	0.007 (4.2×10 ⁻⁴)
Humanities and arts	-5.9×10 ⁻⁴ (4.7×10 ⁻⁴)	-6.9×10 ⁻⁴ (4.7×10 ⁻⁴)	0.002 (3.4×10 ⁻⁴)	0.001 (3.3×10 ⁻⁴)
Teacher training and pedagogy	-0.021 (3.3×10 ⁻⁴)	-0.021 (3.3×10 ⁻⁴)	-0.011 (2.0×10 ⁻⁴)	-0.011 (2.0×10 ⁻⁴)
Social sciences and law	-0.019 (3.5×10 ⁻⁴)	-0.019 (3.5×10 ⁻⁴)	-0.010 (2.2×10 ⁻⁴)	-0.009 (2.1×10 ⁻⁴)
Business and administration	0.008 (5.2×10 ⁻⁴)	0.008 (5.1×10 ⁻⁴)	0.008 (3.9×10 ⁻⁴)	0.008 (3.8×10 ⁻⁴)
Natural sciences	0.002 (4.7×10 ⁻⁴)	0.002 (4.6×10 ⁻⁴)	0.003 (3.2×10 ⁻⁴)	0.003 (3.2×10 ⁻⁴)
Health, welfare and sports	-0.007 (4.6×10 ⁻⁴)	-0.007 (4.6×10 ⁻⁴)	-4.4×10 ⁻⁴ (3.5×10 ⁻⁴)	-3.1×10 ⁻⁴ (3.4×10 ⁻⁴)
Primary industries	-0.009 (4.6×10 ⁻⁴)	-0.009 (4.5×10 ⁻⁴)	-0.002 (3.4×10 ⁻⁴)	-0.002 (3.3×10 ⁻⁴)
Transport and communication	0.005 (6.1×10 ⁻⁴)	0.005 (6.0×10 ⁻⁴)	0.003 (4.1×10 ⁻⁴)	0.003 (4.0×10 ⁻⁴)

Table A2. Relationship between staying rich and business ownership. Results for marginal effects based on pooled probit estimations of yearly transitions, for two definitions of owners of small businesses. Quintile and decile specifications, standard errors in parentheses

	Quintile specification		Decile specification	
	Owners of small businesses, narrow definition	Owners of small businesses, wide definition	Owners of small businesses, narrow definition	Owners of small businesses, wide definition
Ownership of small business	-0.023 (0.001)	-0.015 (0.001)	-0.008 (0.001)	-0.003 (0.001)
Age	0.002 (1.0×10^{-4})	0.004 (1.0×10^{-4})	0.004 (1.1×10^{-4})	0.004 (1.1×10^{-4})
Male	0.096 (0.001)	0.107 (0.002)	0.107 (0.002)	0.107 (0.002)
Married	0.022 (0.001)	0.041 (0.001)	0.041 (0.001)	0.041 (0.001)
Dummy for children	0.040 (0.001)	0.040 (0.001)	0.040 (0.002)	0.040 (0.002)
Urban areas	0.051 (0.001)	0.052 (0.001)	0.050 (0.001)	0.050 (0.001)
Not born W-Europe, N-Amer., Oceania	-0.084 (0.004)	-0.084 (0.004)	-0.073 (0.006)	-0.073 (0.001)
Length of education	0.024 (1.0×10^{-4})	0.024 (1.7×10^{-4})	0.024 (2.5×10^{-4})	0.024 (2.5×10^{-4})
Dummies for fields of education:				
General progr.	0.057 (0.002)	0.056 (0.002)	0.067 (0.003)	0.067 (0.003)
Humanities and arts	0.045 (0.002)	0.045 (0.002)	0.055 (0.004)	0.055 (0.004)
Teacher training and pedagogy	-0.040 (0.003)	-0.040 (0.003)	-0.030 (0.005)	-0.030 (0.005)
Social sciences and law	-0.041 (0.003)	-0.041 (0.003)	-0.007 (0.005)	-0.007 (0.005)
Business and administration	0.058 (0.002)	0.058 (0.002)	0.072 (0.003)	0.072 (0.003)
Natural sciences	0.039 (0.002)	0.039 (0.002)	0.031 (0.004)	0.032 (0.004)
Health, welfare and sports	0.051 (0.002)	0.051 (0.002)	0.075 (0.003)	0.074 (0.004)
Primary industries	0.012 (0.003)	0.012 (0.003)	0.036 (0.004)	0.034 (0.004)
Transport and communication	0.014 (0.002)	0.014 (0.002)	0.007 (0.004)	0.006 (0.004)

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